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Contents

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Editorial Note

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This issue, Journal of No 1 Volume IX, June 2017 provides a range of approaches towards regional macro-economic issues covering a wide area of scientific and research interest, promoting an in depth understanding of these topics, promoting, motivating, and supporting every interested scholar and reader, particularly within the current financial and economic environment, based on selected papers a wide range on modern topics, such as:

- Output, growth, and convergence in a creative region: an analysis of measurement issues of the coefficients of a related cross-region growth regression.
- Moving regional economic policy modernization, providing rationale for the systems basis for organizational and deblocking mechanisms of a discrete regional modernization process.
- Payment technologies and money demand as evidence from dynamic panel on banking system and the total effect of these innovations on money demand and financial innovation.
- Inter-jurisdictional competition for sales tax revenues: a natural experiment of destination retail outlets as an increasingly popular development strategy.
- Cable and pipeline corridors under the legal framework of unclos end the energy treaty. Geopolitical considerations at the eastern Mediterranean sea
- Cities and enhancement of their historic centre and heritage: educational communities' and visitors' perspectives, conceptualising cities' educational, cultural and urban/regional/transnational development aspects.
- Indicators and a mechanism to ensure economic security of the regions as one of the most important components of national security of the state.
- Regional strategies for dealing with structural change, increasingly intended to strengthen the innovative and technology capacity of regions in European periphery.
- Relationship between greenspace agreement, external diseconomy and residents' risk assessment as an effective method to promote the conservation and creation of greenspace.
- Uncoverd interest parity puzzle (uip): evidence from major currencies, highlighting the weak relationship between exchange rates and interest rates.
- Regional inequalities and effects of fiscal consolidation, exploring the impact of fiscal consolidation on regional inequalities on national levels among 13 EU member countries for period 1995-2009.
- Migration and its causes in Monchengladbach – a city for living and working, providing a high quality of life and work for citizens and employees in a specified location.
- Unemployment rate growth model in the euro area
- Methodological aspects of construction of the dynamic model for the development of the institutional environment of the innovative multiclusters, allowing to monitor the effectiveness of the regional cluster policy over the long term.

- Determinants of inclusive growth in Iranian regions (sure approach in panel data) in order to investigate the relationship between income inequality and GDP growth in Iranian provinces over the period of 2000-2014.
- Effects of financial innovation on the demand for money in Malaysia using the ARDL approach to cointergration, investigating how money demand function plays a vital role in monetary policy formulation.
- Economic contagion under uncertainty: CGE with a Monte Carlo experiment, quantitatively investigating how economic shocks of a certain country influence a different country.

The Journal wants to thank each one and all of the contributors and share the belief of this issue being a platform aiming to enable readers to develop an understanding of current best-practice and evidence-based approaches.

On behalf of the Editorial Board

Associate Professor Dr. Aikaterini Kokkinou,

Articles

OUTPUT, GROWTH, AND CONVERGENCE IN A GREATIVE REGION: AN ANALYSIS OF SOME MEASUREMENT ISSUES [1]

Amitrajeet A. BATABYAL
Department of Economics, Rochester Institute of Technology, 92 Lomb Memorial Drive, Rochester, NY 14623-5604, USA.
aabgsh@rit.edu

Abstract

We study some measurement issues that arise when analyzing the long run behavior of the jth creative region's time t log output per creative class member $(y_j(t))$ when this region is part of an aggregate economy of $j = 1, \ldots, N$ creative regions. We focus first (second) on absolute (relative) convergence. In the absolute (relative) convergence case, the N creative regions are similar (dissimilar) in that they all have the same (different) balanced growth path (BGP) level of log output per creative class member denoted by y^{BGP} (y_j^{BGP}). In the absolute convergence case, we analyze how to estimate the speed of convergence parameter (σ) and then discuss the relationship between the variance of $y_j(t)$ and that of $y_j(0)$. In the relative convergence case, we study the error associated with estimating σ using the methodology of the absolute convergence case. Finally, suppose $y_j^{BGP} = a + bX_j$ where X_j is an explanatory variable such as creative capital and a and b are positive constants. Here, we study how to estimate b from our knowledge of the coefficients of a related cross-region growth regression.

Keywords: Convergence, Creative Capital, Economic Growth, Measurement, Output
JEL classification: R11, C18

1. Introduction

1.1. Preliminaries and objective

In the regional science and urban economics literatures, much has now been written about the notion of creativity in general and about creative regions in particular. This state of affairs is primarily due to the work of Richard Florida[2] who has popularized the twin notions of the *creative class* and *creative capital*. Florida (2002, p. 68) helpfully explains that the creative class "consists of people who add economic value through their creativity." This class is made up of professionals such as doctors, lawyers, scientists, engineers, university professors, and, notably, bohemians such as artists, musicians, and sculptors. From the standpoint of regional economic growth, these people are significant because they possess creative capital which is the "intrinsically human ability to create new ideas, new technologies, new business models, new cultural forms, and whole new industries that really [matter]" (Florida, 2005a, p. 32).

As noted by Florida (2005b), the creative class deserves to be studied in detail because this group gives rise to ideas, information, and technology, outputs that collectively promote a region's economic growth. Therefore, in this era of globalization, cities and regions that want to be successful need to do all they can to attract and retain members of the creative class because this class is markedly responsible not only for a region's economic growth but, more generally, for its welfare as well.

In their own ways, several researchers have now pointed to a connection between a region's output or income and the activities of this region's creative class. For instance, Markusen *et al.* (2008) focus on the Boston area and point to the importance of the size of the

[1] Batabyal acknowledges financial support from the Gosnell endowment at RIT. The usual disclaimer applies.
[2] See Florida (2002, 2005a) and Florida *et al.* (2008).

creative economy in formulating sound cultural policy and in forming creative regions. Waitt and Gibson (2009) concentrate on Wollongong in Australia and show that if one is to comprehend the surprising ways in which urban regeneration occurs then it is necessary to first conceptualize the pertinent creative economy qualitatively in place. Currid-Halkett and Stolarick (2013) ask whether the creative class generates economic growth and show that although creativity matters in general, different sub-groups within the creative class have differential impacts on unemployment and growth.

Lee (2014) focuses on different regions in the United Kingdom and shows that creative industries drive both wage and employment growth in other sectors. Correia and Costa (2014) analyze the connection between creativity and economic growth in European Union member states by evaluating the relative performance of alternate indices of creativity. Porter and Batabyal (2016) study a model with two regions and show how to decompose the difference in the logarithm of the output of the knowledge good per raw creative capital unit between the two regions into the contributions of education and that of all other factors.

The papers discussed in the preceding two paragraphs have certainly advanced our understanding of the link between the activities of the creative class in a region and economic growth in this same region. However, to the best of our knowledge, the existing literature has *not* studied some measurement issues that arise when analyzing the long run behavior of the jth creative region's time t log output per creative class member $(y_j(t))$ when this region is part of an aggregate economy of $j = 1, \ldots, N$ creative regions. These measurement issues arise because of our interest in determining the *speed* at which $y_j(t)$ converges to its long run value and from the fact that there are two *different* ways in which we can study the question of long run output convergence in a creative region. Given this lacuna in the literature, our objective in the present paper is to shed light on these measurement issues. We now discuss these measurement issues in greater detail.

1.2. The measurement issues

Consider a stylized, infinite horizon region j that is part of an aggregate economy of $j = 1, \ldots, N$ regions. These N regions are all creative in the sense of Richard Florida. This means that they all possess a vibrant creative class and that the individual members of the creative class possess creative capital. Hence, we can think of each creative class member as a creative capital unit. In the remainder of this paper, we shall treat these creative capital units as essential inputs into a production process that results in the output of a knowledge good such as a smartphone. Let $y_j(t)$ denote the log output of this knowledge good per creative capital unit at any time t.

We first consider the case of *absolute* convergence. In this case, the long run or balanced growth path (BGP) level of log output of the knowledge good per creative capital unit in the jth region is y^{BGP} and this value is the *same* in all the N regions under consideration. In addition, the evolution of $y_j(t)$ over time is described by the differential equation

$$\frac{dy_j(t)}{dt} = \dot{y}_j(t) = -\sigma\{y_j(t) - y^{BGP}\}, \tag{1}$$

where σ is the speed of convergence parameter. There are now two measurement issues to contend with. First, we want to estimate the speed of convergence parameter σ as accurately as possible. Second, we would like to characterize the relationship between the variance of $y_j(t)$ and that of $y_j(0)$.

Moving on to the case of *relative* convergence, the BGP level of log output of the knowledge good per creative capital unit in the jth region is y_j^{BGP} and this value is *different*

in all the N regions under consideration. Moreover, the evolution of $y_j(t)$ over time is now described by the differential equation[3]

$$\frac{dy_j(t)}{dt} = \dot{y}_j(t) = -\sigma\{y_j(t) - y_j^{BGP}\}. \quad (2)$$

The two measurement issues that we study in this case are the following. First, we want to delineate the nature of the error stemming from our estimation of σ using the methodology for the absolute convergence case. Second, suppose that the BGP value of $y_j(t)$ or y_j^{BGP} can be described by the linear relationship $y_j^{BGP} = a + bX_j$ where X_j is an explanatory variable such as creative capital and a and b are positive constants. Here, we want to estimate b from our knowledge of the coefficients of a related cross-region growth regression that is described in greater detail in section 3.3 below.

With this introductory discussion of the measurement issues out of the way, we can now say that the remainder of this note is organized as follows. Sections 2 and 3, respectively, focus on the case of absolute and relative convergence. Specifically, section 2.1 derives a linear relationship satisfied by $y_j(t)$. Section 2.2 provides an estimate of σ. Section 2.3 specifies the relationship between the variance of $y_j(t)$ and that of $y_j(0)$. Section 3.1 derives a new linear relationship satisfied by $y_j(t)$. Section 3.2 stipulates the error involved in estimating σ using the methodology of section 2.2. Section 3.3 discusses the estimation of the coefficient b from our knowledge of the coefficients of a particular cross-region growth regression. Section 4 concludes and then offers two suggestions for extending the research delineated in this paper.

2. Absolute Convergence

2.1. The linear relationship

Our task now is to describe $y_j(t)$ as a linear function of the explanatory variables $y_j(0), y^{BGP}, \sigma,$ and time t. Given equation (1) and the fact that y^{BGP} is a constant, it is clear that the time derivative of $y_j(t)$ is the same as the time derivative of $y_j(t) - y^{BGP}$. Therefore, we can rewrite equation (1) as

$$\frac{d\{y_j(t) - y^{BGP}\}}{dt} = -\sigma\{y_j(t) - y^{BGP}\}. \quad (3)$$

Inspecting equation (3), it is straightforward to confirm that the quantity $y_j(t) - y^{BGP}$ is growing over time at rate $-\sigma$. This finding allows us to infer that

$$y_j(t) - y^{BGP} = e^{-\sigma t}\{y_j(0) - y^{BGP}\}. \quad (4)$$

Isolating $y_j(t)$ on the left-hand-side (LHS), equation (4) can be rewritten as

$$y_j(t) = (1 - e^{-\sigma t})y^{BGP} + e^{-\sigma t}y_j(0). \quad (5)$$

[3] In the macroeconomics literature, the notions of absolute and relative convergence are sometimes referred to as unconditional and conditional convergence. See Romer (2012, pp. 178-188) for additional details.

Equation (5) gives us the linear relationship satisfied by $y_j(t)$ that we seek. We now use this particular relationship to show how we might provide an estimate of the speed of convergence parameter σ.

2.2. Estimating the speed of convergence

As a prelude to estimating σ, suppose that the true relationship satisfied by $y_j(t)$ is the right-hand-side (RHS) of equation (5) plus a random component $(z_j(t))$ that has zero mean and is uncorrelated with $y_j(0)$. Then, we have

$$y_j(t) = (1 - e^{-\sigma t})y^{BGP} + e^{-\sigma t}y_j(0) + z_j(t). \tag{6}$$

Now, in the process of estimating σ, suppose we run a cross-region growth regression of the form

$$y_j(t) - y_j(0) = \alpha + \beta y_j(0) + \epsilon_j, \tag{7}$$

where α and β are positive constants and the error term ϵ_j has the standard statistical properties.

To provide an estimate of σ, we shall first have to determine the relationship between β and σ. We know from standard econometrics---see Kelejian and Oates (1981, p. 56)---that the coefficient β in equation (7) can be expressed as

$$\beta = \frac{Cov\{y_j(t) - y_j(0), y_j(0)\}}{Var\{y_j(0)\}}, \tag{8}$$

where $Cov(\cdot,\cdot)$ is the covariance function and $Var(\cdot)$ is the variance function. Now, using standard formulae for the covariance and the variance of random variables---see Ross (2003, pp. 53-61)---we can simplify the RHS of equation (8). This tells us that

$$\beta = \frac{Cov\{y_j(t), y_j(0)\}}{Var\{y_j(0)\}} - 1. \tag{9}$$

Using equation (6), the numerator in the fraction on the RHS of equation (9) can be simplified to

$$Cov\{y_j(t), y_j(0)\} = Cov\{(1 - e^{-\sigma t})y^{BGP} + e^{-\sigma t}y_j(0) + z_j(t), y_j(0)\}. \tag{10}$$

Now recall that y^{BGP} is a constant and that $y_j(0)$ and $z_j(t)$ are assumed to be uncorrelated. Using these two pieces of information, we can simplify the RHS of equation (10). This yields $Cov\{y_j(t), y_j(0)\} = e^{-\sigma t}Var\{y_j(0)\}$. Substituting this last finding in equation (9), we get

$$\beta = \frac{e^{-\sigma t}Var\{y_j(0)\}}{Var\{y_j(0)\}} - 1 = e^{-\sigma t} - 1. \tag{11}$$

Simplifying the RHS of equation (11) by taking the natural logarithm, we get

$$\sigma = -\frac{\ln(1+\beta)}{t}. \tag{12}$$

Equation (12) gives us the answer to a measurement issue in the absolute convergence case that we are studying presently. Specifically, we see that once we run the cross-region growth regression described in equation (7), we have an estimate of β. Given this estimate of β, we can then use equation (12) to provide us with an accurate estimate of the speed of convergence parameter σ. From equations (7) and (12), we see that as the marginal impact of a change in the initial time log output of the knowledge good per creative capital unit on the corresponding time t log output *rises* or, equivalently, as *rises*, the speed with which the jth creative region's time t log output converges to its BGP level *falls*. We now proceed to study the relationship between the variance of $y_j(t)$ and that of $y_j(0)$.

2.3. Relationship between two variances

From equation (6), we can derive the variance of $y_j(t)$. We get

$$Var\{y_j(t)\} = e^{-2\sigma t} Var\{y_j(0)\} + Var\{z_j(t)\}. \tag{13}$$

Now first consider the case where β in equation (7) is negative. This means that creative regions that are wealthier on average grow *less* than creative regions that are poorer on average. From equation (12), we see that $\beta < 0$ implies that the speed of convergence parameter or $\sigma > 0$. What does this mean for the variances of $y_j(t)$ and $y_j(0)$? We would like to have a situation where $Var\{y_j(t)\} < Var\{y_j(0)\}$. This would mean that the cross-region variance of log output per creative capital unit is *declining*. However, this inequality between the two variances does *not* have to hold. This is because of the variance of the random component of log output denoted by $Var\{z_j(t)\}$ in equation (13). In other words, when β is negative or when σ is positive we have a scenario in which the dispersion of log output is attenuated. However, this attenuation *can* be counteracted by the random component of log output which tends to *increase* the dispersion of log output.

Next, let us consider what happens when β in equation (7) is positive. This condition tells us that creative regions that are wealthier on average grow *more* than creative regions that are poorer on average. Since this case is the opposite of the case discussed in the preceding paragraph, we now have $\sigma < 0$. In addition, we also have $Var\{y_j(t)\} > Var\{y_j(0)\}$. Put differently, the upshot of $\beta > 0$ or $\sigma < 0$ is to *increase* the dispersion of log output and this effect tends to *strengthen* the effect of the random component in equation (13) which also tends to *increase* the dispersion of log output. This completes our discussion of measurement issues in the absolute convergence case. We now analyze some measurement issues in the case where convergence is relative.

3. Relative Convergence

3.1. The linear relationship

Our first task is to derive a linear relationship between $y_j(t)$ and the explanatory variables $y_j(0), X_j, \sigma$, and time t. Now, note that given equation (2) and the fact that $y^{BGP} = a + bX_j$ is constant or time invariant, an analysis similar to that employed in section 2.1---see equation (5) in particular---tells us that

$$y_j(t) = (1 - e^{-\sigma t})(a + bX_j) + e^{-\sigma t} y_j(0). \tag{14}$$

Equation (14) gives us the linear relationship satisfied by $y_j(t)$ that we seek. We now use this relationship to delineate the error involved in estimating the speed of convergence parameter σ using the methodology of section 2.2.

3.2. Deducing the speed of convergence

Suppose that $y_j(0) = y_j^{BGP} + z_j$, where z_j is a mean zero random component as in section 2.2. In addition, $y_j(t)$ is given by equation (14) plus a mean zero random term ε_j and we assume that X_j, z_j, and ε_j are uncorrelated with each other. Suppose we run a cross-region growth regression of the form

$$y_j(t) - y_j(0) = \alpha + \beta y_j(0) + \epsilon_j. \tag{15}$$

where the error component ϵ_j has, as in section 2.2, the standard statistical properties. What we want to know now is the magnitude of the error we would make if we deduce the value of σ from our estimate of β in equation (11).

To determine this magnitude and for comparative purposes, let us first compute the estimate of β implied by the model of this section in which convergence is relative and not absolute. Using equation (15) and the methodology employed in section 2.2, once again, we get

$$\beta = \frac{Cov\{y_j(t), y_j(0)\}}{Var\{y_j(0)\}} - 1. \tag{16}$$

The numerator in the ratio on the RHS of equation (16) can be simplified because we have

$$Cov\{y_j(t), y_j(0)\} = (1 - e^{-\sigma t})Cov\{y_j^{BGP}, y_j(0)\} + e^{-\sigma t}Var\{y_j(0)\}. \tag{17}$$

Because $y_j(0) = y_j^{BGP} + z_j = a + bX_j + z_j$, we can tell that

$$Var\{y_j(0)\} = b^2 Var\{X_j\} + Var\{z_j\} \tag{18}$$

and, because X_j and z_j are assumed to be uncorrelated, we also get

$$Cov\{y_j^{BGP}, y_j(0)\} = Cov\{a + bX_j, a + bX_j + z_j\} = b^2 Var\{X_j\}. \tag{19}$$

Now, substituting equations (18) and (19) into equation (17) and then simplifying, we get

$$Cov\{y_j(t), y_j(0)\} = b^2 Var\{X_j\} + e^{-\sigma t}Var\{z_j\}. \tag{20}$$

Using equations (18) and (20) to simplify equation (16), we get

$$\beta = \frac{-(1 - e^{-\sigma t})Var\{z_j\}}{b^2 Var\{X_j\} + Var\{z_j\}}. \tag{21}$$

We are now in a position to use equation (21) to solve for the speed of convergence parameter σ explicitly. Isolating the term $e^{-\sigma t}$ and then taking the natural logarithm of both sides of the resulting expression gives us

$$\sigma = -\frac{\ln\left[\left\{\frac{b^2 Var\{X_j\} + Var\{z_j\}}{Var\{z_j\}}\right\}\beta + 1\right]}{t} \qquad (22)$$

Inspecting equation (22), observe that the ratio in the curly brackets on the RHS or $\left(b^2 Var\{X_j\} + Var\{z_j\}\right)/\left(Var\{z_j\}\right) > 1.$

This last piece of information and some thought together tell us that if we were to use equation (11) or (12) from section 2 on absolute convergence to deduce σ in the case of relative convergence then this action would result in our estimating a value for this speed of convergence parameter that is *too small* in absolute value. In other words, as long as $\sigma > 0,$ using the section 2 methodology to estimate σ would result in an *underestimate* of the true speed of convergence. We now proceed to our last task in this paper and that is to estimate the coefficient b in the relationship $y_j^{BGP} = a + bX_j$ from our knowledge of the coefficients of a particular cross-region growth regression.

3.3. Estimating the coefficient of a BGP relationship

Suppose we run a cross-region growth regression of the form

$$y_j(t) - y_j(0) = \alpha + \beta y_j(0) + \delta X_j + \epsilon_j. \qquad (23)$$

where the error component ϵ_j has the standard statistical properties. Our specific goal in this section is to come up with an estimate of the coefficient b from our knowledge of $\alpha, \beta,$ and $\delta.$ Using equation (14), the fact that $y_j^{BGP} = a + bX_j,$ and the assumptions in section 3.2, we deduce that

$$y_j(t) = \left(1 - e^{-\sigma t}\right)y_j^{BGP} + e^{-\sigma t}y_j(0) + \varepsilon_j. \qquad (24)$$

Subtracting $y_j(0)$ from the LHS and the RHS of equation (24) and then substituting $y_j(0) = y_j^{BGP} + z_j$ into the resulting equation gives us

$$y_j(t) - y_j(0) = \left(e^{-\sigma t} - 1\right)z_j + \varepsilon_j. \qquad (25)$$

Let $\Omega \equiv \left(e^{-\sigma t} - 1\right).$ Then we note that the cross-region growth regression given by equation (23) is equivalent to projecting the term on a constant, $y_j(0),$ and X_j and it is understood that the random error term ε_j is uncorrelated with the just mentioned RHS variables. We can now rearrange the equation $y_j(0) = a + bX_j + z_j$ to solve for $z_j.$ We get

$$z_j = -a - bX_j + y_j(0). \qquad (26)$$

Multiplying both sides of equation (26) by Δ we get

$$\Delta Z_j = -\Delta\alpha - \Delta b X_j + \Delta y_j(0) \qquad (27)$$

Inspecting equations (23) and (27), we see that the estimate of β in (23) provides us with an estimate of Δ in (27) and, similarly, the estimate of δ in (23) provides us with an estimate of

-Δb in (27). With these two pieces of information in hand, we infer that our estimate of b is the negative of the estimate of δ divided by the estimate of β. In symbols, we have

$$b = -\frac{\delta}{\beta} = -\frac{\Delta b}{\Delta} . \qquad (28)$$

Equation (28) provides us with the answer to the central question of this section. This also concludes our analysis of output, economic growth, and absolute and relative convergence in a creative region.

4. Conclusions

In this paper, we studied some measurement issues that arose in the context of the long run behavior of the jth creative region's time t log output per creative class member $(y_j(t))$ when this region was part of an aggregate economy of $j = 1, \ldots, N$ creative regions. We concentrated first (second) on absolute (relative) convergence. In the absolute (relative) convergence case, the N creative regions were similar (dissimilar) in that they all had the same (different) BGP level of log output per creative class member denoted by y^{BGP} (y_j^{BGP}). In the absolute convergence case, we analyzed how to estimate the speed of convergence parameter (σ) and then discussed the relationship between the variance of $y_j(t)$ and that of $y_j(0)$. In the relative convergence case, we studied the error associated with estimating σ using the methodology of the absolute convergence case. Finally, we supposed that $y_j^{BGP} = a + bX_j$ where X_j was an explanatory variable such as creative capital and a and b were positive constants. Here, we studied how to estimate b from our knowledge of the coefficients of a related cross-region growth regression.

The analysis in this paper can be extended in a number of different directions. Here are two suggestions for extending the research described here. First, it would be useful to explicitly allow for economic *interactions* between the N creative regions and to then conduct a convergence analysis of the sort carried out in this paper. Second, it would also be instructive to study in greater detail the extent to which differences in the growth rates of, for instance, log output between different creative regions are dependent on their *initial* positions relative to their balanced growth paths (BGPs). Studies that incorporate these aspects of the problem into the analysis will increase our understanding of the nexuses between a creative region's economic interactions and its initial position on the one hand and its log run economic growth prospects on the other.

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MOVING REGIONAL ECONOMIC POLICY MODERNIZATION AHEAD: SYSTEMS BASIS FOR ORGANIZATIONAL AND DEBLOCKING MECHANISMS IN PRESENT-DAY UKRAINE

Igor DUNAYEV
PhD in PA, associate professor, post-doctoral fellow, Kharkiv regional institute of public administration of the National academy of public administration by the President of Ukraine
Igor.dunayev@gmail.com

Abstract

The paper objective is to provide rationale for the systems basis for organizational and deblocking mechanisms of a discrete regional modernization process. Basing on methodology of systems analysis, the paper offers an author's conceptualization of a systemic regional economic policy modernization in the present-day Ukraine. The author's original contribution is his profound idea of the modernization process being discrete, non-linear, and following a changeable trajectory. These properties of the system have influenced considerably the interpretation and revaluation of the current state of the modernization process and its "tension lines". Starting out from the properties of "system material" and the author's general concept of the regional economic policy modernization in Ukraine, the paper identifies two actual mechanisms for ensuring stability of a desired modernization trajectory – a mechanism of modernization process organization, and a mechanism deblocking the process of modernization. For each of them, the reasons for existence and "tension lines" are determined and rationalized. Finally, an important conclusion is drawn that the proposed logic of analyzing the mechanisms to support regional modernization can be applied both in Ukraine and in other counties, providing a way to purposefully affect the procedure and structure of governance mechanisms in accordance with the set priorities.

Keywords: regional economic policy, systems approach, mechanisms, Ukrainian modernization

JEL classification: O38, R58, R50

1. Introduction

Problems of renewal of sub-national economic policy have become the object of economic and regional studies relatively lately after shifting beyond the pertinent scope of the national governments. The vast majority of these papers were presented since early 1980s. Most of them were caused by rapid economic and political development inside the EU as well as growing globalization and competition between countries, major cities and odd regions. Rethinking a new role for regions as well as levels of economic and spatial organization of supranational entities has caused new scientific theories (Markusen, 1996; Sapir et. al., 2004; Worldbank, 2009), numerous academic discussions between teams from reputable organizations (Barca, 2009; CAF, 2010; OECD, 2009 and others) and certainly generated some whole new generations of regional and investment policies in the countries and economic blocks (like EU and MERCOSUR). The most common mainstream in such research can be fit in a logical chain "from a macro-stability - towards regional development alignment - towards disclosure of unused regions' potential". Eventually, a sub-regional-level policy is began to be increasingly considered beyond a national "fairway" absorbing the expectations for greater, increasing regional subjectivity (Pike, 2006; McCann, 2008), and the official motto "Europe of Regions" is so fine confirmation for this.

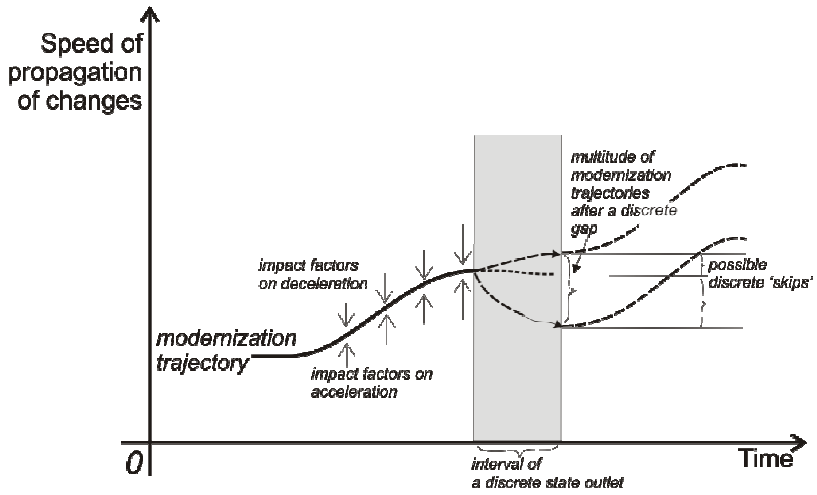
But modern challenges faced by the most of countries on the European continent - from the ultra-right rhetoric and the Brexit to Asian migrants and painful renewal of all the public institutions in modern Ukraine and Georgia – indicate that the old habitual recipes are likely be ineffective again and again. I think, now it's time to look into how to ensure succession and steadiness of advance towards desirable changes, to reconsider a structure of the governmental and sub-national (regional) policy as a very complicated system of numerous relationships inclined to persistent changes.

One of possible answers to this is to look at policy modernization as on a discrete, intermittent process of generating new systems capable to more definitely move along a given trajectory.

Clearly, any development is an interruption of a steady state due to emergence of new phenomena, disturbance of a static equilibrium. Since modernization brings about social conflict between traditions and innovations, it can be regarded not as a linear process, but as a discrete one. Thus, modernization preconditions "a situation of unsteady equilibrium i.e. a sort of balance of forces of its supporters and opponents" (Medushevskyi, 2014 : 11) giving rise to a "reformer dilemma", which determines an optimal development of social processes.

The dialectics of modernization changes with regard to its discreteness allows a more profound understanding of modernization processes abstract structure. At the moment of the "unsteady equilibrium" destabilization, that is misbalance of influencing forces, a modernization trajectory is shifted along the propagation velocity axis. It is the point, prior to which endogenous contradictions between factors of different states – figuratively speaking "traditional" and "new" – are to manifest themselves most particularly (Image 1). In its turn, the process of a discrete change of the system states is affected by a change of "dominating generations" (Maievskyi, 2011), or predominant combinations of factors (technologies, cultures).

Image 1 : Discreteness in an abstract modernization process



Source: the authoring

Practically all the developing countries, in order to save time and extremely scarce political and financial resources, engage in "catch-up modernizations". These do not appear as evolutionary processes, but rather as "destruction of trends established in the course of institutional and technological changes" (Martynov, 2010 : 21). It means that modernization of this kind is characterized by mostly discrete shifts, also followed by knowingly discrete and controlled adaptation changes of institutions, including political ones. That is to say, we discern at least two manifestations of discreteness that may be asynchronous, which adds risk to public administration. However the key point is that both of them manifest a controlled discrete process.

Definition of key notions

Before proceeding to discussion of the conceptual issues, it is necessary to define the key specific notions,

– by modernization, a "growing capacity for social transformations" (Roxborough, 1998) is meant;

– by a regional economic policy, we mean a socio-economic policy of multilevel development of a region and its territorial communities, which includes a system of integrated and coordinated plans and actions of local development subjects, aimed to reduce internal economic inefficiency and social inequality;

– by regional economic policy modernization, we mean “qualitative controlled social transformations of complex administrative and economic relations at the regional and interregional levels that manifest themselves in a different way depending on the system of values and priorities under specific historical conditions” (Dunayev, 2015 : 19).

2. Methodology

In this paper, a methodological research chain will embrace a logical passing along two working hypotheses.

Hypothesis 1. On the sub-national level, a public relations modernization provides a transition from a stable, regular development of the project towards development and dissemination of values and sustainable balance between the interests of the local community, the state and local business. A messaging with clear reasoning along this assumption would allow moving to the next, purely managerial assumption.

Hypothesis 2. A transition mentioned above in the first hypothesis, needs some specific management mechanisms, namely some mechanisms for organization of modernization processes. What is their specificity, and what their administrative nature? The point is a comprehensive vision of sub-national governance inevitably meets with at least two fundamental questions of "what are their purpose and objectives?", and "what does prevent to do it as before?". Obviously, maintaining a current status-quo is cheaper and easier in terms of political capital and of ability to simulate reform by ruling power... However I think that the answer is, first, in a historical moment when the Ukrainian regions have got opportunity to reform their small "economic universe" and, secondly, in accumulated "clots" in "vessels" of social relations. It's like crucial "tension lines" that defines a special nature of those ways of governance at the sub-regional level.

Unveiling it determines a methodological logic of this paper.

An apparent complication to research it along the first hypothesis needs some additional methodological refinements. It is concluded in three important methodological areas.

Firstly, the properties of discrete processes are the starting point. So, the cybernetics theory shows that, based on a “possibility of changing process control strategies” criteria, discrete processes are subdivided into controlled and uncontrolled ones; based on predictability of process behavior, into stochastic (probable) and determinate; and by process flow time, into unlimited, time-limited, and instantaneous. Hence, an ideal task of the process of administrative relations modernization is maintaining its controlled nature, determinateness, and time-limitation.

Secondly, a theoretical projection of similar processes on time-boundless renewing the way of public-administrative organization makes the systems approach application feasible.

Along with the proliferation of systems analysis to solve applied problems and to establish somehow a kind of standardization of procedures to implement it, now there is a variety of methodological approaches to run this analysis that is reflected in two main approaches, namely, the "systems approach" and the "management approach". In general, their distinction is in emphasis to study: the first one focuses on processes into an object of management (Chelleri et al., 2015; Fiksel, 2006; Arnold & Wade, 2015; Pearson & Pearson, 2014), the second distinction focuses on the way of organization in a subject, in a regulator (Pollitt, 1990; Cendon, 2000; Holmes & Shand, 1995; Lopez-Portillo et al., 2016). A choice in favor of a proper approach depends on a distinction in regulating procedures, as long as the "systems approach" determines a systematic design of an object, but the "management approach" stipulates for a systematic design of a way of management implementation, that then will acquire its expression in specific methods and tools of analysis and mechanisms of public administration. Notably, the various approaches have their drawbacks. In particular, the systems approach requires special tools and subjectivity-oriented procedures when setting the aims and when determining difference between natural (evolution) and technical (development). And vice-versa, the management approach requires deployment of special procedures to formalize long-term planning and to eliminate excessive subjectivity in decision making. And avoiding these shortcomings is very actual task for governance in terms of transformation processes in Ukraine. This paper will be based on the "systems approach"

because of it's needed to keep a right focal point on regional (sub-national) governance instead of micro-level of an organizations or institution.

In the recent years, the systems approach has become almost a universal requirement to researching any sort of problems. The general theory of systems analysis gives an apt answer to this by explaining the properties of a system:

a) a system is integral, all its elements being interrelated and united;

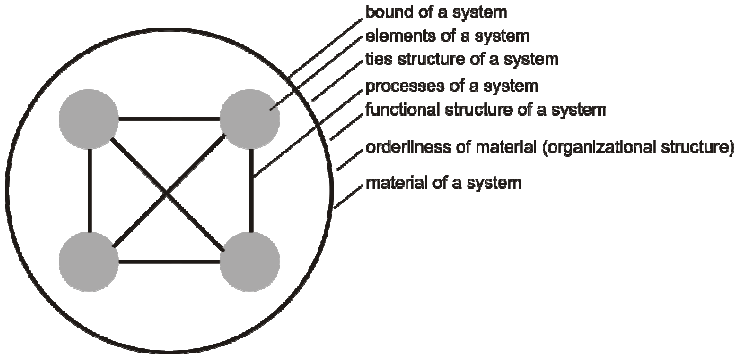
b) a system is divisible, discrete and can be subdivided into homogeneous and heterogeneous elements;

c) a system is multiple, since the state and behavior of any of its parts are unique, and a mere totality of its components does not describe its general quality.

Applying the systems approach to study of regional modernization processes in sub-national policies, some authors (Sukhodolia, 2005; Shchedrovitsky, 2003; Maddens & Swenden; Hooghe et. al, 2010) indicate a need to reconsider the factors of subjectivity and process dynamics. It's possible by distinguishing opportunities to regulate them (e.g., regulating the processes on their directions, intensity as well as parameters) and by fostering them (using object's own volition to "move spontaneously") (Hooghe & Marks, 2016; Burgess, 2006). Notably, the "governance" is run in full subordination of an object to a subject (organizational and administrative subordination, legal regulation of activity) and the "management" covers "own initiative" of a controlled object and should consider its aims and incentives. That's why the mechanisms of governance in modernizing sub-national economic policy should include legal regulatory tools and incentives (management) to improve the efficiency, flexibility and integrity of a sub-national economy.

For the present paper, the systems analysis methodology of G. Shchedrovitsky is chosen as the basic "systems approach" methodology to imply and to enable more clearly the process, structural, and functional components of systems analysis (Shchedrovitsky, 1982, 2003) (Image 2). This selected approach involves description of a managed object as a system through its components: bounds of a system, elements of a system, processes of a system, ties structure of a system, functional structure of a system, organizational structure (orderliness of material), and material of a system

Image 2: A model of systems representation of a controlled object (by Shchedrovitsky's methodology)



Finally, the third point is the peculiarities of tracking the wishful transitions along different statuses. There are two core assumptions:

1) *Tracking trajectory along conventional statuses*. There is a complicated dialectical tie between administrative institutions development and social relations development (e.g., in local communities). The administrative institutions development is a reflection of society, is a source for organizational strategic development, as well as it's believed as an additional management task. Applying an analogy with the social "roles-statuses," that are commonly used in sociology (Katz, 1973, Masolo, 2004) and in behavioral leadership (Vroom, 1984; Fielder, 1967; Hollander, 2009; Avdeev, 2016), we would then more clearly describe a discrete modernization transit for the purposes of sub-national governance. A particular link with a "stuff" and a "structure" of a system, that are proposed by some methodologists of system analysis theory, is playing an important role here. And it is logically connected with a following assumption.

2) *A discrete alternation of internal processes*. Its' known, that a discreteness is expressed in alternation of internal system processes of evolution (emancipation) and transformation

(qualitative jump of a system). It is associated with the phasing characteristic: it is irreversible and consistent, that is it's impossible to "jump over" a separate development stage but it's possible to dip it "below." Each next stage has its more complicated and differentiated structure where previous qualities can be displayed (a "layered model"). A new stage has a new dominant subsystem stipulating newer reordering in relations within a system. Each stage is characterized by its unique structure and condition, by its essential elements, by a development strategy and by a dominance of cultural, social or technical-instrumental subsystems. A regional evolutionary development and its policy is possible only when the local elites, individuals, pressure groups and all organizational units are in a constant process of learning, of perception the new.

3. Results

Using the George Schedrovitsky's methodology, a detailing the components of regional economic policy that is essentially modernized, has yielded some results as below.

Decomposition of policy modernization according to systems analysis elements

System Bounds. The bounds of a system can be varied dependently on a management entity's choice and its capability (or desire) to influence the selected objects entirely (Ackoff, 2004). Unlike operational management, when a managed object is predetermined and provisionally unchanged, a policy modernization requires revision and readjusting of its object (referring to a discreteness property). During a quondam plan-based economy, a productive industry acted as an object of development management. Nowadays on a background of a three adjoining reforms kick-off in Ukraine – the administrative-territorial system reform, the local governance reform, and the state regional policy reform – modernization of regional economic policy assumes a truly new quality of a combined economic, spatial, and governance development. Here, the authorized persons of governance subjects fall into an inertness "trap" of regional approach. The thinking of regional authorities, naturally, tends to cover the administrative boundaries of their region, since those boundaries delineate their area of responsibility. The assumed powers and thinking within their constraints block a farsighted strategic perspective and project activity at the macro- and interregional levels at least because any idea of cooperation between regions or their parts is usually rejected in view of a "natural effort" to avoid an excessive complexity. Yet, large investors are always attracted by an open scope for market coverage and large scale. Instead of a true socio-economic and socio-cultural polycentric zoning, the Ukrainian regional state administrations and regional councils (local parliaments) still tend to recognize a formal administrative and physical-geographical territorial zoning, which is very loosely correlated with economic structuring. Lastly, region-bound thinking is not inclined to create incentives for networking and cooperation with other regions, administrative districts, or consolidated communities, for a common "pyramidal" structure of management and statistical recording does not regard other structures as a norm.

At the level at least equal to that of a regional center or a big interregional center (e.g. the biggest Ukrainian cities as Kharkiv, Dnipro, Odessa, Lviv, Donetsk as potential prototypes like the EU NUTS-1 macro-regions), it is possible to redesign the "viewing system", since it is here that opportunities for networking and cooperation of resources, localized in different regions, become noticeable. After all, it is from here that the problem range of trans-border cooperation can be seen with a fair degree of detalization – compared to a discerning perspective that emphasizes capital cities. The task of forming new institutions of economic and spatial development, in the first place those of territorial planning, has been provided for in the vertical structure of public authority, and built in the regional governance frame by the State Strategy of Regional Development up to 2020, although that strategy has not been implemented yet.

The logic of the above-said allows us to proceed to a systems representation of **system elements**. These are formed by identification and description of the environment with its specific behavioral characteristics (features and objective laws) in a multifactor environment. For systems analysis of regional economic policy modernization under the conditions of

integration processes, four basic elements of a management system have been selected: public administration, economy, space, and institutions (Table 1).

Table 1: Elements of regional economic policy modernization and their properties

Elements	Essential specification	Attribute properties	Functional properties
1	2	3	4
Public administration	The state administrations, local councils, political parties, methods and practices of decision-making	Sphere of public interest with forming of a power and power implementation	Principles, forms, methods and tools of social relations, political and regulatory processes of acquiring goods
Economy	Business entities, local institutions and economic traditions, industrial and cooperation links	A manufacturer of tools and resources to meet society's needs and human needs	Quantity, quality and conversion of activity resources, ways of sharing resources
Space	The way of production forces organization in areas, the networks of localized settlements, infrastructure and natural resources	One of the forms of substance being that is inseparable from time	Source of natural and human-made resources; source of challenges for governance relations updating
Institutes	Resistant forms of people's common life	A public system of rules and of human relations	Adopted and not-adopted system of rules, rights to resources, resource concentration, the effects of blocking

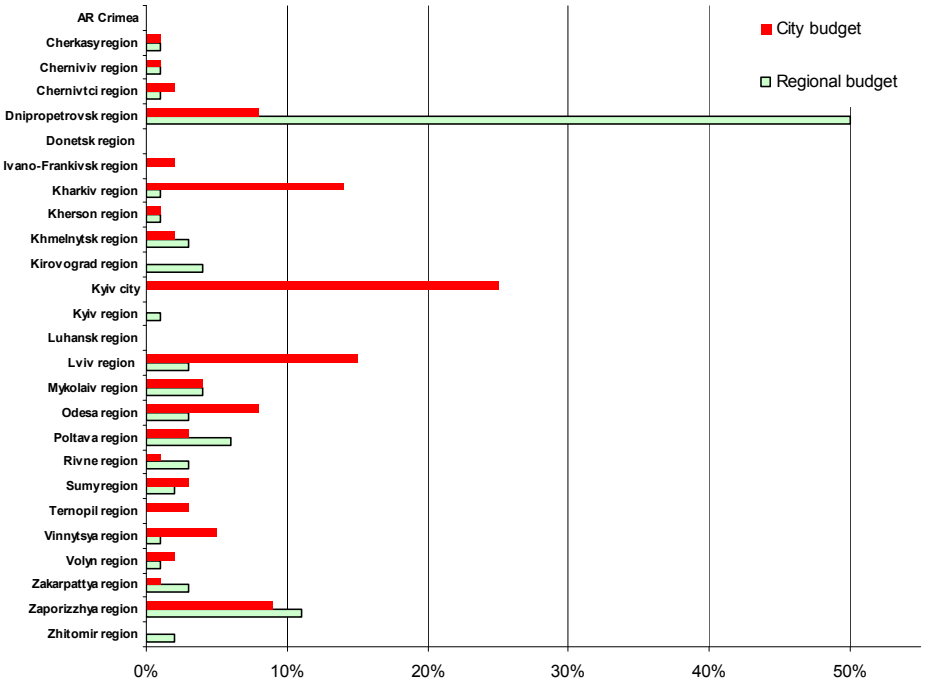
Source: the authoring based on (Shchedrovitsky, 2003; Sukhodolya, 2005).

This choice of system elements is explained by: 1) a growing capacity for resource management and economic self-development at the sub-national and local levels; 2) social life democratization and authorities' accountability; 3) a gradual replacement of customary economic practices with resource-saving ones, application of project and procedural approaches to administration and business.

System processes. In 2014-2015, Ukraine launched, in rather general terms, the processes of new regionalization, creating a new liberal space for public-administrative, socio-cultural, and economic specificity of its regions. As contrasted with the Soviet and transition times, the regions of today have to compete economically with one another. The competition necessitates a natural process of identification of internal capacity and relative self-sustainability of regional economies (Åslund & Djankov, 2014). This development vector on no account means political or economic sovereignty, or isolation from the macro-environment and rupture of meso- and microprocesses; on the contrary – it is a chance to even their significance for economic development. For many years now, there exists a situation in Ukraine, when regional environments are subordinated hierarchically to the national level practically in everything, particularly – in resources. Financial provision of local governments' development capability relies specifically on development budgets, the most advantaged being those of the biggest cities whose fiscal capacity exceeds that of the rest of local budgets manifold (Image 3). There are many reasons for this situation, the major ones being different internal possibilities of filling budgets and different capabilities to use all legal ways for budget replenishment. However, on the one hand, an open economy's macro-environment alone creates conditions for a more intensive development, for instance, an integrative, synergetic, coordinated type of development. On the other hand – changes in the external environment call for an adequate and preferably prompt response on behalf of a

region and subjects located in it. Today, the internal factors are continuously affected by the external ones, having to adapt to changes that occur beyond their will.

Image 3: A share of regions and regional centers in a total amount of funds of regional and municipal development budgets (according to the regional and municipal budgets approved for 2015), %



Source: designed according to open-source date by the Ukrainian Association of tax payers of Ukraine, 2015

If a regional system does not react to external challenges, and its internal subsystems do not build an adequate interaction with the external environment, the result is a slow-down of regional development dynamics, with simultaneous deactivation of intensive development mechanisms. In this case a system should possess a developed or actualized property of self-improvement, responding to unfavorable factors and neutralizing them through mobilization of its own resources, and to be able to assume legal and social responsibility in its relations with its subjects. That is why the presence of the two responsibility limitations is regarded as a low level of adaptation of a regional economic system and of the relevant policy. It is a sign of the adaptation level, resulting from interaction of environments, as a basic prerequisite of modernization.

Functional and organizational structures. The next step is defining a management object's functional and organizational structures that are built on the basis of actual processes and determine the structure of an object's ties and conditions of existence. Since the main condition for modernization of economic ways is consensus of elites as to basic developmental principles (Auzan and Sattarov, 2012 : 67), and reaching that consensus means realization of a social contract idea, the key roles in the processes are played by trust and a quality social capital.

Taking a functional structure fragment of a process of developing regional economic policy as an example, Table 2 presents author's reflection on typical functions and participants with their basic interests (See Appendix 1). Also, the origin of forces influencing an object, their roles and extent to which they participate in the process with their actual scopes of authority, as well as sources of object (process) funding – usually local and state budget funds, and non-budgetary contributions of the interested parties – are important too. The functional structure of ties provides for a balance of interests option and movement along the modernization trajectory. Based on understanding the ties within the functional structure, an organizational structure of the entire process is formed, its typical actors, as a rule, being ***subjects of change*** (see Appendix 2), the key of which are a regional state administration and regional council. What is this role exactly? This is a challenging role of initiator, regulator

and capacity integrator of quality-driven "social transformations" (Roxborough, 1988) into complicated governance and economic relations. These relationships, as shown in Appendix 1, arise between power state authorities and local governments and business and the public, and also involving external institutions.

In practice, the organizational structure of an object is not always a management extension of its functional structure (a regulatory body is established, but its legal framework is deficient); in such cases institutional failures are common due to inability to perform the role, functions, or be of benefit for the process. Besides, within economic orders (by W. Eucken (Eucken, 1952)) stable groups of stakeholders are formed evolutionally; these groups are interested in creation and preservation of standing institutions and practices, and consequently, in blocking of innovations unfavorable for them. For example, the dominating interests of argo-holdings or latifundists who are guided by getting profits and raw materials rent from large-size farmlands, determine poor loyalty to administrative innovations of the local government reform (Gotzuenko and Gotzuenko, 2015) which causes problems for innovation diffusion, social responsibility, trust in state reforms etc.

The structure of ties of a management object. This structure shows interdependence between the objects' elements and processes, and performs an important indicative function at the designing stage. As O. Sukhodolia notes, analysis of a management object is aiming to identify processes and detect discrepancies between the processes and types of structure (Sukhodolia, 2005). Based on literature review and on the author's own reflection, the main conflicts and ruptures in processes, behavior, and interaction of elements (see Table 1) among themselves and with their multifactor environment are presented in Appendix 3 in a very concise form.

The Appendix 3 illustrates that most of the contradictions are also related to a problem of maintaining regions' trajectory of development upon condition of a certain "path dependency" of relations development at all levels of governance in Ukraine. These and some other contradictions are getting increasingly noticeable in the context of lack of the Ukrainian people's trust in the government institutions. Thus, in January 2016, according to data of Kyiv International Institute of Sociology, the Ukrainian government institutions had a record-breaking low level of the population confidence: -48.1% of trust in the President of Ukraine; -66.3%, in the government; -72.4%, in the Parliament (Ukrainian Pravda, 2016). Given a strong political will, Ukraine could eliminate the above mentioned imbalances in several years.

Essentially, most of the Ukrainian contradictions, mentioned in Table 3, are of institutional nature and thus can be eliminated in an evolutionary manner. The most advantageous experience of it is accumulated by the EU countries and OECD. Therefore, it is reasonable to group principles, regularities, and "best practices" according to the following three dimensions: spatial development, economic development, and integrated development management with international inclusion. Transferring them to the Ukrainian reality could accelerate considerably the operation of complex mechanisms of social self-regulation through realization of the systemological Wallerstein-Braudel principle. According to that principle, a society has anything that there is to exist, although mostly in an implicit form, only a small part of it being actualized. Thus, there is nothing principally new, since everything existed at proper time and can become relevant in due course. In this respect, new institutional forms of regional economic policy modernization, expedient from the standpoint of the adopted advanced experience and realization of the Ukrainian regions potential, can be as follows:

– communication and integration 'corridors' used in cooperation with other interested regions, including the European twinning regions. These corridors can provide for creation and accumulation of institutional and economic potential between the axis endpoints;

– new cultural communities in "bonfires of competitive ability", which include university centers and technological clusters as sources of renewable resources of new time – culture, innovations and technologies. "Bonfires" of that sort are needed not only as deposits of ideas and skills, but also as sources of integration and self-activity, drawing into its orbit larger territories – other settlements, districts, and even regions. "Deposits" of added value and their

"processing" facilities lie in the same space. Transnational corporations are unable to occupy that niche, and that is why it needs state support;

– special state services: pre-privatization preparatory work carried out according to world standards and a guarantee follow-up of technological modernization at large infrastructure facilities of power industry, housing maintenance and utilities services, transport that are evenly allocated in the territory of Ukraine, which signalizes a full-fledged infrastructural development.

The state practice of ensuring industries' development in the form of target programs presupposes a primarily functional territorial division of the country meant to achieve object-oriented character of the programs. The biggest centers of sustainable development or prospective centers (middle-size cities of the most advantageous or strategically beneficial location – in terms of polycentrism) are highly probable to become development zones nuclei, while their external borders are noted for a maximum effective range: up to 150-200 km along highways, and 50 to 100 km beyond main roads.

In the present-day Ukraine, a multilayer space has been formed: the physical space has come to encompass multiple objects of different subordination, which require different patterns of management, in particular by the state. In the course of decentralization, the Ukrainian state is at the very start of applying a new pattern of non-hierarchical redistribution of responsibility and resources. Basically, the government can perform the functions of a coordinator of 'responsibility lines' between heterogeneous political, social, economic subjects. However under decentralized governance, it is necessary to have regard to a natural spatial structure of people's settlement, known as a 'nesting doll' (also known as 'the Christaller chart'). Thus, a change of development management principles should take place at each level of a decentralized spatial structure: consolidated communities, districts, regions etc. At the local community level, neither macro-economic nor branch-oriented mechanisms are applicable; instead, economic functioning mechanisms should be applied. Similarly, at the regional level, it is important to use the principle of political consensus as to economic entities' operation, activating or deactivating the mechanisms of regional economic policy modernization.

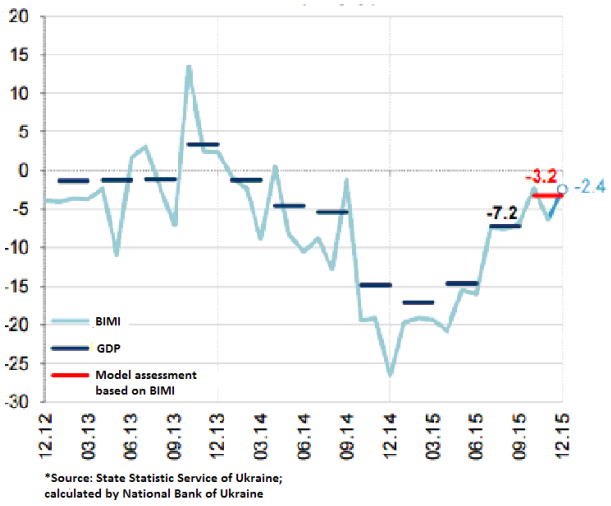
Material of a system. A current system of regional economic policy modernization exists under the conditions of idealistic and democratic change of attitude of the state and society to human rights and dignity. Ideally, this should be expressed in decentralization of the regulatory powers and improved economic interaction between the "center" and the regions, between a region and smaller entities of all forms of ownership located in it. However the Ukrainian decentralization of power in 2015-2016 became an argued and far from being popular reform that was forwarded in the conditions of lack of real alternatives, the state budget exhausted during the previous years, and scarce economic opportunities to compensate for the "reform burden" of the impoverished Ukrainian population. For example, Image 4 demonstrates the dramatic failure of the two major macroeconomic indicators characterizing increment of wealth in Ukraine and the production growth in 2013-2015. Besides the Russia's military aggression, the past 2014-2015 years were remembered as the years of the several difficult reforms started, years of start of political and economic modernization with a huge load on the previously devastated Ukraine's state budget.

The financial aspect of modernization is essential as it affects the system material, firstly, through increased own and delegated powers, and a greater resource capacity of consolidated territorial communities and local councils; secondly, due to insufficient institutional and resource capabilities of practically all regions, which impede their new development in the new conditions. It is also important to realize that serious intellectual and social challenges block the development too, as it proves that, apart from financial resources, the introduction of changes has to be supported by social trust and national unity, as well as by skilled staff, technologies, and effective development strategies of all different spatial formations.

There is an important connection between the system material of a catch-up modernization (in our case it is a regional economic policy) and management of manifestations of discreteness of regional economic policy modernization at the institutional level. This connection manifests itself in a dialectic acquisition of an accumulated ability of the leading subject of change to perform linear transition from one position to another (see Appendix A) in a role-status sequence of "outsider – follower – innovator – leader". A 'critical mass' and a

powerful combined surge of business and administrative activity are needed to overcome the barrier of institutional inertness when entering the state of modernization changes "from the inside" rather than externally – by command "from the top". The next mighty impulses of administrative activity will allow crossing the institutional passivity threshold in a new leadership manner. It is significant to mention that a modernization transit from one leadership status to another is fairly unique: localized and consolidated nuclei-groups of regional politico-administrative elites identified with a specific region can assume those roles/statuses. Thus, the interest of elites counts for a great deal in the regional economic policy modernization.

Image 4: Ukraine's real gross domestic product (GDP) and basic industry manufacturers index (BIMI) in 2013-2015, in % y-to-y



Superposition of roles/statuses of "outsider – follower – innovator – leader" onto aggregated results of the above systems representation of the components of a regional economic policy system under modernization has led us to the following conclusions about transformations of administrative relations as affected by discreteness (Appendix 4). The current Ukrainian situation is indicative of the start of the "outsider – follower – innovator – leader" transition in the catch-up modernization.

As business practice proves (Blank, 1995; Boyett, 2006), accumulation of 'critical mass' of effective entrepreneurial and management activity leads to the situation when local initiators, project managers or subordinate middle executives in due course can become coordinators and managers of local modernization processes, and eventually – upper management leaders who generate new leaders. Under certain conditions, a substantial institutionalization of their personal status and social capital takes place (by P. Bourdie (Bourdie, 1972 : 182)).

Consequently, in the course of complex social relations modernization, the major change of a modern leadership role-status of an individual or reform nucleus (team) lies in transition from management of an object's steadiness to develop, in particular through designing strategies, to development and dissemination of value-oriented vision.

4. Discussion

Tension lines and promising mechanisms of modernization

It is important that imbalances resulting from domination of one group of factors, which accelerates or hinders modernization, can cause an appreciable shift in time the emergence of a new "unstable balance" and affect the length of a new discrete "jump" towards changes (see Fig. 1). For the purposes of regional economic policy modernization it means that, subject to a strong political will for state reform implementation in Ukraine, the functional mechanisms for regulation of modernization processes that facilitate, at least organizationally, regaining of the desirable modernization trajectory and speeding up of movement along it are of great current interest. These mechanisms include:

1) **mechanisms for organization of modernization processes** (initiating and designing actions, streamlining, coordination, communication, collaboration and integration with other structures of all levels regardless of their geographic location);

2) **mechanisms for deblocking the modernization processes**, which is called forth by opposition (or sabotage) on behalf of certain pressure groups, lack of mutual understanding, institutional inability etc. Let us take a closer look at them.

To begin with, turning to management mechanism it is worthwhile to accept a definition given by G. Odintsova who describes it as "a means for resolving a conflict within a phenomenon or a process, a systematic implementation of actions, which are based on fundamental principles, goal orientation, functional activity with application of the relevant management methods, and are aimed to achieve the set objective" (Odintsova, 2002 : 12). Depending on a management object and functions, there exist optional versions of management mechanisms with different functional or disciplinary emphases.

Mechanisms for organization of modernization processes. Target vectors of mechanisms for modernization processes organization are as follows:

– initiation, development and realization (within the competence of the relevant power authorities) of the established value orientations and vision along with a set of regional development targets and objects located in the region;

– formation of development centers network for spatial dissemination of innovations. In particular, infrastructure development that reduces economic remoteness (by the new economic geography theory), improvement of other factors (human capital and institutions), support for settlements that create and translate innovations to the periphery);

– attainment of balance between the natural interests of the state, local government bodies, local business, and the public;

– pro-active and efficient response to changes of the structure and rate of growth of a regional socio-economic system;

– organizational mobilization of the reserves for the economic growth of a region and territorial communities located in it;

– integration of a publicly determined trajectory and available resources of regional development with external partners in international, inter-regional and private-corporate cooperation.

At the same time, modernization itself and its organizational mechanisms are obviously contradictory: ruining for the sake of creating more effective institutions requires a "flexible hardness" for its implementation. Carrying out modernization in a young democracy such as Ukraine, it is possible to discern at least ***four essential 'lines of tension'*** in several functions of initiation, streamlining and coordination, integration and communication:

– 'uncontrolled self-progress – controlled "movement by touch"', which requires a continuous scientific monitoring of modernization, its saturation with breakthrough ideas and solutions, and timely correction subject to external and internal circumstances;

– 'managerial incompetence and uncertainty – a guiding, regulating, and controlling role of the state', since it is the state which should be a guarantor of a desired social outcome (Kaufmann, 2003) in the eyes of its citizens;

– 'social disbelief and sabotage – reliance on positive public opinion' as to the desired course of modernization by a fair and timely redistribution of state resources and implementation benefits among the population strata;

– 'power – population', when in the course of regionalization and voluntary consolidation of communities, the size of government assistance to poorly developed territories may be reduced.

Mechanisms for deblocking the modernization processes. The condition of the state and local budgets, as well as that of the entire market infrastructure, corruption rate, stereotypes of the previous regimes, and "path dependence" have not allowed the Ukrainian regions to build their long-term economic policy or create a mass of new jobs in the real sector of the regional and local economies. All the above-mentioned challenges increase social tension, causing destructive opportunistic behavior of many social groups, and generating new risk factors. That is why it is expedient to combine the mechanisms for organization of modernization processes with those deblocking it.

Reasons and factors for blocking modernization process at the regional level basically lie in the following areas:

– administrative area – as a result of public disbelief in the reforms, continuity in procedures and transition (or loss) of power, inertness in treatment of changes, corruption and so on. These factors are conceptually based on social interaction theories; the concepts of organizational fields and institutional isomorphism (DiMaggio and Powell, 1983); a concept of 'the strength of weak ties' (Granovetter, 1973), related to social ties theory (Bourdie, 1986; Coleman, 1988); a network relations concept etc.;

– resource area, which includes such blocking factors as lack of the key resources – financial, trust and inner consensus as to values and goals, staff, and accountability;

– integration area (blocking through a community's isolationism and ignorance, disintegration and weak cooperation ties among regions).

To block potentially effective changes, a variety of ways are used: from ideological grounding of changes inadmissibility, with references to traditions, national mentality and the like, to overt bribing of elected law-makers (members of parliament and local deputies) or of appointed heads of executive authorities, whose jurisdiction is to effect the appropriate changes.

Manifestation of all the aforesaid factors brings about formation *of three other groups of systems contradictions*, which, according to G. Kupriashin, penetrate the existing institutional design (Kupriashin, 2015 : 60-61), namely: 1) conflict interaction and tension between institutional changes and continuity; 2) an imbalance between the stereotype of politico-administrative power centralization and the necessity for coordination and institutional autonomy of management objects; 3) an imbalance of reformist efforts concerning simultaneous accomplishments and efficiency, and accountability of authorities' bureaucratic activity on the basis of combined market and administrative methods. Accordingly, the following three axes of tension emerge:

– 'steadiness – novations'. It is a crisis of perception of values underlying various governance practices;

– 'coordination – centralization'. Here belong flaws of politico-administrative coordination of new decisions acceptance and promotion, which are expressed through conflicts between party and political communications and administrative executive procedures of evaluation of local needs;

– 'efficacy – accountability'. Due to a crisis of credibility to new or weak government institutions, there is an increased risk of non-transparent local decision-making and a growing uncertainty of regulatory mechanisms, since here new informal institutions with low transparency step in.

In this view, the described mechanisms for organizational furtherance of modernization with their "tension lines" explain the manifoldness of the problem range of the current regional economic policy modernization in Ukraine both in terms of organizational regulation and provisions of institutional design and reconstruction of quality institutions. They are a response to a series of "pathologies" traditional for the Ukrainian public sector and governance: irresponsibility, lack of initiative, imitation of changes, disintegratedness, chronic resource scarcity etc. One of real "keys" to solving these problems is adoption of the best modern approaches to mastering external opportunities and mobilizing internal resources, which will be the topic of the author's next works.

5. Conclusions

It has been proved that the systems approach as a basic methodology of studying and designing a new regional economic policy is closely connected to linking contradictory and multidirectional processes into a consistent logic of institutional modernization or, as a minimum, that of development along a desired trajectory.

Theoretically, this task is fulfilled under the conditions when modernization (or transformation) of relations and institutions runs along traceable paths with application of specific, non-universal modernization mechanisms (in the form of a module-based model of institutional change). This logic makes it possible to build a strategy for regional economic policy modernization in the shape of a consistent development of qualities (capabilities) of a management system and minimization of dysfunctions along the tension lines. Based on feasible mechanisms and identified imbalances, certain

'institutional modules' or functional mechanisms of regulation (legal, economic, information), which would incorporate sets of operation rules of regions' group interaction with other similar subjects in different locations. The mechanisms in question are to be approved by formal and informal institutions, allowing for solution of related problem issues even at the national level.

The regional economic policy modernization along a desired trajectory will be successful only if the regional systems of governance are able to form and make use of more than the two discussed basic mechanisms of furthering modernization – organizational and deblocking; their constituent mechanisms should be employed too. These mechanisms, which are supposed to integrate institutions, interests and values at least at the regional level, are of current interest for all the developing regions and countries. From that angle, the process of incrementing institutions will turn, to a large extent, into a self-transformation (self-development) process.

Generally, the presented logic of identification of mechanisms to support regional modernization can be applied both in Ukraine and in other countries, making it possible to purposefully affect the sequence of processes and structure of management mechanisms pursuant to a country's priorities. Taking the proposed logic and rationale into account allows avoiding a great many of conflicts and institutional disabilities in management, strengthening regional and local authority's interest in taking the initiative and exercising democratic flexibility.

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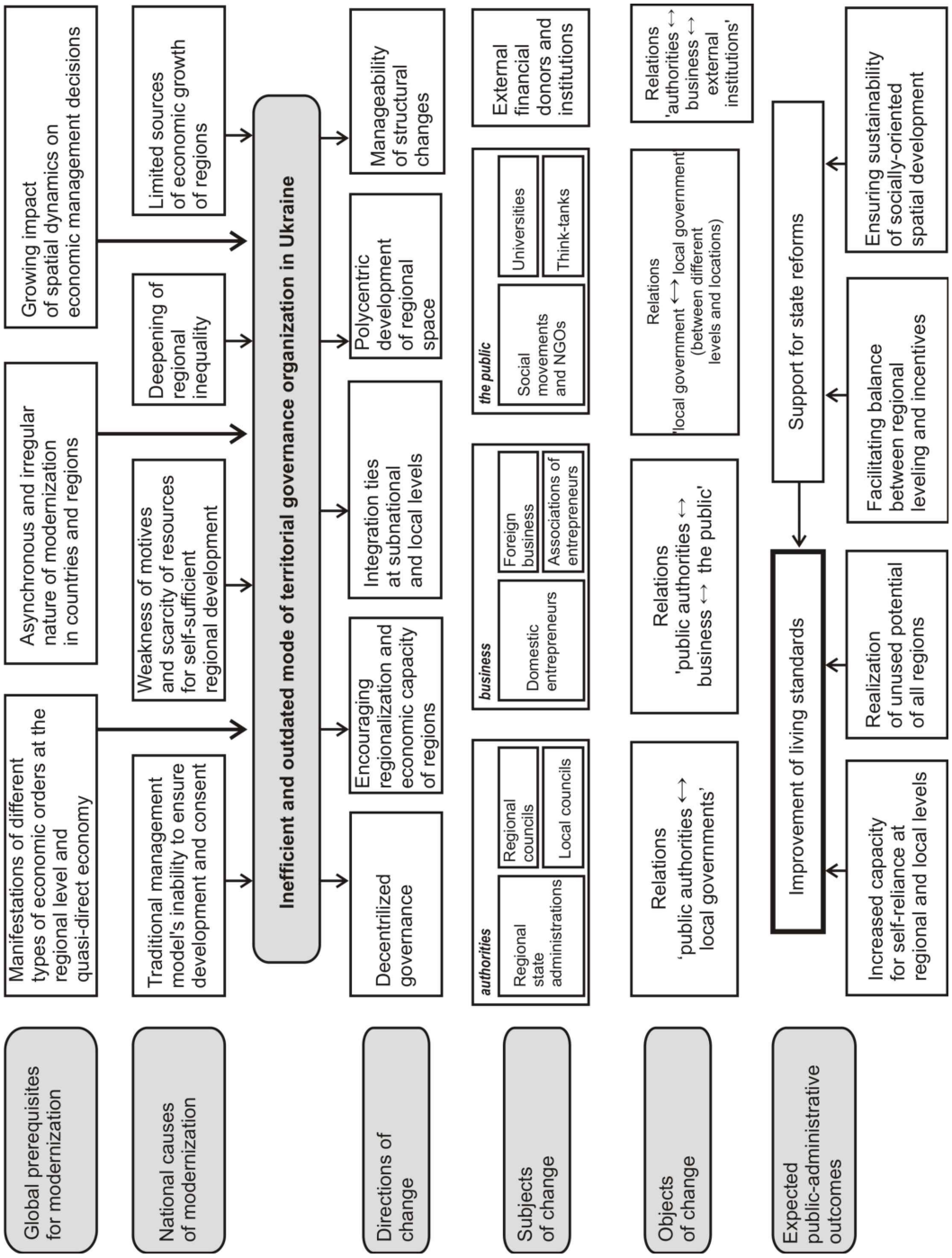
7. Appendices

Appendix 1: A fragment of representation of the functional structure of a management object, as exemplified by the regional economic policy development process

Typical functions of the process	Main process participants	Basic interest of a participant
Stage: "a process of formulation and coordination of regional development priorities"		
Initiation	State administration (an executive body) and/or a local council	A goal-oriented rational or political motive
Designing policies, forecasting results and options	State administration, developers – experts, special interest groups (big companies, associations, NGOs, communities, universities)	A goal-oriented rational motive
Coordination of parties involved	State administration	A goal-oriented rational motive
Seeking a balance of interests	State administration, a local council	A political and/or goal-oriented rational motive
Stage: "a process of setting and coordination of development tasks and their sequence"		
Designing and selection	State administration, special interest groups	A goal-oriented rational motive
Removing threats beyond set priorities	Developers – experts, state administrations	A goal-oriented rational motive
Stage: "a process of evaluation and approval of main resources for regional development"		
Designing	State administration, "interested parties"	A goal-oriented rational and a political motives
Seeking a balance of interests	A local council and State administration	A goal-oriented rational and a political motives
Drawing up an "agenda" for acceptance	State administration and a local council, special interest groups	A political motive
Formal approval of a consensus agreement	A local council	A goal-oriented rational and/or political motive
Preparation for introduction to implementation and political processes	State administration, a local council	Neutralization of opposition to change and search for support

Appendix 2: The general conception of regional economic policy modernization in modern Ukraine (designed by the author)



Appendix 3: Principal contradictions of modern regional economic policy modernization

Domain of manifestation	Essence of existing contradictions
Public-administrative domain	– between (a) conflicts of economic and political interests of certain local elites and special interest groups with projections of innovations of three Ukrainian reforms – local government reform, territorial system reform, and state regional policy reform – and (b) social request for prompt realization of reforms. – between (a) a declared wish of the state to delegate a major part of its authority, resources and responsibility to local governments and (b) a practice of complicated and excessively regulated access to other public resources (funds, guarantees etc.); – between (a) decision-making inertness and (b) institutional capacity of the regional tier of governance to mobilize a partially used administrative and economic potential of the decentralized system of relations, in which regions' independent search for the most reasonable development options plays a major role; – between (a) traditional power authority of the state and (b) new methods of public management.
Economic and spatial domain	– between (a) a drastic inadequacy of the method of spatial organization of socio-economic life and (b) market principles and reasons for independent economic entities' location and new settlement preferences of citizens; – between (a) economic heterogeneity of regional space and (b) low competitive ability of all the regions and their low institutional and financial capacity for efficient solution of regional socio-economic problems; – between (a) a traditional practice of applying a sector approach to solving socio-economic problems, mostly with public funds, and (b) and integrated programs' approaches to mobilization of various local resources; – between (a) better developmental opportunities, guaranteed by the legislation, for consolidated communities and (b) new institutional-economic and image disparity of communities in terms of attraction (retaining) of valuable resources due to concurrent existence of consolidated and non-consolidated territorial communities in a region – an actual problem of the transitional period; – between (a) the new Ukrainian cultural and economic centers with rather high and increasing competitive abilities and (b) similar foreign competing centers (regions, communities).

Appendix 4: Evolution of transformations in regional economic policy relations affected by the property of discreteness

Type of transition between roles/ statuses	Essence of transformations	Traditional driving forces and motives of modernization
”Outsider”- “follower”	a) open-mindedness to introduction of someone else’s experience and new practices. To be happy means to be up-to-date, including in perception of up-to-dateness; b) creation of a potent motive, an internal source of development and self-motivation.An answer to the ‘for what purpose?’ question determines a possibility to become a leader in future; c) ideological and mobilization attitude for transition from ‘process’ to ‘ultimate result’, from ‘immediate effect’ to ‘profound long-term changes’(AuthentiCity, 2008 : 19).	Elites’ career and power ambitions; justification of people’s confidence
“Follower” – “innovator”	a) from administration and motivation to reliance on trust and unanimity; b) from isolation to integration; readiness for taking risks is supplemented with the ability to manage social risks; c) from ready-made solutions and predictability to originality; from organizational formalism to cultural relations;	Ambitions of the state and elites as to their historical role; retaining power; a human being as a value
“Innovator” – “leader”	a) value-oriented vision (instead of concept and strategy development); strategic competence is required as before, however leadership is performed by impulses, which bring about ideas and innovations that are initially chaotic and often spontaneous; b) transition from general management functions to the role of a propagator of ideas and functions of a company’s mission; c) transformation of the roles of an organizational structures designer and a management system architect into the roles of an organizational transformer, a proxy for changes and a converter of its followers into local leaders; d) conversion of individual status leadership into group leadership.	Ambitions of the state and elites; retaining power; power over the future: morals and architecture of new social relations; a human being as a value.

*Source: the authoring, 2016.

PAYMENT TECHNOLOGIES AND MONEY DEMAND: EVIDENCE FROM DYNAMIC PANEL

Payam Mohammad ALIHA
Ph.D candidate, National University of Malaysia (UKM), Malaysia
payammaliha@gmail.com

Tamat SARMIDI
Professor Dr. Faculty of Economics and Management, National University of Malaysia (UKM), Malaysia
tamat@ukm.my

Abu Hassan SHAARI
Professor Dr. Faculty of Economics and Management, National University of Malaysia (UKM), Malaysia
ahassan@ukm.my

Fathin Faizah SAID
Professor Dr. Faculty of Economics and Management, National University of Malaysia (UKM), Malaysia
fatin@ukm.my

Abstract

The banking system has experienced rapid and significant technological changes in recent years, including automated teller machines (ATMs), automated clearing houses, point of sale systems, telephone transfers, automatic bill payer accounts, and credit cards. The total effect of these innovations on money demand has been the subject of some empirical research; however, the individual effect of most of these innovations has not been estimated. This article attempts to partially bridge the gap in the empirical literature by providing empirical evidence relating to the effect of ATMs on money demand in world scale. The demand for money is a very important for the conduct of monetary policy and measurement of the effectiveness of monetary policy. This study attempts to analyse if financial innovations has impacted the demand for money using a system (the original equation and the transformed one) GMM method. In this study, money demand dynamics are examined empirically by using the Blundell–Bond estimator which reinforces Arellano–Bond by making an additional assumption that first differences of instrument variables are uncorrelated with the fixed effects. It makes it possible to introduce more instruments that improve the efficiency considerably. We estimate the demand for money (M2) for a panel of 215 countries and territories from 2004 to 2013. The elasticity of the demand for real money to ATM is about 0.01 percent meaning that the sensitivity of money demand to ATM is low. In other words, money demand is not elastic with regard to ATM.

Keywords: Money demand, ATM, Financial innovation, Dynamic panel data model, GMM

JEL classification: C13, C40, C51, E40, E44

1. Introduction

Using new electronic technologies caused more than ever the expansion of e-commerce due to its high-speed and low-cost data transfer that needs the monetary instruments and proportionate payments. It means that the transfer of funds by paper-based method is a major obstacle to the trade. Therefore, electronic transfer of funds has been developed along with the development of e-commerce in a variety of forms. Electronic payment method provides security, convenience, speed, low cost and high efficiency. Electronic payment can be made by automatic teller machines (ATMs) and include electronic money (e-money), electronic cards (e-cards) and electronic check. The use of electronic money in a large scale has significant business, economic, political and social impacts.

The Keynesian money demand = (,) is enriched with innovation (r*) so that it can be represented implicitly as = (,, r*). Financial innovation is an opportunity for investors, who, on the market, decide which innovation is going to survive and evolve, and monetary authority, which looks at the demand for money and its stability as an explanatory variable together with consumption and investments, should consider these portfolio shifts and their (adverse) effects.

The objectives of the current paper is to estimate the demand for money in the presence of financial innovation using panel data from 215 countries in the world for the period 1961 to 2013. We shall use a systems based General Method of Moments (GMM) of Blundell and Bond (1998) for estimation. This has several advantages. Our paper is the first to use this method to estimate demand for money with panel data for all of the countries in the world. The rest of the paper is structured as follows. A review of the theoretical and empirical literature is given in Section 2 followed by methodology including a brief overview of the conventional demand for money and econometric approach in Section 3. Section 4 presents the results of the estimation and it ends up with summary in section 5.

2. Literature Review

There are 3 different outcomes out of the bulk of the major previous studies about the impact of payment technologies on the demand for money. The first category came to the conclusion that it has a negative effect on money demand while the second group conclude a positive impact and the third one produce mixed results or no significant impact.

First, we begin with the studies with negative effect. Boeschoten (1992) find out that the use of ATMs, cheques and POS terminals significantly reduces cash holdings (based on microeconomic analysis of payment habits in the Netherlands). Attanasio et al. (1998) sum up that the demand for money of households who holds an ATM card is much more elastic to interest rate than that of households who do not (based on time-series and cross-sectional data during 1989 – 1995 in Italy). Rinaldi (2001) states that the development of card payments (including ATM cards) will reduce the demand for money in Belgium. Snellman et al. (2001) and Drehmann et al. (2002) come up with the result that the number of POS terminals and ATMs has significantly negative effects on money demand (based on panels of European countries). Attanasio et al. (2002) finds that the interest rate elasticity of money demand is sensibly higher for individuals who have access to ATMs than those lacking. Therefore, ATM users hold significantly lower cash balances than non-users (based on data from Central and in Southern Italy). Stix (2003) proves that if the share of individuals who use the ATM frequently is high compared to infrequent ATM users, then a negative effect on cash demand was likely to occur. Markose and Loke (2003) believe that high ATM density as well as low user costs may reduce cash demand. Duca and Van Hoose (2004) show that money demand is inversely related to the improvements in transaction technology (such as ATM) that lower transaction costs. Columba (2009) come to the conclusion that technological innovation has a negative effect on currency in circulation, whereas their effect on M1 is positive.

We then, pay our attention to the studies with positive effect. Zilberfarb (1989) shows that the use of ATM reduces the transaction cost and therefore it increases demand deposits. Goodhart and Krueger (2001) state that people visit ATMs more often and withdraw small amounts of cash, which would increase the demand for small bank notes. Attanasio et al. (2002) say there are significant differences between individuals with an ATM card and those without. Most of the ATM transactions involve the withdrawal of cash (and very few deposits), it is quite likely that ATMs infra-structure influence the use of cash and money demand positively.

Finally, we focus on the studies with mixed or no significant effect. Boeschoten (1998) shows that ATMs lead to reduced cash demand by the public but increased inventories of currency held by the banking sector for ATM usage. Thus the total effect of ATMs on the total amount of currency outstanding is quite moderate (based on Dutch data during 1990–1994). Snellman, Vesala and Humphrey (2001) proves that ATMs leads to more cash withdrawal but less amount of cash and therefore, the total effect on cash demand is ambiguous. Drehmann et al. (2002) conclude their research with the results that ATMs seem

to increase the demand for small notes, while the effects on large notes are unclear (based on annual data from 1980 to 1998 for 18 OECD countries).

3. Methodology

3.1. Theoretical approach

The general form of the theory of money demand includes the main determinants of the level of economic activity:

$$\frac{M_t}{P_t} = \Phi(R_t,)$$

where the demand of nominal money balances is denoted by M_t, the price index is denoted by P_t that is used to convert nominal balances to real balances, the scale variable is denoted by that relates to activity in the real sector of the economy (proxied by GDP), and R_t is the opportunity cost of holding money that is proxied by the interest rate.

Scale Variables: We include the scale variable in the money demand function to measure transactions relating to economic activity. Transactions theories of money demand put emphasis on income as the relevant scale variable while in asset theories, wealth is considered as a relevant scale variable. The problem with asset theories is that it is not easy to measure wealth. Long time series on financial wealth have been collected and recorded only in few countries such as USA and UK. furthermore, these measures are not as comprehensive as the general measure of wealth that includes the value of human and nonhuman capital, proposed by Friedman's (1956) modern quantity theory. Measuring expected income was made possible by using Cagan's (1956) model of adaptive expectations. The adaptive expectations model for the unobserved expected level of income at time t, Y_t^e is:

$$Y_t^e - Y_{t-1}^e = \theta\,(Y_t^e - Y_{t-1}^e)$$

where $0 \leq \theta \leq 1$. By rearranging the above adaptive expectations model, we have:

$$Y_t^e = \theta Y_t + (1-\theta)\, Y_{t-1}^e$$

Y_t^e as shown in above formula implies that the expected level of income at time t is a weighted average of the current actual level of income and last period's expected value of income. The weights are the adjustment parameters θ and 1−θ. By continuous back-substitution, finally it yields the second presentation of the adaptive expectations model:

$$Y_t^e = \theta Y_t + (1-\theta) + \theta(1-\theta)^2 Y_{t-2} + \ldots,$$

This formulation indicates the unobserved expected level of income at time t is a weighted average of the current actual level of income and already known income levels of the past, Y_{t-1}, Y_{t-2}, and so on. θ, θ (1 − θ), $\theta(1-\theta)^2$, and so on that are the weighting scheme, represents a memory that is the influence of past income levels on the formation of expectations. For instance, if θ is close to zero, the weights decline slowly and the economic agent has a long memory. In other words information from the distant past considerably impacts the formation of expectations. Alternatively, If θ is close to one, the weights decline quickly and the agent has a short memory meaning that only information from the recent past impacts the formation of expectations. The problem with the adaptive expectations model is that it doesn't suppose enough rationality on the part of economic agents meaning that only current and past values of the variable in question are used by economic agents when it formulates expectations for the future. John Muth's (1961) rational expectations hypothesis is considered as an alternative hypothesis for the above analysis. Rational expectations imply that economic agents when forming their expectations for the future use all of the available information, including relevant economic theory. Lucas (1972, 1973), Sargent and Wallace (1975), and Barro (1976) made significant contributions to the concept of rational expectations. Using the rational expectations for empirical work requires quantifying the concepts of 'available information' and 'relevant economic theory.' This quantification is

very helpful but it is not an easy task to do. It is because, we need to treat many issues, such as structural shifts in the income growth process for empirical work, see Barro (1977, 1978). In order to represent the scale variable in the money demand function, the level of current income is going to be used. Laidler (1993, pp. 98-99) mentions that the measurement of this variable is not problematic because, in spite of the fact that economists use gross national product series, net national product series and gross domestic product series to measure the scale variable, these variables move rather closely together over time and using one or the other makes no difference. Measure of transactions is a more comprehensive compared to the measure of income. We give an example for clarification purpose. Gross national product (GNP) does not include transactions in financial assets, sales of intermediate goods, transfers, and purchases of existing goods despite the fact that they all have impact on the demand for money. That is why economists have relied on the construction of scale variables on the basis of more general measures of transactions. It is not known yet to say for sure if these new data will make important improvements in the explanation of aggregate money demand. Recently, there have been attempts to disaggregate GNP into several scale variables to take into account this fact that all the transactions are not equally money intensive. For instance, Gregory Mankiw and Lawrence Summers (1986) state that consumption is a more suitable variable than GNP in order to estimate money demand functions and that the disaggregation of GNP into components that replicate the nature of international transactions is important for open economies. The fact that disaggregation of GNP improves the performance of money demand functions is not yet backed by empirical evidence.

Opportunity Costs: The opportunity cost of holding money is defined as the difference between the rate of return on assets alternative to money and the own rate on money. The question is that what is the best choice for the rate of return on alternative assets? Economists adopt a transactions approach and a narrow definition of money (short term interest rates, such as the Treasury bill rate, the commercial paper rate, or the saving deposit rate) is used for this purpose. By adopting asset approach, on the other hand, broader definition of money (longer-term rates of interest) is used. Now we turn our attention to the own rate on money. Most economists believe that it is actually zero meaning that the explicit rate of return on most forms of money (i.e., currency, demand deposits, etc.) is zero. This is questinable, because even if it is the case (the explicit return is zero), money earns an implicit rate of return (gifts, services, or reduced transactions fees) by maintaining a minimum level of deposits. The problem is that it is not easy to measure the implicit rate of return so many researchers have ignored it. See Benjamin Klein (1974) and Richard Startz (1979) for exceptions. However, some other variables might have impacts on the money demand function. For a discussion with further references see Goldfeld and Sichel (1990), Laidler (1993), and Subramanian Sriram (1999).

We start the empirical estimation of money demand functions with introducing the long-run, log linear function that is of the form

$$\text{Log}\left(\frac{\mathbf{M_t^*}}{\mathbf{P_t}}\right) = \alpha + \beta_1 \log \mathbf{Y_t} + \beta_2 \mathbf{R_t} + \varepsilon_t$$

Desired stock of nominal money is denoted by $\mathbf{M^*}$, P is the price index that we use to convert nominal balances to real balances, Y is the scale variable, and R is the opportunity cost variable.

The conventional money demand $\mathbf{M^d} = (\mathbf{Y_t},)$ is misspecified and leads to the bias that gets into the estimated coefficients. Therefore, it has to be enriched with financial innovation (r*) so that it can be represented implicitly as $\mathbf{M^d} = (\mathbf{Y_t},, r^*)$.

3.2. The empirical model

The standard specification, based on the quantity theory of money that is the conventional money demand function, used in many empirical works in several country specific models is as below that has a semi log-linear specification. We proxy the effect of financial innovation (technology payments) on the demand for money by the number of automated teller machines (ATMS):

$$\text{Log}\, M2_{it} = \beta_0 + \text{Log}\, GDP_{it} + \beta_2\, R_{it} + \beta_3 \text{Log}\,(ATM_{it}) +$$

In order to estimate a demand for real balance of money, we use the amount of currency in circulation. The currency in circulation in real term is denoted by M2, real gross domestic product is denoted by GDP, R refers to the interest rate, the number of automated teller machines is denoted by ATM, and the error term is denoted by e_t with t spanning from 2004 to 2013. The official website of the World Bank is the source of data.

3.3. Econometric approach

This study analyse some possible approaches ranging from simple (static pooled ordinary least squares to more complex dynamic panel models. In order to reach the preferred econometric estimator, we have to make a number of decision as follow: 1) should we use a pooled estimator, or effects-based models aiming at taking into account cross-sectional variation/heterogeneity; 2) if we decide that the preferred model should be dynamic (including lagged adjustments); 3) after deciding on a dynamic model, then we decide what the preferred estimator is; 4) the next step is that if we can use the estimates for forecasting purpose; and 5) if we can use the data for estimating such a model. Figure below shows the decision making process aimed at reaching the preferred estimator.

After discussing the possible econometric models, we will describe the initial modelling in order to select the preferred econometric model. It is important to use effects-based models to include the possibility of heterogeneity in the dataset. Based on statistical analysis, we decided that fixed effects were more appropriate. The reason for this is that static models lead to unjustly large parameter estimates and very high t-statistics. Therefore, dynamic specification is more appropriate. ECM or an ARDL model are as alternatives for dynamic models with the difference that in ECM, the long-run relationships are modelled explicitly while ARDL involves in modelling long-run relationships implicitly. We estimated ARDL due to the small number of time-series observations but it faces the challenge of identifying long-run elasticities explicitly. On the other hand, we estimated ECM, taking advantage of identifying long-run elasticities explicitly but again, it has the disadvantage that it is not very suitable for our short time-derived data. In other words, ARDL and ECM each have their own advantages and disadvantages with regard to our data set. At the end, we arrive at the final stage of choosing the best model. The question now is that model out of the two common dynamic panel data estimators is more appropriate. Based on its advantages, we decided that the Blundell–Bond estimator was the best.

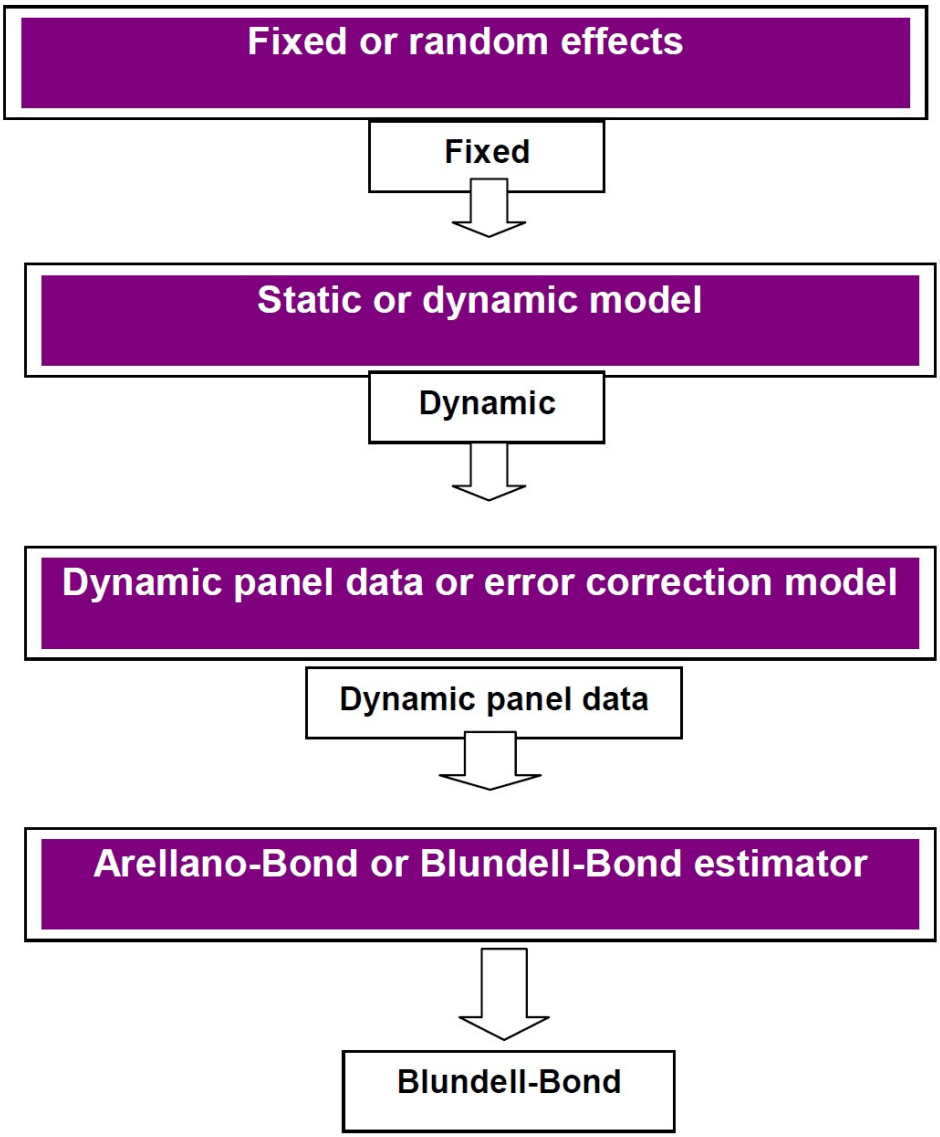
A model was estimated using the estimation Blundell & Bond technique. Arellano & Bond technique uses an estimator that is built to handle the endogenous nature of the lagged dependent variable that is very similar to the instrumental variables (IV) estimators that uses different variables as instruments or proxies for the lagged dependent variable. There should be no serial correlation in the residuals in order to meet the requirement of using these estimators; if there is serial correlation in the residuals, the instrumentation is not valid leading to inconsistent estimator. If the coefficient of the lagged dependent variable is large (in other words, if the time series is close to containing a unit root), the Arellano–Bond estimator will not be efficient (Baltagi, 2008). Blundell & Bond use a system of equations/GMM estimator that offers a solution to this problem. The Blundell–Bond also assumes that the initial observations have an insignificant impact on the observed observations. Based on these significant advantages, we chose the Blundell–Bond estimator as the best econometric technique for use in this study.

3-4- Diagnostic testing

Diagnostic testing in panel data is not as advanced as diagnostic testing in cross -sectional or time-series analysis. However, only a few tests that is available to use which include: autocorrelation, and instrument validity. This is because when the cross-sectional element of the data is large (as is the case for this study); the estimated standard errors are asymptotically robust to heteroscedasticity and non-normality. In other words, even if the errors are non-normal and hetroscedastic, the estimated standard errors are not affected by these factors. Also, the squared correlation coefficient between actual and fitted results is used as the optimal measure of model fit. We discuss these diagnostic tests further below. Fortunately, the estimated regression passed all of these tests. Autocorrelation: Arellano & Bond developed a test for autocorrelation in dynamic panel data. The Arellano–Bond and the

Blundell–Bond estimators are both based on the assumption that there is no residual autocorrelation in the model. The Arellano–Bond test for autocorrelation is a statistical test for correlation in the first-differenced errors. There is autocorrelation in the first differences due to the construction of the model. Therefore, we expect that the null hypothesis of no autocorrelation will be rejected for the first differences. However, if null hypothesis of no autocorrelation at second or third differences is rejection, it means that the moment conditions are not valid and therefore, the estimator is not valid. Moment validity: The estimators mentioned above are valid only if the moment conditions are valid meaning that the instruments that have been used in the estimation must be uncorrelated with the error term and correlated with the lagged dependent variable. There is no way to test this assumption directly. Next best approach for testing the validity of the instruments is using the Sargan test. Only if the instruments are valid, the estimates of the parameters of interest are considered consistent so Sargan test is of special importance.

Figure 1: Econometric procedure selection



4. Results

The systems GMM estimator thus combines the standard set of equations in first differences with suitably lagged levels as instruments, with an additional set of equations in the levels with lagged first differences as instruments. Although the levels of Y_{it} are necessarily correlated with the individual-specific effects (η_i) given model (1) below,

assuming that the first-differences $D^{Y_{it}}$ are not correlated with η_i, and thus permitting lagged first-differences to be used as instruments in the levels equations.

$$Y_{it} = \alpha Y_{i,t-1} + \eta_i + v_{it} \qquad |\alpha| < 1$$

Results of the Monte Carlo simulation show that the system based GMM approach has better finite sample properties in terms of bias and root mean squared error than that of GMM estimator with first differences alone. It is argued by Blundell and Bond (1998) that the systems GMM estimator performs better than the simple GMM estimator because the instruments in the levels equation remain good predictors for the endogenous variables in this model even when the series are very persistent. Though it is argued that system based GMM approach uses more instruments than the standard GMM and many instruments problem could be serious, in the simulation results this is not found to be a limitation. In fact simulation results show that the systems GMM estimates are less biased even in moderate sample sizes of cross-section data, too.

Linear dynamic panel-data models include p lags of the dependent variable as covariates and contain unobserved panel-level effects, fixed or random. By construction, the unobserved panel-level effects are correlated with the lagged dependent variables, making standard estimators inconsistent. Arellano and Bond (1991) derived a consistent generalized method of moments (GMM) estimator for this model. The Arellano and Bond estimator can perform poorly if the autoregressive parameters are too large or the ratio of the variance of the panel-level effect to the variance of idiosyncratic error is too large. Building on the work of Arellano and Bover (1995), Blundell and Bond (1998) developed a system estimator that uses additional moment conditions; xtdpdsys implements this estimator. This estimator is designed for datasets with many panels and few periods. This method assumes that there is no autocorrelation in the idiosyncratic errors and requires the initial condition that the panel-level effects be uncorrelated with the first difference of the first observation of the dependent variable.

Consider the dynamic panel-data model

$$\mathbf{y_{it}} = \sum_{j=1}^{p} \alpha_j \, \mathbf{y_{i,t-j}} + \beta_1 \mathbf{x_{it}} + \beta_2 \mathbf{w_{it}} + \mathbf{v_i} + \boldsymbol{\varepsilon_{it}}$$

where:

the α_j are p parameters to be estimated,

$\mathbf{x_{it}}$ is a 1 X $\mathbf{k_1}$ vector of strictly exogenous covariates,

β_1 is a $\mathbf{k_1}$ X 1 vector of parameters to be estimated,

$\mathbf{w_{it}}$ is a 1 X $\mathbf{k_2}$ vector of redetermined or endogenous covariates,

β_2 is a $\mathbf{k_1}$ X 1 vector of parameters to be estimated,

$\mathbf{v_i}$ are the panel-level effects (which may be correlated with the covariates), and

$\boldsymbol{\varepsilon_{it}}$ are i.i.d. over the whole sample with variance σ_ε^2.

The $\mathbf{v_i}$ and $\boldsymbol{\varepsilon_{it}}$ are assumed to be independent for each i over all t.

By construction, the lagged dependent variables are correlated with the unobserved panel-level effects, making standard estimators inconsistent. With many panels and few periods, the Arellano–Bond estimator is constructed by first-differencing to remove the panel-level effects and using instruments to form moment conditions.

Blundell and Bond (1998) show that the lagged-level instruments in the Arellano–Bond estimator become weak as the autoregressive process becomes too persistent or the ratio of the variance of the panel-level effects v_i to the variance of the idiosyncratic error $\boldsymbol{\varepsilon_{it}}$ becomes too large. Building on the work of Arellano and Bover (1995), Blundell and Bond (1998) proposed a system estimator that uses moment conditions in which lagged differences are used as instruments for the level equation in addition to the moment conditions of lagged

levels as instruments for the differenced equation. The additional moment conditions are valid only if the initial condition E[$v_i \Delta y_{i2}$] = 0 holds for all i. Xtdpdsys fits dynamic panel-data estimators with the Arellano–Bover/Blundell–Bond system estimator.

That the system estimator produces a much higher estimate of the coefficient on lagged money demand agrees with the results in Blundell-Bond (1998) who that show the system estimator does not have downward bias that the Arellano-Bond estimator has when the true value is high.

STATA bond reports the Arellano-Bond test for serial correlation in the first-differenced errors. The moment conditions are valid only if there is no serial correlation in the idiosyncratic errors. Because the first difference of independently and identically distributed idiosyncratic errors are autocorrelated, rejecting the null hypothesis of no serial correlation at order one in the first-differenced errors does not imply that the model is misspecified. Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid that in fact is not rejected. Also, according to Sargan test, instruments are valid.

Predetermined covariates: Sometimes we cannot assume strict exogeneity. A variable x_{it} is said to be strictly exogenous if E[$x_{it}\varepsilon_{is}$] = 0 for all t and s. If E[$x_{it}\varepsilon_{is}$] ≠ 0 for s < t but E[$x_{it}\varepsilon_{is}$] = 0 for all s ≥ t, the variable is said to be predetermined. Intuitively, if the error term at time t has some feedback on the subsequent realizations of x_{it}, x_{it} is a predetermined variable. However, we do not believe that unforecastable errors today might affect future changes in GDP, so we do not suspect that GDP is predetermined instead of strictly exogenous. Estimated coefficients using GMM method are as follow:

The estimate of the coefficient on the expected interest rate is positive and it is significant at 5% level. It says that if the real interest rate increases by one unit, the real amount of currency held increases by 0.003 percent meaning that money demand is not sensitive to the interest rate. The estimate of the coefficient on GDP says that when the level of GDP increases by one percent, the currency held increases by 0.11 percent. Its sign is positive as expected, and it is significant at 5% level. The most important result is the estimate of the coefficient on ATM numbers which is negative. If ATM increases by one percent, the currency held decreases by 0.01 percent. Since we use the data obtained by the whole economy, not a survey, it tells us the exact relationship between the number of ATM and the currency demand in the economy. Finally, according to the estimation results, elasticity of money demand to one lagged money demand is 0.89 percent. For models estimated by GMM, we may compute the first and second order serial correlation statistics proposed by Arellano and Bond (1991) as one method of testing for serial correlation. The test is actually two separate statistics, one for first order correlation and one for second. We expect the first order statistic to be significant (with a negative auto-correlation coefficient), and the second order statistic to be insignificant. In other words, there is first order autocorrelation while there is not second order autocorrelation.

The statistics are calculated as:

$$m_j = \frac{\rho_j}{\sqrt{VAR(\rho_j)}}$$

$$\rho_j = \frac{1}{T-3-j}\sum_{t=4+j}^{T}\rho_{tj}$$

$$\rho_{tj} = E\left(\Delta\epsilon_{i,v}\,,\Delta\epsilon_{i,t-j}\right)$$

Where ρ_j is the average j-th order autocovariance. (Note that this test is only available for equations estimated by GMM using first difference cross-section effects).

TABLE 1: STATA output of the Blundell-Bond estimation (Two-step results):

Variables	Coef.	Std. Err.	z	P>|z|	[95%Conf.	Interval]
Lmd(-1)	0.896889	0.0077811	115.27	0.000	0.8816383	0.9121396
lgdp	0.117268	0.0075553	15.52	0.000	0.1024598	0.1320761
irate	0.0029198	0.0000754	38.73	0.000	0.0027721	0.0030676
latm	-0.0109137	0.001865	-5.85	0.000	0.1024598	0.1320761
cons	-0.1471167	0.0201003	-7.32	0.000	0.1865126	-0.1077208

TABLE 2: Allerano-Bond test for zero autocorrelation in first-differenced errors (H_0: no autocorrelation)

Order	z	Prob>|z|
1	-5.1748	0.0000
2	-1.6693	0.0950

TABLE 3: Sargan test for over-identifying restrictions (H_0: over-identifying restrictions are valid)

Chi2 (440)	110.2809
Prob>chi2	0.3430

Also, according to Arellano-Bond Serial Correlation Test (with probability of 0.00 for first order and 0.08 for second order) and Sargan test of overidentifying restrictions (with probability of 0.26), the estimated model passed both authocorrolation and Sargan tests. Therefore, the instruments for differenced eqution (that is the second lag of money demand) and instruments for level equation (that is the fisrt lag of money demand) are valid. Heteroscedasticity would not be a problem as the panel data by itself is a solution to heteroscedasticity. The advantage gained on GMM is that is consistent even in the presence of heteroskedasticity. Also, we did not include period dummy variables to take into account for period fixed effects. We also note that the estimated coefficients of interest rate is very low meaning that demand for real money is not sensitive to the change in interest rate. One lagged dependent variable followed and GDP are considered variables with the biggest impact on money demand. Also, interest rate and ATM are considered predetermined variables and GDP is considered an endogenous variable. The reason for treating interest rate and ATM as predetermined variables is that predetermined is more common in economic theory than the extreme cases of being exogenous and endogenous as the first one implies that the independent variable is uncorrelated with current, past and future error terms and the second implies that it is correlated with contemporaneous errors which is highly unlikely in either cases so I supposed the variables are predetermined implying that the current period error term is uncorrelated with current and lagged values of the predetermined variable but may be correlated with future values that is the most common case which makes fully sense regarding the fact that interest rate and the number of ATMs are already decided in the previous year. Also, we know that GDP is endogenous by its nature. One lag dependent variable is included in the model. Furthermore, 1 lag of dependent variable and 2 lags of predetermined variables (interest rate and ATM) are used as instrument to address the issue of endogeneity. Finally, estimation output does pass Arellano-Bond test for zero autocorrelation in first-differenced errors and Sargan test of overidentifying restrictions as well while having significant and meaningful coefficients.

5. Summary

In this study, we estimated a conventional money demand model (as described above) with currency in circulation (M2) as dependent variable and gross domestic product (GDP, constant 2005 US$), interest rate (IRATE), the number of automated teller machines per 100,000 adults (ATM) to take into account for the effects of financial innovation as dependent

variables. It covers 215 countries and territories over the period 1961-2013. The model is estimated using different estimation methods as follow: GMM, Cointegration, Vector Error Correction Model (VECM), Autoregressive Distributed Lag (ARDL), OLS (Panel Fixed Effects), and Panel Dummy Variables. Each of these methods/estimators have their own weaknesses and strengths, however, regarding the nature of our data, GMM was selected as the preferred model. The results of the other estimation methods should be treated with care as the limited time-series dimension of our data may not be enough to produce efficient and trustful estimates and they should be considered merely as by product of this study. Therefore, we chose GMM as the best estimator.

Generalised Method of Moment (GMM) proposed by Arellano and Bond (1991) is the commonly employed estimation procedure to estimate the parameters in a dynamic panel data model. In GMM based estimation, first differenced transformed series are used to adjust the unobserved individual specific heterogeneity in the series. But Blundell and Bond (1998) found that this has poor finite sample properties in terms of bias and precision, when the series are persistent and the instruments are weak predictors of the endogenous changes. Arellano and Bover (1995) and Blundell and Bond (1998) proposed a systems based approach to overcome these limitations in the dynamic panel data. This method uses extra moment conditions that rely on certain stationarity conditions of the initial observation.

We can summarize the results as follow: 1) GMM is an OLS procedure applied to a suitably transformed version of the model whose elements are uncorrelated therefore yielding more efficient estimates. 2) GDP and IR coefficients are all positive and significant. 3) ATM coefficient is negative and significant. 4) Lagged money demand is the most important determinant of the current money demand followed by GDP and ATM. We used lagged dependent and independent variables as instruments in the estimation. ATM is found to have a negative effect on the demand for real money; however, its impact on money demand is small meaning that 1 percent increase in ATM unit will lead to only 0.01 percent decrease in money demand. The coefficient of the interest rate is positive which is not what we expect from the theory, however, the magnitude of the coefficient is very close to zero implying that its effect on demand for money is negligible and the total effect of financial innovation/payment technologies advancements is channelled through income effect (GDP).

The finding of this study revealed that financial innovations have a negative effect on money demand. Introduction of new financial products due to innovations in the financial sector reduces the efficiency of the financial sector than in turn caused the complication of the environment in which monetary policy operates. This situation makes money demand sensitive to changes in monetary environment and so researches should keep an eye on variables that may affect money demand. The results of this study are primarily in line with theoretical and empirical studies that proved the macroeconomic impact of financial innovations on money demand. The implication of this finding for money demand is that financial innovation have to be included in the estimation of money demand, otherwise, the money demand function will be misspecified. There is a need for keeping an eye on the ever changing monetary aggregates that may cause structural changes on monetary developments. This is because, if financial innovations have impact on money demand, adjustment can be made to monetary aggregates in the presence of such monitoring. Central banks should conduct inflation targeting, economic growth enhancement along with enhancing efficiency and effectiveness in a changing financial and economic environment.

The study reveals some more implications as follow: 1) The low interest elasticity of the money demand indicates that the money market in most countries is not sufficiently developed. This is particularly true as most of the countries under investigation are actually underdeveloped countries. The money market in most countries lacks the depth and flexibility that results from a diversified participant. Another reason is that underdeveloped countries suffer from an unhealthy financial system. 2) Income level is a primary determinant of demand for money by economic agents. 3) Regarding the fact that financial innovations have an impact on the demand for money; there is room for monetary policy as a macroeconomic stabilization measure.

Financial innovation leads to the deepening of the money market and promoting the effectiveness of monetary policy through its significant impact on the demand for money. In the light of our findings based on GMM estimation, this research project suggests the

following recommendations: 1) A policy should be made to attract more private participants and private sector funds to the money market to deepen the market thereby making the market more dynamic and open to monetary policy, 2) Recapitalization in the banking sector to pave the way for financial innovations and adopting a suitable monetary policy strategy to deal with the challenges posed, and 3) The central banks needs to monitor the financial landscape and be able to predict the consequences of financial innovations.

Further research need to be conducted to quantify the relationship between the change in money demand and the effectiveness of monetary policy to establish a link between financial innovation and effectiveness of monetary policy as this study is limited to determine the effect of financial innovation on the demand for money which is just one side of this two-sided relationship. This study targeted the impact of financial innovations/payment technologies on the demand for real money and did not investigate the effect of financial innovations on money multiplier and money velocity that can be a possible area for further research. Assessing the effect of financial innovation on currency in circulation also provide another potential area for research. Investigating the effect of financial innovations on economic growth can attract further research. They should be positively related to each other but the effect has not been quantified in any empirical research by far. There is also a need to examine if financial crisis in the economy are caused by innovations in the financial sector. Further research can be conducted on how monetary aggregates react to a monetary shock due to new innovative products.

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INTER-JURISDICTIONAL COMPETITION FOR SALES TAX REVENUES: A NATURAL EXPERIMENT OF DESTINATION RETAIL OUTLETS

G. Jason JOLLEY
Assistant Professor and MPA Director, Ohio University, Voinovich School of Leadership & Public Affairs
jolleyg1@ohio.edu

Anirudh V.S. RUHIL
Associate Professor, Ohio University, Voinovich School of Leadership & Public Affairs
ruhil@ohio.edu

Stephen KLEINSCHMIT
Assistant Professor, Western Michigan University, School of Public Affairs and Administration
stephen.kleinschmit@wmich.edu

Aleksey KOLPAKOV
Assistant Professor, University of Nevada, Reno, Political Science Department
akolpakov@unr.edu

Abstract

In an age of increased competition for economic growth, attracting destination retail is becoming an increasingly popular development strategy. Local governments engage in inter-jurisdictional competition to attract large-scale retail outlets, which may also serve as a lucrative source of local government sales tax revenue. This study uses a natural experiment design to examine sales tax revenue collections in a seven county region in the state of North Carolina in the United States focusing on the entrance of the Tanger Outlet Mall in Alamance County. After its opening, the county experienced several years of increased sales tax collections, particularly for apparel, relative to the surrounding region. Our evidence suggests that destination retail may prove a desirable strategy for promoting development, though we posit that structural changes in retail and apparel markets, as well as state tax policies, may work to undermine the utility of this approach as means of generating local tax revenue.

Abbreviations:
CPI – Consumer Price Index
FY – Fiscal Year
LOST – Local Option Sales Taxes
NCCCR – North Carolina Center for County Research

Keywords: Tanger, outlet malls, sales tax, LOST, destination retail
JEL classification: H73, H2, R5, R1, L81, Z38

1. Introduction

Economic base theory dominates regional economic analysis in the United States. It divides economic activity into two categories: export market (i.e. basic industries) and local market (i.e. non-basic, service or residentiary activities) (Malizia & Feser, 1999). Its major underlying assumption is that exogenous or external demand for a region's products boosts demand for nonexportable goods while working to "increase nonexport-sector employment" (Nishiyamara 1997, 100). For this reason, economic development practice has traditionally focused on industrial recruitment or other activities that produce a good or service sold to an external market.

However, attracting export-oriented industries is highly competitive, and attracting them seldom proves successful. Prior research has suggested a 10 to 1 ratio of communities seeking investments to actual large-scale relocations or expansions (Levine, 2002). Increased globalization coupled with the Great Recession has further reduced the odds for most communities of landing a large-scale manufacturing operation. Thus, these communities have increasingly turned to other policy approaches as a means to complement traditional industrial

recruitment, including small business assistance, entrepreneurship and technological upgrading (Lowe & Freyer 2015, 1284).

Some communities have broadened their efforts to pursue forms of retail development. Kassab and Luloff (1993) likened this chase for the service sector as a new "buffalo hunt" for service sector employment. At first blush, there appears to be little reason for local governments to target retail development. Retail jobs offer lower pay and fewer benefits than traditional manufacturing employment. Additionally, retail development serves the local market and does not have significant impacts on regional growth. Large retailers may generate some costs to communities such as lower retail wages, traffic congestion, or infrastructure costs (Irwin & Clark, 2007). If retail is effective in increasing net employment, importing outside dollars from new shoppers, or preventing residents shopping elsewhere, it may be considered a form of economic development (Pittman & Culp, 1995; Kelton & Rebelein, 2007). Meyers (1995) advocated for factory outlet malls as a driver of economic growth, citing outlet malls in Stroud, Oklahoma, Woodbridge, Virginia, and Kittery, Maine as succesful examples. Given a suitable location and community, factory outlet malls can increase sales tax revenue for both the city and the established downtown businesses.

2. Inter-jurisdictional competition

Fiscal rationales exist for local governments to focus on retail development as part of a holistic development strategy. Retail development brings needed property tax base to local governments. Additionally, maintaining retail development prevents local sales tax revenue from flowing across boundaries and into the coffers of neighboring governments. While retail development mostly serves regional market needs, intra-metropolitan sales tax flows can hurt some local governments while benefitting others within the same region (McHugh & Jolley, 2012). This effect is magnified by the increasing concentration of retail into regional malls and big box shopping centers (Artz & Stone, 2003). In the absence of revenue sharing arrangements, local governments engage in inter-jurisdictional competition within the same metro region to keep these local sales and property tax dollars in their home jurisdictions. This competition for local sales tax dollars often drives municipalities to offer economic incentives for retail development (Artz & Stallman, 2006).

Certain classes of retail or highly concentrated retail stores may complement tourism and associated efforts to draw visitors to a locality. This paper focuses on one of these unique classes of retail development, destination retail in the form of a factory outlet mall. These malls allow for brand-name manufacturers of clothing and apparel to sell their inventory to customers at lower prices than traditional shopping and retail outlets (Reynolds, Ganesh, & Luckett, 2002). In theory, they serve as a tourism venue by attracting destination shoppers from outside of the region who otherwise would not visit and spend money (Patton, 1985). Destination retailers and sports stadiums are among the common non-export based businesses who claim to attract purchasers external to the region to justify their requests for financial assistance and incentives (Bartik, 2011). A vexing issue for local governments is the extent to which spending at a destination retailer comes from shoppers outside of the region versus residents who would have shopped locally without the presence of the retailer.

3. Local sales taxes

Local sales taxes, particularly local option sales taxes (LOST) have received considerable attention in the academic literature. This review is brief, as the intent is not to undertake a comprehensive review of the literature, but rather to demonstrate that retail derived sales taxes constitute essential components of local government finance structures. Under this system, municipalities have the option to administer a sales tax on goods, and sometimes services, purchased within their jurisdiction. In theory, they offer revenue stability through tax base diversification, yet academic literature has not yet found evidence of this in practice (Hou & Seligman, 2010; Afonso, 2014).

Prior studies have found competing motivations for adopting LOST, with some municipalities utilizing it to finance new spending and others utilizing to reduce property tax rates (Sjoquist, Walker, & Wallace, 2005). More recent research finds that counties also use the technique to reduce property tax burdens and increase revenue (Afonso, 2014). Research

has also shown that municipalities relying on local sales taxes positively influence retail sales in non-central places (Wassmer, 2002).

Regardless of the motivation for adopting LOST, the consequence is often regressive. Rural communities in proximity to new urban malls can lose significant portions of their sales tax revenue (Chervin, Edmiston, & Murray, 2000). Revenues from this technique are often more unevenly distributed across local governments than property tax revenues (Zhao & Hou, 2008), which may facilitate the transfer of fiscal resources from poorer counties to wealthier ones, as has proven to be the case in North Carolina (McHugh & Jolley, 2012). North Carolina does not have a traditional LOST system, as counties are restricted to the percentage of local sale taxes that it can impose (NCCCR, 2015). At the time of their study, very little deviation existed among counties in local sales tax percentage.

4. Natural experiments and public finance

Natural experiments have been at the heart of much work in economics (DiNardo 2007, 12). The technique is useful when the researchers do not have an opportunity to assign participants to treatment and control group, like standard experiments in the social sciences and policy analysis. Instead, a random intervention like a policy change, natural disaster or unplanned event produce the differences among the geographical, political or social units of observation. The intervention creates a true randomization effect that could not be created otherwise (Dunning, 2012). Natural experiments also have an advantage over laboratory experiments in offering researchers control as participants; in this case, local governments cannot opt out of the experiment (Al-Ubaydli & List, 2015). Additionally, the technique's analytical utility lies in the ability to facilitate the "evaluation of an actual policy" but "depends on how one judges the power of other methods of inquiry (DiNardo 2007, 13).

There are several additional advantages of using natural experiments in public finance. First, natural experiments can be cost effective, considering the wide-scale availability of the public reported data. Second, they do not have ethical or implementation constraints in comparison to conventional experiments, where a researcher has to deprive the respondents of services by assigning them to a control group (Cook & Campbell, 1979). Finally, public finance practitioners can easily use the technique for evaluating projects and programs.

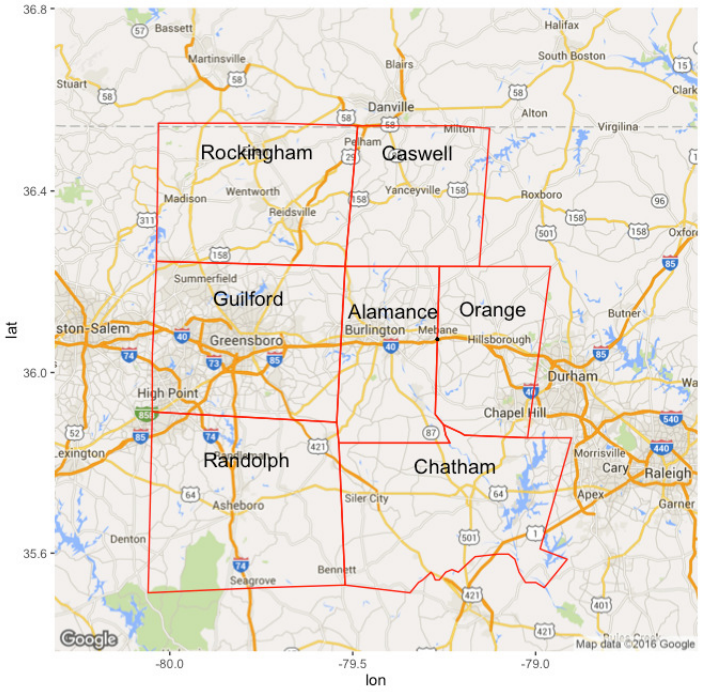
Natural experiments have an established history within regional science. In their assessment of the Appalachian Regional Commission, Isserman and Rephann (1995) utilized a quasi-experimental design to "match" a county to a "twin" that does not receive the same treatment effect. This methodology and derivatives of it have also been used in public finance and regional science to study the impact of stadiums on property values (Dehring, Depken, & Ward, 2007), school district property tax decisions (Johnston, Marlowe, Matkin, & Hayes, 2011), tax-induced migration of millionaires (Young & Varner, 2011), impacts of local land transfer taxes on land sales (Dachis, Duranton, & Turner, 2012), impacts of minimum wage laws on fast food employment (Persky & Baiman, 2010), and impacts of oil and gas exploration (Tunstall, 2015).

Others have taken a stronger focus on examining the border effect when policies different from bordering jurisdictions. Numerous scholars have found that geographic borders are a "useful device for natural experiments" (Feser, 2013, p. 57); Holmes (1998) examined the impact of "right to work" laws in a comparison to strongly unionized states and found a significant border effect and increases in manufacturing activity in right-to-work states. Holcombe and Lacombe (2004) compared tax rates and economic growth in counties across state borders, finding that higher marginal tax rates (when compared to neighboring states) had slower economic growth. Kahn and Mansur (2013) used Holmes (1998) border-pairs design to compare manufacturing growth on the borders of right-to-work and unionized states. They found counties with lower electricity prices had a concentrate of energy-intensive industries, while labor-intensive industries tended not to locate in heavily unionized counties. Other tax-related border studies have included enterprise zones (Billings, 2009), local taxes, and property values (Charlot, Paty, & Visalli, 2013). The main condition underlying their validity is that "treatment and control groups created by the natural experiment are similar in terms of all observed and unobserved factors that may affect the outcome of interest" (Sekhon & Titiunik, 2012, p. 36), a point that drove our group selection.

5. Methods: the Tanger outlets case

The City of Mebane (Population estimate: 12,981 per U.S. Census Bureau, 2013) is primarily located in Alamance County, though a small portion of its jurisdiction extends into Orange County. Interstates I-40 and I-85 pass through the town, connecting it to the larger metro areas of the Piedmont Triad (Greensboro, Winston-Salem, and High Point) to the west and the Research Triangle (Raleigh, Durham, and Chapel Hill) to the east. Figure 1 demonstrates Tanger Outlet's location in Alamance County and proximity to the seven counties in the study region.

Figure 1: Location of Tanger Outlet in the Seven-County Region



Source: Google Maps

In 2010, Tanger Outlets developed a 317,572 square feet outlet mall on 52 acres in the City of Mebane just inside the Alamance County border adjacent to Orange County (News & Observer, 2010). The outlet was projected to generate 4.5 million annual visitors, 800 new jobs, $7 million in annual sales taxes, and $200,000 in annual property taxes (News & Observer, 2010). This paper utilizes a natural experiments design to examine the regional and county-level retail spending patterns around the outlet that opened in Fall 2010 in Mebane (Alamance County), North Carolina. A finding of substantial differences in sales tax collections, especially in the area of apparel sales, would suggest that the siting of large retail outlets is an important consideration for local governments seeking to maintain their tax base.

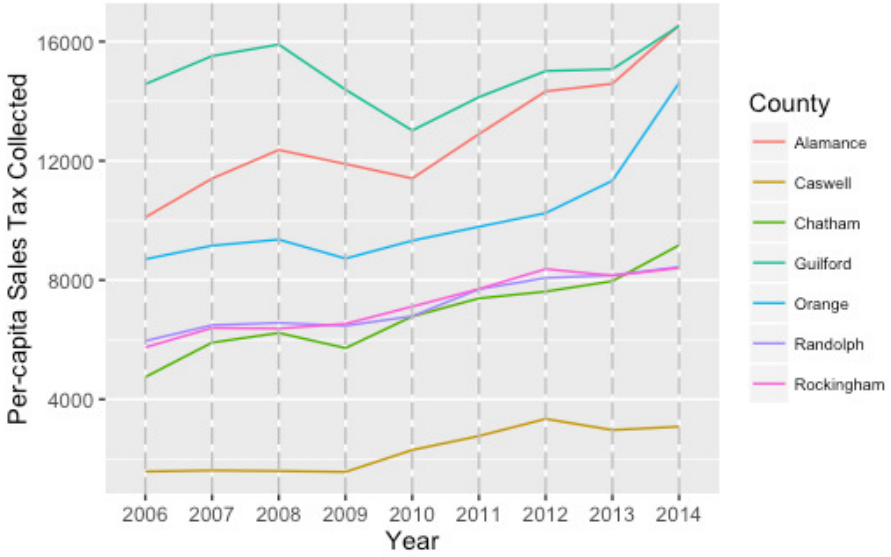
To address the research question, fiscal year publicly available data on the local sales tax collection were accessed for Alamance County and all contiguous counties – i.e., Orange, Caswell, Chatham, Guilford, Randolph, and Rockingham; our study period covers the collection of data from 2006 to 2014. All fiscal data are adjusted for inflation; CPI (All Urban Consumers) series were used, and 2000 was used as the base year to construct the adjustment factor. The resulting real sales tax collections per county per year are converted to per-capita equivalents before performing the analysis. We then calculated "first-difference" and "difference in difference" sales tax time series comparisons.

It should be noted that North Carolina joined the Streamlined Sale Tax Agreement, which changed the manner and type of data collected and reported. As such, trend comparisons prior to 2005 may not be accurate. Additionally, the state stopped reporting sales tax data for small municipalities, such as Mebane, so it is impossible to make direct comparisons on point of sale for small municipalities.

6. Analysis

As is evident from Figure 2, starting in 2009 per-capita sales tax collections were rising in all counties except for Alamance and Guilford. However, in 2010 sales tax collections began rising for Alamance and Guilford, with some of the steepest increases occurring in Alamance. One does see a continued rise in per-capita sales-tax collection for the other counties, but the rate of change is considerably smaller.

Figure 2: Taxable sales



Source: Author's calculations from North Carolina Department of Revenue Sales and Use Tax Statistics

Table 1 demonstrates that most of the Tanger Outlet stores sell apparel items. Very few food or other stores exist at the outlet. Therefore, the largest effect on per capita sales would occur in the area of apparel sales.

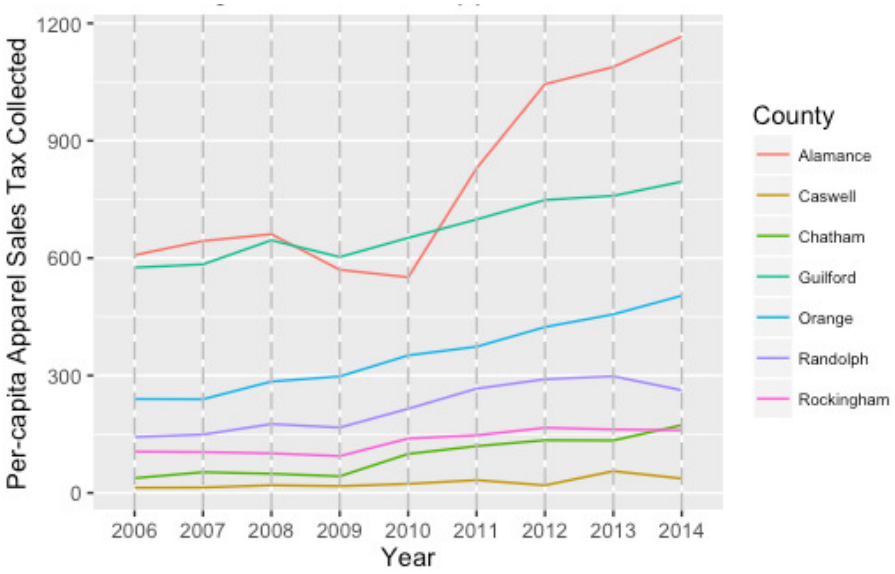
Table 1: Tanger outlet store type

Store type	Store count	Percentage %
Apparel	54	77%
Specialty	7	10%
Accessories	5	7%
Food	4	6%
Total	**70**	**100%**

Source: 2015 Tanger Outlet Mall Directory of Stores

Figure 3 displays the change in taxable sales for apparel, the predominant good sold at Tanger Outlet. Per-capita taxable apparel sales in Alamance County doubled from 2010, the fiscal year that Tanger entered the market, to FY 2014. This growth amounted to the largest increase in taxable apparel sales within the seven-county region, far outpacing that of Chatham and Orange counties.

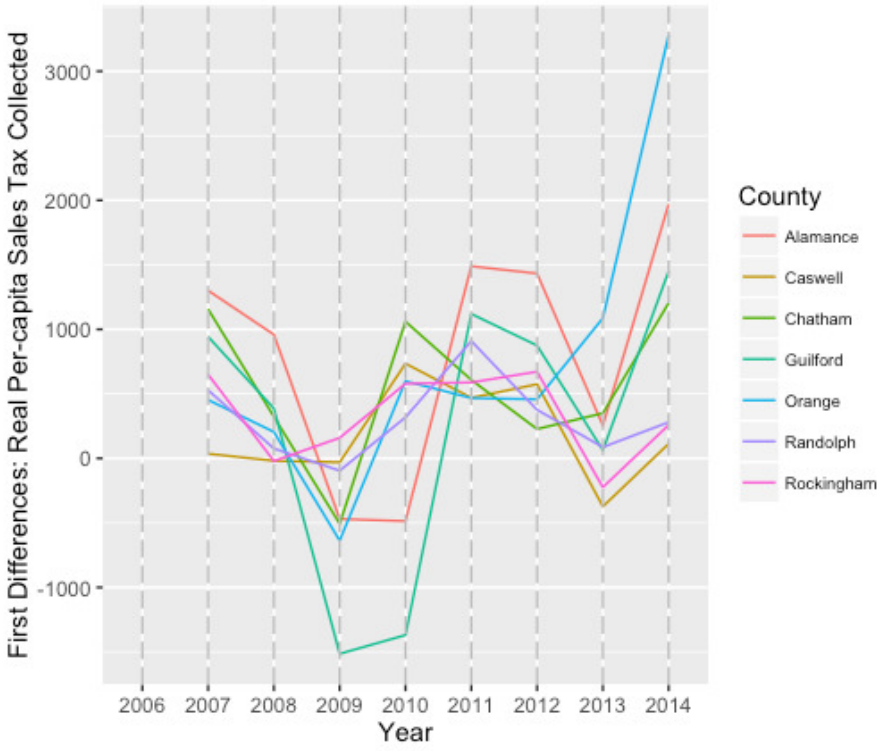
Figure 3: Taxable apparel sales



Source: Author's calculations from North Carolina Department of Revenue Sales and Use Tax Statistics

Next, a first-difference series was calculated to show real per-capita sales tax collection movement from one fiscal year to the next for all counties.

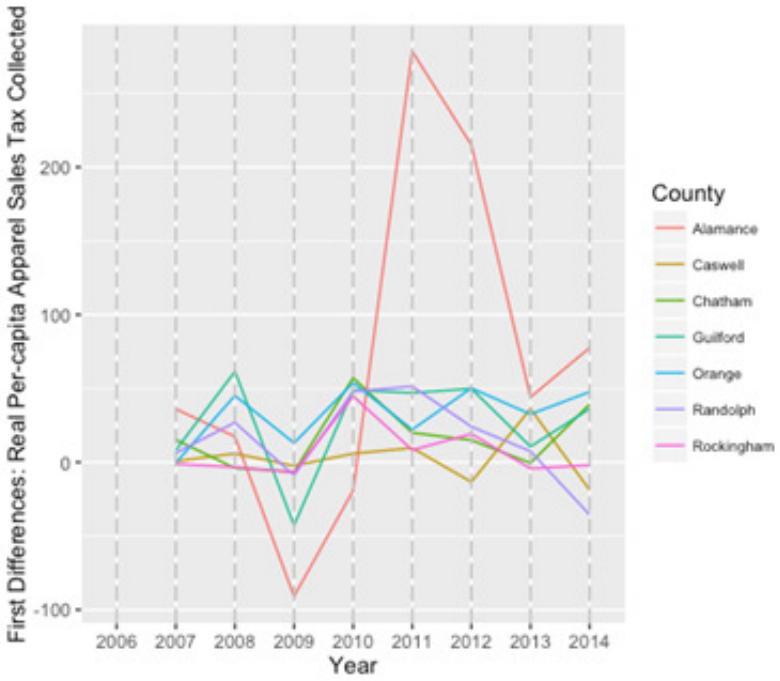
Figure 4: First-differences of total sales tax



Source: Author's calculations from North Carolina Department of Revenue Sales and Use Tax Statistics

While the first-difference series (see Figure 4) of total sales tax collected (per county, and in real per-capita terms) show considerable movement from one fiscal year to the next, it does not distinguish Alamance's trend. Figure 5 is more illustrative, as the taxable apparel sales series are plotted, it is quite clear that an uptick in taxable apparel sales began in FY 2009, accelerated in FY 2010, peaking in FY 2011 (the first fiscal year with the Tanger Outlet in operation). The year-to-year movement settles down back to the average for the rest of the counties by FY 2013. Once again, the series suggest a markedly different trend in Alamance as compared to that in the other six counties (including Orange).

Figure 5: First-differences of apparel sales tax



Source: Author's calculations from North Carolina Department of Revenue Sales and Use Tax Statistics

To be sure, a review of the trends in apparel sales tax collections and per-capita LOST suggest that the Tanger Outlet Mall had an impact on Alamance County relative to contiguous counties. To test this possibility via fitting difference-in-difference models to two outcomes – (a) the real per-capita sales tax collected, and (b) the real per-capita apparel sales tax collected was attempted. Although these suggested a significant increase in real per-capita sales tax collections, these models did not allow a conclusion that the increases in Alamance did not extend to the other counties as well.

7. Closing thoughts and conclusion

Our evidence suggests that Tanger's entrance into the market significantly increased the tax collections in Alamance County, especially in the area of apparel sales relative to surrounding counties. This effect dissipated after several years before per capita sales taxes normalized. We hypothesize that the patterns realized within our study were influenced by external factors, including general economic conditions, structural changes in larger apparel and retail markets, and state tax policy that may prove important considerations for future research.

The sharp economic downturn that began in 2009 resulted in a drop of consumer spending in both the retail sector and apparel sales. Net profit for U.S. retail trade corporations in Q1 2009 was roughly half that of Q1 2006, and apparel sales dropped 29% between Q1 2008 and Q1 2009, though both rebounded to more "normal" levels in the next year (Census Economic Survey, 2016). The trends specified by Census economic indicator data across these sectors reflect the same degree of volatility evidenced in our data.

During our study period, there was also a substantial increase in e-Commerce, which would have a diminishing effect on local tax collections. In 2006, it accounted for 2.6% of total retail activity, by the end of 2014 this accounted for 7.0% (Census, 2016). Additionally, the apparel sector saw a 350% increase in online sales from 2006-2014. The younger, technically savvy residents that make up the Triad and Triangle (that might otherwise be drawn to the Tanger Outlet) are increasingly turning to online retailers. Though e-Commerce still accounts for a relatively small proportion of total sales (7.8%), it does comprise of 60.4% of retail sales growth (Census, 2016). Continued growth in online retail would increasingly hinder sales at retail outlet malls, and would work to undermine the efficacy of destination retail as an economic development tool and a revenue source.

Compounding this effect, online retailers were not required to collect sales tax if they had no physical presence in the state, creating an annual revenue loss estimated $214 million in 2012 (WRAL, 2014). The effect on Alamance County is magnified by the state's tax system, which at the time relied on a combination of the "county of purchase" collection and per capita population counts for distribution. The county's population ranked 18th out of the states 103 counties in 2012, and would lose disproportionately more revenue than other counties under this system. Though outside of the scope of this analysis, the new tax distribution formula implemented in FY 2016 further reduces distributed sales tax revenue to Alamance County to 0% for a system favoring redistribution to the state's struggling rural counties. Proposed changes also eliminated the local sales tax option all together in favor of a pure state sales tax, which could have caused counties to "lose control of their fiscal stability if local sales taxes become state revenues" but were later removed ("Bill Shakes Up," 2015).

This paper supports prior research on the "fiscalisation of land use for retail activity" (Wassmer, 2002: 1323) and provides evidence to suggest the location of retail outlets is an important consideration for competition among jurisdictions in the same market for sales tax dollars. While retail jobs may not offer significant wages, local governments, especially those with LOST systems, should be aware of potential sales tax impacts of destination retail outlets locations as clear winners and losers exist, especially in the short-term. As a long-term development strategy, we believe that economic developers be cognizant of changing patterns in consumer behavior (i.e. e-Commerce) and changes in state tax policy (particularly with LOST systems) that may eventually undermine its utility for generating local tax revenue.

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CABLE AND PIPELINE CORRIDORS UNDER THE LEGAL FRAMEWORK OF UNCLOS END THE ENERGY TREATY. GEOPOLITICAL CONSIDERATIONS AT THE EASTERN MEDETERRANEAN SEA

Georgios-Alexandros SGOUROS
gesgour@geol.uoa.gr

Ioannis Th. MAZIS
Professor of Economic Geography and Geopolitics, Dept. of Turkish and Modern Asian Studies.
National and Kapodistrian University of Athens
yianmazis@turkmas.uoa.gr

Abstract

This article is divided in three sections; the first is presenting the plethora of fiber optic and power cable geographical distribution, providing to the reader an insight to underwater infrastructure. Readers can bind together the importance of survey, lay, repair and maintenance of underwater cables and pipelines, based on the legal framework provided by the Energy Treaty and UNCLOS. The second section provides a brief report on notions mentioned in the International Energy Treaty. We also mention the Energy Treaty and the Energy Treaty Charter as a case study for pipeline and power cable installations; At the third section, we focus especially at the genesis of UNCLOS with regards to the EEZ maritime zone regime; At this section, we will present the difference between the terms marine research and cable route study, based on the applicable UNCLOS conventional terminology. The last section of this article will be an effort to carefully examine whether these two Treaties are sufficient to regulate transnational cable surveying and laying operations under the current geopolitical frame in the Eastern Mediterranean Sea; as new oil and gas fields are being developed in the region two factors affect the geopolitical equilibrium: 1) The disputed EEZs in the Eastern Mediterranean, 2) The role of Turkey based on its destabilizing and revisionist stand as this is highlighted by extreme geopolitical behaviors causing the present instability in the geopolitical environment of the Eastern Mediterranean, mainly with regards to the supply of energy from discovered gas reservoirs in the Eastern Mediterranean.

Keywords: EEZ, UNCLOS, Energy Treaty, Cables, Pipelines
JEL classification: R21, R32

1. Introduction

Under the prism of the international legal framework certain geopolitical/economic factors have a specific gravity. These factors and their interactive role on the geopolitical actors of the Eastern Mediterranean that affect energy related activities consist the cornerstone of the present text. Our conclusive remark is that the geopolitical distribution of power and the resulting balance of power is now at a critical threshold making it now, more than ever, imposing the international laws a critical issue; upholding International Laws, with the consensus of the neighboring States and the transnational powers that already have concrete and solid interest in EU energy security, is promoted by maintaining the geopolitical equilibrium in the Eastern Mediterranean region.

In this article, we devoted a substantial effort in describing the legal regime established through international law for activities such as survey, lay, repair and maintenance of underwater cables and pipelines, based on the legal framework provided by the **Energy Treaty** and **UNCLOS**. We focus especially in the EEZ maritime zone regime of the Eastern Mediterranean due to existing EEZ disputes; Whereas the territorial sea of each **Coastal State** falls under the full State's jurisdiction, the submarine cables and pipelines in that zone are governed by the same legal regime applicable for land cables and pipelines. In the other maritime zones extending from 12 nautical miles seawards, UNCLOS is the only internationally recognized legal tool regulating the right to survey, lay, bury and repair a cable, also describing the right of a State to question, or, as occurs in many occasions, to

oppose such activities or undertakings. A second key point discussed in this article is the role of the **flag state** and their right to mediate in EEZ disputed areas; several examples of the flag state intervention will be discussed, especially in the Eastern Mediterranean region. We will also mention the **Energy Treaty** and the **Energy Treaty Charter** as a case study for future pipeline and power cable installations; the full concept of the application of this treaty in the Eastern Mediterranean has been understudied, up to date, most of the cases where the treaty has played a substantial role as a legal mechanism has been in the Caspian Sea, where pipeline development plans are way ahead in terms of project initialization and planning.

The concluding remark of this article will be an effort to carefully examine whether these two Treaties are sufficient to regulate transnational cable surveying and laying operations but not only; it will try to examine the current geopolitical frame of the Eastern Mediterranean Sea as new oil and gas fields are being developed in the region. Consequently, there are two questions we address and attempt to answer;

1. What are the high level geopolitical requirements, risks, considerations, applicable constraints and assumptions that must be considered in order to enable the energy supply from the newly found reserves of the Eastern Mediterranean route to the European Energy Market?
2. Are the two treaties sufficient legal framework to protect the new investments pushing aside the claims and disputes existing in the Eastern Mediterranean Seas?

Furthermore, the reader will note in the next paragraphs that it is not uncommon for Companies and States to enter different types of agreements and special international treaties, describing contractual terms under the existing legal regime that the aforementioned treaties describe in full extent. Nevertheless, due to the complicated nature of transnational interconnections, some deficiencies in the current legal framework have been identified and explained in this document.

2. What Is The Status On The Seabed Today?

2.1. Submarine Fiber Optic Cables

According to the International Cable Protection Committee (ICPC), underwater telecommunication cables hold a predominant role of over 95% of international voice and data traffic, having apparent advantages against satellite communication in respect of traffic and cost, ensuring high reliability, cost effectiveness, increasing capacity and security. Additionally, 100% of transoceanic internet traffic relies on submarine cables. The increased amount of traffic also lead several companies such as Facebook and Google to build their own subsea cable infrastructure in order to handle the amount of internet traffic.

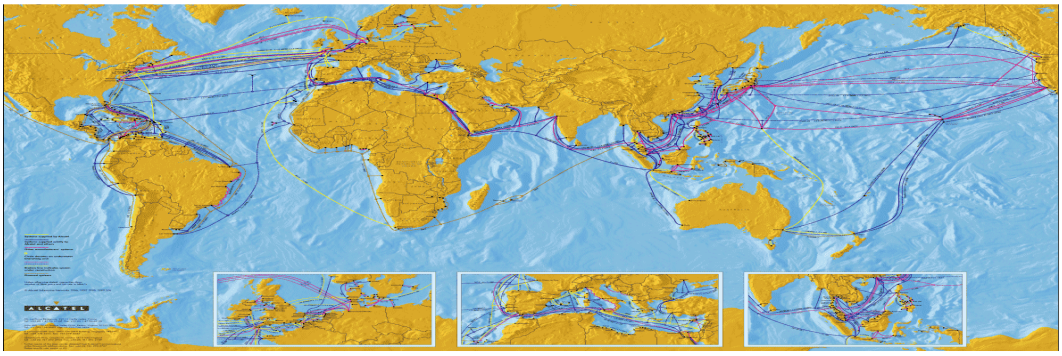
As a matter of fact, Google has announced in 2014 that it has joined five other companies to build a trans-Pacific cable system that connects the west coast of the U.S. to the cities of Chikura and Shima in Japan. Known as FASTER, the cable system is estimated to cost $300 million. FASTER addresses the traffic demands for broadband and mobile content on the trans-Pacific route. FASTER will be designed with 6-fiber-pair cable and optical transmission technologies with an initial capacity of 60Tb/s (100Gb/s x 100 wavelengths x 6 fiber-pairs). The other five investors in FASTER include China Mobile International, China Telecom Global, Global Transit, KDDI and SingTel. NEC, will be the system supplier for **FASTER**.

On the other hand, on the 30th May 2016, Facebook and Microsoft joined the race with a massive 4000-mile underwater cable which is just the latest of a dozen high capacity trans-oceanic cables being built by tech companies to deal with their insatiable demand for bandwidth.

The underwater plant will run from Virginia to a data hub in Bilbao, Spain adding on a cat's cradle of cables now belonging or funded by large tech companies rather than telecommunication companies. Currently, due to this increasing trend, data transmission by high technology companies consist of approximately 20% of the world's internet traffic.

Let's note that Google began the trend in 2010 when it invested in a cable across the Pacific between the United States and Japan called **Unity**. Google also has plans to invest in five undersea cables whereas Microsoft plans another four, Facebook two and Amazon one. Many other plans are not yet publicly announced.

Figure 1 An overview of undersea cross-border fiber optic communication cables.



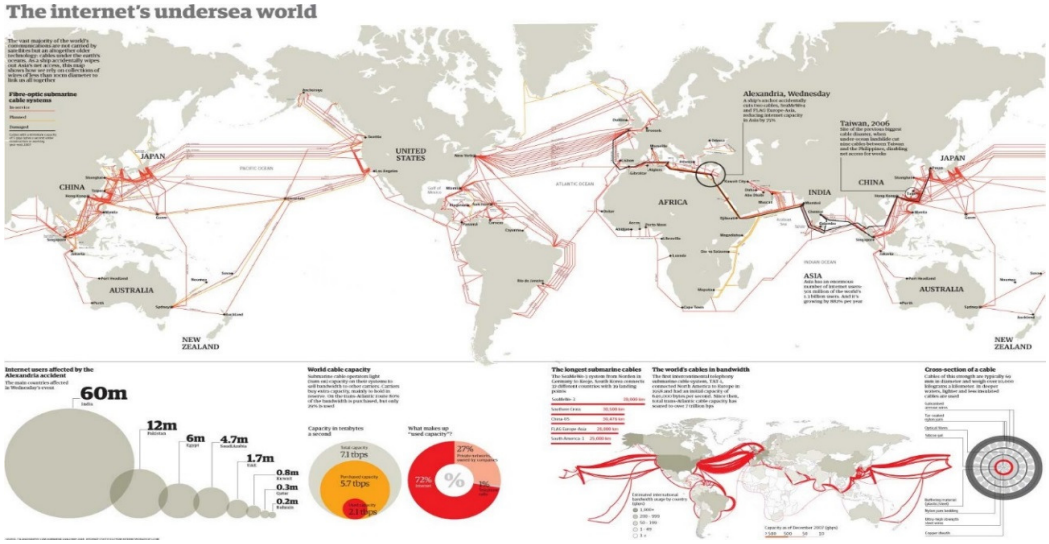
Source: Alcatel – Lucent Submarine Networks

In the 20th century, telephony became the driving force for submarine cable deployments. TAT-1 was the first trans-Atlantic telephone cable installed in 1956 having the capacity to transmit 36 analog phone channels simultaneously. These days' fiber-optic submarine cables carry the bulk of the trans-oceanic voice and data traffic. In the past two decades, many of these cables have been deployed, primarily triggered by the explosive growth in Internet traffic.

The world map of cable routes shows that Europe, North America and East Asia are well connected; numerous cables connect the continents and countries. However, Africa, the Middle East and South Asia have far fewer cable systems. Looking at the available bandwidth or capacity in these cables **[1]**, the differences become even more apparent. Faults in cables connecting these regions therefore have a higher impact than comparable faults in trans-Atlantic cables.

Although they rarely make news headlines, cable faults are not uncommon. Global Marine Systems, a company active in submarine cable installations and repairs, reported more than 50 failures in the Atlantic alone in 2007. To limit the impact of such faults, cable systems often have built-in redundancy. Ring structures, for example, cross the ocean twice, each cable segment taking a geographically different route. When one segment breaks, signals can still reach the destination over the other segment(s). Repairs can then take place without much media attention.

Figure 2. The Alexandria incident. A ship's anchor cut two cables near Alexandria, Egypt. As a result, internet capacity in Asia was reduced by 75%, mainly affecting almost 80 million internet users in India, Pakistan, Saudi Arabia, UAE, Oman, Qatar, Bahrain and Egypt.



Map Source: http://visual.ly/internets-undersea-world

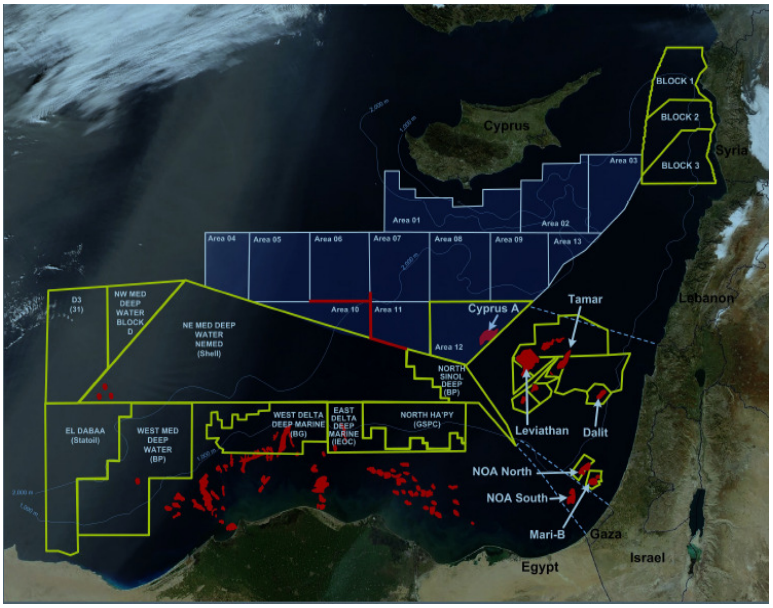
2.2. Pipelines

Modern pipelines provide is a safe and environmentally friendly method for transporting oil, gas, fluid carbon dioxide, hydrogen, gas liquids, chemicals and other material.

Additionally, they are the cheapest method of oil and gas transportation. It is expected that the demand for pipelines will continue to grow, since the traditional source fields are being depleted, as is the case of the North Sea reserves and the new sources are often landlocked, or require great transit distance (especially in the case of gas materials). I am making this reference so that we can discuss below the case of the East Med pipeline. The planned distance from Cyprus to Greece is well over 800 km, thus in case this project moves forward will become the longest pipeline ever laid until today. But we are still in the conceptual phase and many hurdles need to be overcome in order to have a feasible and viable route to connect the Israeli and Cypriot gas reserves with Europe through this route.

For the sake of discussion, the legal definition of a pipeline is a *"... connected series of pipes with pumping and control devices for the conveying of liquids, gases, or finely divided solids"* **[2]**. Submarine pipelines in the territorial waters follow same legal norms that apply to the land based pipelines. In addition to the various national laws' regulations, several international rules regulate land-based pipelines and the transit of goods through them. Some regulate open trade principles, like the General Agreement on Tariffs and Trade (GATT)**[3]** replaced by the World Trade Organization (WTO), which was concentrated on reducing the barriers on trade (based on tariffs, quantitative restrictions and subsidies). A comprehensive web reference for the GATT documentation is available at the CIESIN Thematic Guide (www.ciesin.org). The legal deficiencies and questions risen throughout the years, and as transnational projects were designed specifically to promote the EU energy security, the international community has devised the Energy Charter Treaty that deals specifically with the cross-boundary pipelines on a global level.

Figure 3. An overview of the Offshore Oil and Gas Blocks in the Eastern Mediterranean region



Source: http://www.radiusocean.com

2.3. Submarine Power Cable Interconnections [4]

With emerging new technologies enabling installations up to 3000m water depth, transnational power cable interconnections are expected to increase rapidly in the next decade. Since this is a rather new technological development, statistical and historical data for deep-water installations do not exist.

Power cables link countries separated by small to medium width water bodies on the same continent or at its fringes. There are a small number of intercontinental links like Spain-Morocco interconnection and the Red Sea Cable (Egypt-Jordan) but they are HVAC interconnectors and run on short distances (up to 30 km).

Most of the transmission power cables at the moment are laid in rather shallow waters, i.e. at less than 500 m depth. Only three cables go beneath this depth: HVDC Italy-Greece (1000 m), Cometa HVDC (1485 m) and SA.PE.I. (1650 m), which is the deepest in the world. The

two deepest ones were both produced by Prysmian and are of mass impregnated (MI) paper type.

The most challenging power cable interconnection in the world is now the EUROASIA Interconnector. Upon completion, this will constitute the world's deepest power cable interconnection, reaching approximately 3000m water depth, spanning between Israel, Cyprus and Greece. The project is funded by the EU under the EU Energy Security Strategic Plan and it is envisaged to be completed by 2022.

Table 3. Existing power cable interconnections

	CABLE NAME	*COUNTRIES LINKED OR INVOLVED*	*BODY OF WATER*	*POWER (MW)*	*VOLTAGE (KV)*	*SUBMARINE LENGTH (KM)*	*COMMISSIONING YEAR*
1	NorNed	Norway, Netherlands	North Sea	700	450	580	2007
2	SAPEI	Italy	Tyrrhenian Sea	1000	500	420	2012
3	SACOI	Italy, France	Tyrrhenian Sea	300	200	121	1968
4	HVDC Italy-Greece (Grita)	Italy, Greece	Ionian Sea	500	400	160	2001
5	East-West Interconnector	UK, Ireland	Irish Sea	500	200	186	2012
6	BritNed	UK, Netherlands	North Sea	1000	450	240	2011
7	SwePol	Sweden, Poland	Baltic Sea	600	450	239	2000
8	Baltic Link	Sweden, Germany	Baltic Sea	600	450	231	1994
9	Skagerrak I	Denmark, Norway	Baltic Sea	250	250	127	1977
10	Skagerrak II	Denmark, Norway	Baltic Sea	250	250	127	1977
11	Skagerrak III	Denmark, Norway	Baltic Sea	440	350	127	1993
12	Skagerrak IV	Denmark, Norway	Baltic Sea	700	500	137	2014
13	Cometa HVDC	Spain	Mediterranean Sea	400	250	244	2012
14	Fennoskan1	Sweden, Finland	Gulf of Bothnia	500	400	200	1989
15	Fennoskan2	Sweden, Finland	Gulf of Bothnia	800	500	200	2011
16	EstLink 1	Estonia, Finland	Gulf of Finland	350	150	74	2006
17	EstLink 2	Estonia, Finland	Gulf of Finland	650	450	145	2014
18	Kontek	Germany, Denmark	Baltic Sea	600	400	52	1995
19	Gotland I	Sweden	Baltic Sea	30	150	98	1954
20	Gotland II	Sweden	Baltic Sea	130	150	92	1983
21	Gotland III	Sweden	Baltic Sea	130	150	92	1987

	CABLE NAME	*COUNTRIES LINKED OR INVOLVED*	*BODY OF WATER*	*POWER (MW)*	*VOLTAGE (KV)*	*SUBMARINE LENGTH (KM)*	*COMMISSIONING YEAR*
22	HVDC Cross-Channel	France, UK	English Channel	2000	270	46	1986
23	HVDC Moyle	UK	Irish Sea	500	250	55	2001
24	Storebælt	Denmark	Baltic Sea	600	400	32	2010
25	Kontiskan 1	Denmark, Sweden	Kattegatt Strait	250	285	21	1965
26	Kontiskan 2	Denmark, Sweden	Kattegatt Strait	300	285	21	1988
27	Neptune Cable	US	Lower Bay	660	500	80	2007
28	Trans Bay Cable LLC	US	San Francisco	400	200	85	2010
29	Vancouver Island Pole 1	Canada	Strait of Georgia	312	260	33	1968
30	Vancouver Island Pole 2	Canada	Strait of Georgia	370	280	33	1977
31	Cross Sound Cable	US	Long Island Sound	330	150	39	2005
23	HVDC Leyte - Luzon	Philippines	San Bernardino Strait	440	350	21	1988
33	HVDC Hokkaidō–Honshū	Japan	Tsugaru Strait	300	250	44	1979
34	Kii Channel HVDC system	Japan	Kii Channel	1400	250	50	2000
35	HVDC Inter-Island	New Zealand	Cook Strait	1200	350	40	1965
36	*Basslink*	*Australia*	*Bass Strait*	*500*	*400*	*290*	*2006*

Source: (Modified after Ardelean, M., Minnebo, P.; 2015; HVDC Submarine Power Cables in the World; EUR 27527 EN; doi: 10.2790/95735)

Table 4 . Planed power cable interconnections

	CABLE NAME	*COUNTRIES LINKED OR INVOLVED*	*BODY OF WATER*	*POWER (MW)*	*VOLTAGE (KV)*	*SUBMARINE LENGTH (KM)*	*COMMISSIONING YEAR*
1	Ice Link	Iceland, UK	North Sea/Atlantic	1200	N/A	1170	2022
2	NorGer	Norway, Germany	North Sea	1400	450	630	N/A
3	NSN Link	UK, Norway	North Sea	1400	N/A	711	2021

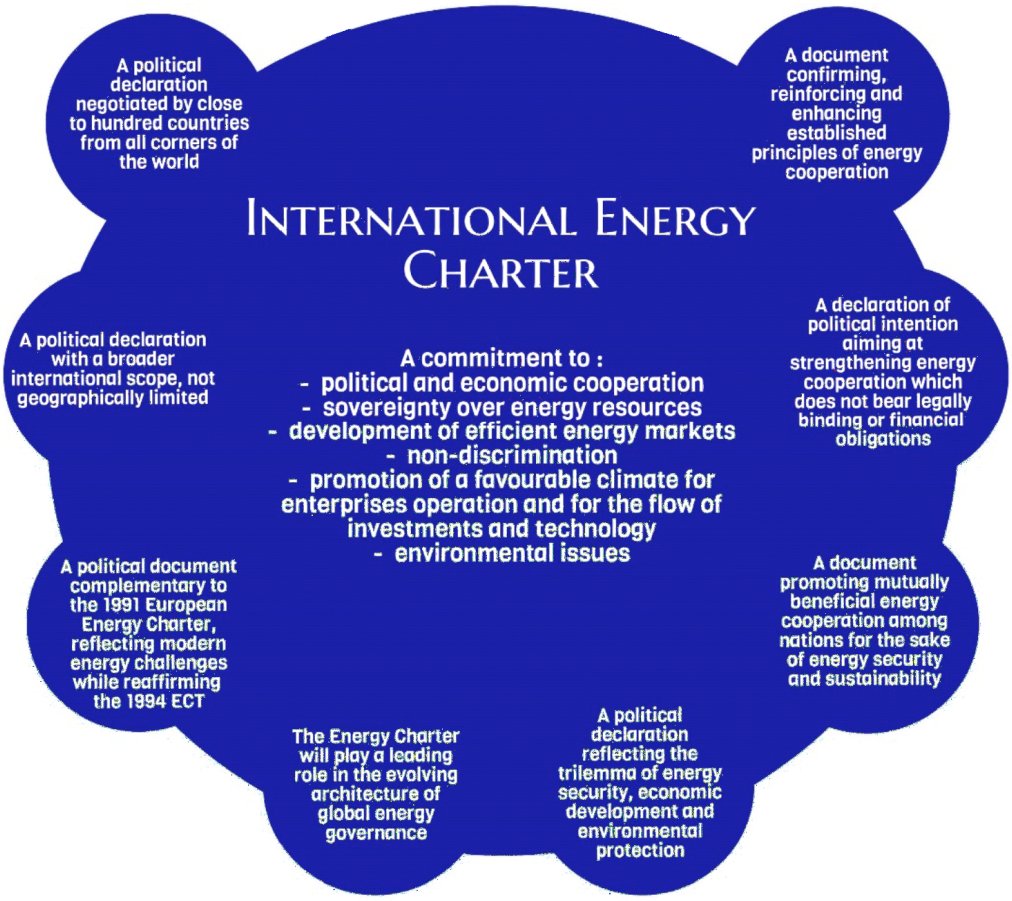
	CABLE NAME	*COUNTRIES LINKED OR INVOLVED*	*BODY OF WATER*	*POWER (MW)*	*VOLTAGE (KV)*	*SUBMARINE LENGTH (KM)*	*COMMISSIONING YEAR*
4	NorthConnect	Scotland, Norway	North Sea	1400	500	650	2025
5	Nord.Link	Norway, Germany		1400	525	500	2020
6	NordBalt HVDC	Sweden, Lithuania	Baltic Sea	700	400	400	2015
7	UK Western Link	UK	North Channel	2200	600	385	2016
8	Interconnexion France-Angleterre (IFA 2)	France, UK	English Channel	1000	N/A	208	2020
9	Nemo Link	Belgium, UK	English Channel	1000	400	130	2019
10	Euro-Asia Interconnector	Israel, Cyprus, Greece	Mediterranean Sea	2000	N/A	1000	2022
11	Labrador-Island Link	Canada	Strait of Belle Isle	900	315	35	N/A
12	Maritime Link Project	Canada	Gulf of St. Lawrence	500	200	170	2017
13	HVDC Sumatra-Java	Indonesia	Malacca Strait	3000	500	35	2017
14	INDIA-SRI LANKA POWER LINK	INDIA, SRI LANKA	PALK STRAIT	1000	400	39	N/A

Source: (Modified after Ardelean, M., Minnebo, P.; 2015; HVDC Submarine Power Cables in the World; EUR 27527 EN; doi: 10.2790/95735). Please note EUROASIA Interconnection; Reconnaissance offshore survey has already been completed and pre-engineering route considerations are in place. The detailed survey is planned to commence within Q2/2017.

3. Energy Charter Treaty

3.1. Energy Charter Treaty as a legal instrument; where does it fit in the cable and pipeline industry?

In order to understand the provisions of the Energy Charter Treaty, it is necessary to mention a number of legal issues that are considered constraints “usually called showstoppers in case they are not resolved” and need to be addressed before the construction phase of the pipeline project can commence. Those include the political will of the involved States to support and oversee the project, establishment of the legal framework governing the project based on the national and international legislation and applicable rules, and legal construction of the operational phase of the project ensuring that the transit will not be unlawfully disrupted.



With respect to cross-border connections, it is imperative to underline the following considerations emerging from this treaty:

a. The Energy Charter Treaty is a multinational legally binding instrument that deals with the transit of energy products and materials. We must note that the Energy Charter Treaty and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects entered into force in 1998, numbering 53 members (two of which are European Community and Euratom), with 48 ratifications (or approvals or accessions), two cases of provisional application of the Treaty (Belarus and Russian federation), and three signatories.] Greece, Cyprus and Turkey are members of the Energy Treaty and are legally bounded to apply the rules and framework of cooperation described in the ET.

b. The Treaty's purpose is to "*promote energy security through the operation of more open and competitive energy markets, while respecting the principles of sustainable development and sovereignty over energy resources*".

The reader should note that submarine power cables methodology differs significantly from the pipeline construction; interconnections do not require any significant infrastructure to be laid on the seabed apart from the cable itself and a number of submarine joints, thus zeroing the role of the transit State (a State through which a cable is passing through but without landing station) with regards to "geopolitical interventions"; there are no control and metering techniques (just using a common expression here: nobody has the control to open or close a valve, as in the case of pipelines) applied by transit states. A power cable interconnection with starting point at the Sending State, crossing and EEZ of a transit State, arriving in the Receiving State, requires much lesser effort for implementation and possibly no taxation from transit states, unless otherwise specified and agreed between states, due to the application of UNCLOS legal regime in combination with the IEC, IET and EET.I

In the case of pipelines and according to Malecek [5], as described by Mudric in [6] "the main benefits that the transit states enjoy are the attraction of foreign investments (resulting in short-term and long-term creation of jobs, and possible development of domestic energy

industry) and the collection of the transit fees". Additional benefit is the strengthened national security due to the fact that other countries take interest in the peaceful political and legal environment of the transit state. Another beneficial factor to be taken into consideration are the energy needs of the transit state that can also be secured by the passing pipeline, and the energy export capabilities through the passing pipeline. However, both import and export factors can have a negative impact on the transit state, because commencing the operation of the pipeline might cause a rise in the energy prices affecting the import of energy, or, due to the opening of additional sources of energy products, the transit state that exports its own energy resources might lose some of its export income. In the case of the Eastern Mediterranean, Egypt, Cyprus and Israel are the most promising and potential export countries of natural resources to the EU supply market where a strengthened national security factor is applicable.

We shall endeavor to focus on the main legal definitions controlled by the Energy Treaty with respect to pipelines, in order to explain the rules and obligations derived by this legal instrument.

The fundamental principles of the Energy Charter Treaty are the strengthening of the rule of law on energy issues, creation of the set of rules to be respected by all members, and mitigation of the risks associated with energy-related investment and trade. The provisions of the Treaty aim to protect the foreign investment (fair and equitable conditions for investments, protection against expropriation and nationalization), ensure non-discriminatory cross-border energy transit (open and competitive market based on commercial terms, without anti-competitive behavior), establish the resolution of conflicts system, promote energy efficiency and minimize negative impact to the environment. According to the Treaty [7], the term "transit" is defined (Art 10/10(a) (i)) as the:

"Transport of goods (energy materials and products) from a country, through at least one other country, to a third country"

The transport facilities included under the provision of the Treaty (Art 10/10(b)) are: high-pressure gas transmission pipelines, high-voltage electricity transmission grids and lines, crude oil transmission pipelines, coal slurry pipelines, oil product pipelines and other fixed facilities specifically handling energy materials and products (e.g. port terminal facilities).

According to article 7/1, contracting parties have a duty (Art 7/1) to **facilitate** the transit, **ensure** that the **freedom of transit** is **respected** ("without distinction as to the origins, destination or ownership or discrimination as to pricing on the basis of such distinctions"), and **prevent unreasonable delays**, restrictions or charges.

Two features that deserve closer attention are the **negotiated Transit Protocol**, and the guidelines **for non-legally binding Model Agreements**.

3.2. What is the Transit Protocol?

The protocol is still under negotiation between the Treaty members; its aim is to elaborate the rules regarding the transit of energy products and materials mentioned in (Art 7). Especially ensuring that transit is based on transparent and non-discriminatory basis and to establish the rules for good faith during negotiations, and reasonable and non-discriminatory tariffs.

3.2.1. Current status of the Transit Protocol

As Mudric points out in [6]: "Considering the position of the European Union, the Energy Charter Conference decided on 29 November 2011 to repeal the negotiation mandate of 2009. In view of the possibility of a reset of negotiations on a new Protocol the Trade and Transit Group conducted several stakeholder consultations events on energy transit and cross-border trade to obtain expert advice. It became apparent during consultations that the provisions on energy transit continue to be highly valued by the contracting parties and are considered as unique features of the Energy Charter Treaty since no other multilateral treaty offers comparable rules.

In this direction, the Energy Charter Secretariat [8] is currently conducting broad consultations among government and industry representatives from member states as well as observers on a possible reset of negotiations on the Transit Protocol or an additional Energy Charter instrument on energy transit as a legal framework to facilitate energy trade across

borders and cooperation among energy producing, consuming and transit countries. This task is resulted from the Review under Article 34(7) in 2014, where members identified work on the implementation and enforcement of the transit provisions of the Energy Charter Treaty as a priority activity of the Energy Charter Secretariat".

Nevertheless, it would be prudent to consider another issue that may be bounding Turkey, among all the other Eastern Mediterranean countries Turkey to act per the following mandates:

"It is understood that ***nothing in this Protocol shall derogate*** *from a Contracting Party's rights and obligations under international law, including customary international law, existing bilateral or multilateral agreements, including rules* ***concerning submarine cables and pipelines.***

Furthermore, **it is understood that the provisions of this Protocol are subject to the conventional rules of international law**. The provisions are not intended to affect the interpretation of existing international law on jurisdiction over submarine cables and pipelines or, where there are no such rules, to general international law. For the purposes of this Protocol and without prejudice to any rights or obligations of the coastal state under international law, whenever an article is applied to the Area beyond the outer limits of the territorial seas, the term Contracting Party is understood to be the Contracting Party exercising jurisdiction over the owner or operator of the Energy Transport Facilities".

With respect to Article 4: *For the purposes of this Protocol, it is understood that notwithstanding Article 7(10)(b) of the Treaty, the expression "Energy Transport Facilities used for Transit" excludes "other fixed facilities" to the extent that such facilities are not necessary to secure the flow of Energy Materials and Products in Transit through high-pressure gas transmission pipelines, high-voltage electricity transmission grids and lines, crude oil transmission pipelines, coal slurry pipelines and oil product pipelines.*

3.2.2. Model Agreements

Examples of implementation of different types of agreements can be found in [6]. The Energy Charter Secretariat has prepared two Model Agreements:

(a) Model Intergovernmental Agreement; the Model Intergovernmental Agreement (IGA) is a model international treaty signed between the States involved in the pipeline project. The IGA can regulate issues such as: enactment of special legislation necessary for the implementation and operation of the pipeline project; freedom of transit; land rights approvals, question of ownership, governmental approvals and licenses, usage of equipment and personnel, tariff regime and taxation, and dispute settlement procedure.

(b) Model Host Governmental Treaty Agreement. The Model Host Governmental Treaty Agreement (HGA) is a model agreement between the host government and the pipeline owner and/or investor. The HGA model deals with rights and obligations of the signatories, standards of safety, questions of liability and other issues relevant to the implementation of the project. Since the project participants (owners, operators, investors) do not participate in the IGA agreements, it is necessary for them to acquire certain rights and guarantees. Therefore, certain issues already dealt within the IGA agreement will again be regulated in the HGA agreement.

Other types of agreements may also be utilized for pipeline projects; as is the case of Baku-Tbilisi-Ceyhan.

For the next chapter, the reader must keep the following considerations derived by the Energy Treaty in mind:

- Applies to "through-transit"
- Reference to "Freedom" of transit
- 'Necessary measures to facilitate' [Art. 7(1)]
- Obligation to encourage 'relevant entities' to co-operate in modernising, developing & operating transit facilities, to mitigate supply interruptions [Art. 7(2)]
- 'Non-discrimination' [Art. 7(3)]

- Obligation not to place obstacles in the way of new capacity being established [Art. 7(4)]
- Exceptions to Art. 7 [Art. 7(5)]
- Non-interference with transit of energy materials & products Art. 7(6)
- Unique dispute settlement mechanism –compulsory conciliation

To summarize:

Treaty members are obliged to uphold the freedom of transit in the field of energy transport and the following obligations are generally accepted:

- Non-discrimination principle
- Non-interference for political or economic reasons
- Non-interruption
- Fair and reasonable tariffs, where applicable
- Notification in cases of emergencies, where applicable
- Mutual assistance

3.2.3. UNCLOS, SUBMARINE CABLES and the FLAG STATE

The legal definition of a submarine cable is: "a means of communication laid on the sea-bed between two terminal points".

The International Cable Protection Committee's principal objective is to provide to the industry the regulations for the protection of submarine cables from natural and man-made hazards, the supply of cable awareness programs and relevant charts and to produce a set of guidelines to assist both the cable owners and public authorities for the safeguarding of submarine cables [9]

Among the ICPC recommendations, the following apply to the right of States within their jurisdictional waters:

- **Management of Redundant and Out-Of-Service Cables** (OOS Cables);
- **Recommended Routing and Reporting Criteria for Cables in Proximity to Others;**
- Criteria to be Applied to the **Proposed Crossing Between Submarine Telecommunications Cables Pipelines/Power Cables;**
- **Standardization of Cable Awareness Charts;**
- **Recommended Actions for Effective Cable Protections** (Post Installation).
- **Planning and Removal Considerations** deal with situations where new submarine cables are laid in the position or near an Out-Of-Service cable (the same provisions apply for the subsea structures and mining of the seabed materials). A limited recovery of the OOS cables through the cooperation of the seabed users is suggested. There is no requirement provided by the UNCLOS (or customary international law) to remove the OOS cables outside of the territorial waters, as there is no full sovereign jurisdiction beyond the limits of the territorial sea. Therefore, such removal is based on the decision of the cable owners. Many pre-decision and post-decision factors can influence the cable owners to act in such a manner. This Recommendation aims to assists the cable owners in reaching a compromise in the situation of the cable crossing. A set of technical instructions is provided to assists the cable owners in choosing the right approach and methods both in communicating and executing planned crossing.
- Technical assistance document for both the submarine cables and pipelines owners whose **cables and pipelines are about to cross each other**. Whereas

the crossing of two cables does not necessarily require a special agreement by the parties (a simple exchange of "letters of agreement to cross" should suffice), in the case of the crossing of the cable and a pipeline, the ICPC recommends the executing of the special Crossing Agreement (Model Crossing Agreement is drafted by the ICPC). Such an Agreement should cover the issues of liabilities and rights of parties, consequential losses, construction details, maintenance plans, and mutual recognition of the parties' operations and limitations of their authority.

- Recommendations to suggest that appropriate national Hydrographic Offices should be notified every time a new cable installation has been placed, or the existing one has been moved or removed. Subsequently, these notifications should be noted on the **"Cable Awareness Charts"**, so that all interested parties (fishermen, merchant fleets, oil & gas industry and others) would become aware of the cable presence or removal. The Recommendation provides detailed information on what these charts should consist of, depending on the target group.
- Set of instructions direct Public Authorities on how to inform the Fishing Industry about the existence of the cables and their preservation. Additionally, Military Authorities, various Commercial Entities (Oil & Gas Industry, Cable Maintenance Authorities etc.), Port Authorities, Hydrographic Offices, Local Authorities, Environmental Authorities, should all receive update information. An emphasis is placed on the development of **national legislation on Cable Protection and the establishment of Cable Protection Areas.** Additional measures of monitoring the cable corridors via electronic monitoring equipment (radar, vessel monitoring system), air patrol, sea patrol and terrestrial patrol are suggested.

In practice, a marine survey aims to provide all relevant information with respect to the protection of the submarine cable from shipping, fishing and other activities, and in many occasions including the risk of piracy and terrorism, usually by providing a threat and security risk assessment for the area of operations, if and when this is deemed necessary according to the work scope. Apart from the man-made hazards, the natural hazards include: submarine earthquakes, fault lines & related landslides, density currents and waves, tsunami, storms and sea level rise, other extreme weathers, icebergs and volcanic activity. According to the ICPC, around 70% of the cable faults are caused from man-made hazards (mainly fishing and anchoring, mainly in the water depths of 200m), and around 12% are caused by the natural hazards, Submarine Cable Improvement Group. For a bizarre case of an act of piracy on international submarine cables by Vietnamese fishermen, see [10].

Before the operation of construction and laying of the submarine can commence, a number of criteria needs to be satisfied in order to achieve the necessary standards of safety. It is necessary to select and conduct survey of the possible route/s, calculate impacts of the design and laying to the environment and safety, give proper notification of the position of the cable, and develop a maintaining and repair/replacement plan.

Additional measures of protection include: a cable burial in the seabed trenches (1 to 10 meters, usually in water depths to 1500 meters water depth); designation of non-anchorage areas (where the submarine cables are placed); the creation of cable protection areas (limitation of all activities (like e.g. fishing) which could potentially endanger the submarine cables); coast guard and naval patrols (preferably joint-State cooperation); radar systems, Long Range Identification and Tracking (LRIT) and Automatic Identification Systems (AIS); and, laws and regulations introducing strict penalties for infringements (including specialized laws on terrorist acts, ensuring the cooperation of States). All the afore-mentioned should also be implemented in the EEZ.

3.2.4. Cable systems outside of the territorial jurisdiction of the Coastal State – Legal regime.

Unlike in the Territorial Sea where a land legal regime of the Coastal State fully applies, in other maritime zones defined by the UNCLOS, the Coastal States cannot enforce the full

jurisdiction, but are granted certain rights. The UNCLOS provides several rules regarding laying and operation of the submarine cables63 and pipelines.64 The Convention also defines conditions necessary to be met in order to obtain the right to lay submarine cables and pipelines, and instructs Member States to adopt national legislation that imposes sanctions on those not respecting the rules.

In brief, and prior to UNCLOS, a few international legal instruments regulated the laying and subsequently the related cable survey operations. These conventions nowadays lack the scope to meet the industry demands and the technological developments. Following the first trans-oceanic laying of the cable, it became apparent that it was necessary to devise a legal instrument of protection of such cables outside of the coastal state's jurisdiction, which was, at the time, everything outside of the territorial waters (12 nautical miles). The Convention for the Protection of Submarine Telegraph Cables was adopted by more than 40 countries in Paris in 1884. This convention is still in force in countries not part of any subsequent legislation, although this is detrimental, as the conventions norms do not correspond to present needs. This convention is applicable to telegraph (obsolete) and power cables. According to this convention, the owners cannot take action until a cable is actually damaged.

Due to the efforts of the International Law Commission, on the 29 Apr 1958, the Geneva Convention on the Continental Shelf and the Geneva Convention on the High Seas took over relevant provisions of the Protection of the Submarine Cables Convention and came in to force. More importantly, the scope of the application was expanded to include the protection of the telephone cables, high-voltage power cables and submarine pipelines. Article 26 of the Convention on the High Seas recognized the right of the Coastal State to exploit its natural resources, and gave the Coastal State a right to prevent the laying of the cables and pipelines which unjustifiably interfere with that right (similarly, the Art 4 of the Convention on the Continental Shelf).

3.2.5. EEZ and Continental Shelf and High Seas

The UNCLOS adopted the Geneva Convention norms, extending them significantly, and relating any cable survey and installation activity with the EEZ and Continental Shelf legal definition. The UNCLOS Convention recognizes the right of States to lay, repair and maintain submarine cables and pipelines both in the Exclusive Economic Zone (Art 5873) and the Continental Shelf (Art 7974).

- In the EEZ, the Coastal State has rights (Art 56) regarding the exploration, exploitation, conservation and management of natural and living resources, and the activities adjunct to that zone (e.g., wind-farming). In addition, the Coastal State has a jurisdiction over artificial structures built and marine scientific research conducted in the EEZ, as well as the protection of the marine environment. Other rights of the Coastal State include the right of boarding, inspection and arrest (Art 73), and the right of imposing safety standards.
- Similarly, in the Continental Shelf, the Coastal State has the right (Art 79) to take "reasonable measures" for the exploration and exploitation of the natural resources of the seabed or subsoil, and prevention, reduction and control of pollution (this third option is, however, only reserved for the case of the pipelines, and it does not apply to the cables). Also, the Coastal State is given a right of jurisdiction over artificial structures (Art 80). If the EEZ is established above the Continental Shelf, the regime of the EEZ applies.

The owner of a cable or pipeline to be laid needs to pay due regard to other submarine cables or pipelines already in position, and in the case of pipelines, needs to obtain the Coastal State's consent regarding the delineation of the pipeline (Art 79(3)), and the conditions for the removal after its abandonment (no such consent is necessary for the cables). If necessary, prior information and negotiation with the Coastal State over the route of the cable should be conducted. In case of a conflict, the Coastal State has priority. Article 60 allows the creation of the safety zone up to 500 meters around any installation on the continental shelf to provide for safe navigation (e.g. around pumping stations).

On the High Seas, all States have a right to lay submarine cable and pipelines (Art 87(c),78 Art 11279).

This however does not imply the acquiring of the title on the seabed. Additionally, there is no possibility of establishing a safety zone. The owner of the cable or pipeline to be laid has to pay due regard to the interest of other submarine cable or pipeline already in place and prepare a crossing agreement where the technical requirements are presented to other owners. Namely, the UNCLOS establishes a duty to inform an owner of the already existing submarine cable or pipeline in the case of crossing, and an obligation of negotiation regarding the point of crossing if necessary.

Article 113 determines the obligation of the Member States to adopt in their national legislation the sanctions for the willful of culpable negligent breaking or injury to the submarine cable or pipeline, or activity that is intended to result in such breaking or injury. There is a possibility of an exclusion in a case where damage caused was necessary to preserve lives and vessels. If damage is caused, the owner of the cable that is being laid bears the costs of repair (Art 114). In case of damages beyond repair, the national law shall determine the subsequent proceedings. If a person has sustained loss whilst trying to avoid the damage to the submarine cable, UNLCOS provides the right of indemnity from the owner of that cable (Art 115). Jurisdiction in penal or disciplinary matters is set to the flag state court or the court of the state of which the person concerned is a national (Art 113).

An important addition to international regulation is the extension of the cable provisions to the high-voltage cables and pipelines.

The UNCLOS does not allow the right of visitation on the High Seas.

3.2.6. Debates on issues regarding submarine cables

3.2.6.1. Third-Party Access to Submarine Cables

The standard facility doctrine of the submarine cables dictates that the underwater cables are considered as ancillary installations to the sending station, therefore being subject to the same domestic installation of that station, and usually recognized as a chattel. Even if the Receiving State sends back the electric signals, the status of that submarine cable will not change. However, the facility doctrine can be problematic when considering third-party access and the contents, whether those are communication data or energy of any form, provided through the cable. The question of jurisdiction arises when it becomes necessary to determine which law, that of the Sending State, Receiving State or the Third-Party State will govern the intellectual property issues. Having in mind the fact that the submarine cables carry most of the international voice and data communication, it is of relevance to establish in advance which law will govern that transfer.

3.2.6.2. Project Unnecessary Delay – Abuse of Right by a Coastal State and the role of the Flag State

The Coastal State has, in the EEZ and the Continental Shelf, a right of prevention of the laying of the submarine pipelines and cables, should they prevent the Coastal States from exercising the rights of exploration and exploitation of the natural resources in those areas. Should the Flag State (survey of laying ship) wish to challenge such regulations, this is to be done through the provisions set in the Art 297 of UNCLOS. What exactly such a challenge would comprise of, is not defined by the UNCLOS, and is left to the dispute settlement system to determine in a case of a dispute. The question is on what basis can the Coastal State claim that the laying of the submarine pipeline or a cable prevents the exploration and exploitation of the resources.

Beckman suggests that «it would seem reasonable for a coastal State to impose restrictions on the laying of submarine cables in its richest fishing grounds or coral reef areas in its EEZ and to put restrictions on the laying of cables in areas designated for off-shore exploration for oil and gas" noting that "Disputes on the application and interpretation of article 79(2) could arise if a company laying a submarine cable is of the view that the laws and regulations of the coastal State restricting their right to lay submarine cables are not reasonable measures".

Additionally, before the commencing of the construction of the submarine pipeline, consent of the Coastal State is necessary. This is usually preceded by environmental and safety studies, and the study of the best possible route of the pipeline. There is however, no

limitation as to the length of these consultations and studies, nor is the Coastal State required to approve laying in a certain period. Article 300 of the UNCLOS promotes good faith in fulfilling the obligations set under the UNCLOS and prohibits the abuse of the rights determined by the UNCLOS. Accordingly, every false claim regarding the "reasonable measures" for exploration and exploitation of the resources, and every unnecessary delay of the project should be sanctioned due to the abuse or rights it constitutes. The ICJ (International Court of Justice), ITLOS (International Tribunal of the Law of the Sea) or any other arbitration (or special arbitration) should adjudicate such sanction (the same legal principle should be present in other dispute settlement forums). However, the broad variety of choice regarding the place of adjudication could potentially lead to the "forum-shopping" attempts, depending on the choice of law more favorable to the parties.

3.2.6.3. Enforcement of the UNCLOS Provisions

The ICPC endorses the ratification of the UNCLOS, and adoption of the national legislation aimed at implementing the UNCLOS provisions. However, many countries still did not ratify the Convention, or did not establish adequate domestic laws providing for effective penalties against such violations. Another interesting point is a suggestion that due to the possible heavy penalties for breaking or injury of the submarine cable, the level of compensation paid by the cable owners to the marines who work the sea bed near the cable is increased. If there is no such compensation, punitive measure can result in a refusal by fishermen to approve cable laying in their territory. In conjunction with the previously said, several UNCLOS provisions lack clarification on the specific terminology used. The Nord Stream Project is a good example of long and, in some cases, unsuccessful negotiations with prospective trans-border nations (even if only having the EEZ in mind) [(Vinogradov, 2009)]

3.2.6.4. Marine research in the EEZ – Why a cable survey is not marine research

A problematic term in the UNCLOS is "Marine research" in the EEZ. Can the seabed survey necessary for laying submarine cables and pipelines collide with the seabed mineral research, and in what conditions is the Coastal State allowed to stop or modify such an endeavor?

We should note here the scope of a cable route survey within the overall objective of an EPIC contract [EPIC: Engineering, Procurement, Installation and Commissioning]

The fundamental objectives of the cable route survey are to [12]:

1. Prove and document the initial route developed during initial project planning stages.
    a. Preliminary stages for route planning are based on web resources and other historical information, thus a survey provides actual bathymetric, geophysical and geotechnical information that validate the actual data and information derived during initialization of the project.
2. Identify and where practical, develop the initial route to avoid obstructions and hazards found during the survey.
    a. This stage is usually done on board the vessel and during the survey within 24 hours of data acquisition processes.
3. Determine final cable route engineering and cable length - and cable armouring - quantities
    a. Burial feasibility, trenchability classes and soil classification parameters are estimated, along with risk assessments for burial and other cable protection parameters. Thus, the cable route survey, confirm or amend preliminary cable protection strategies, in a closer timeline to the installation process.
4. Provide all data and documentation necessary to support cable installation
5. Provide the database framework for system maintenance

We will present below arguments supporting **that the scope of submarine cable route surveys cannot be construed as Scientific Research.**

The route survey scope is not designed to perform systematic investigations into and study of the marine environment in order to establish facts and reach new conclusions about the marine environment, nor:

- To carry out exploration or exploitation of living or non-living resources
- Drill on the continental shelf

- Use explosives or harmful substances
- Construct, operate or use artificial islands, installations or structures

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NOTE: It is also obvious that the engagement of universities, scientific institutes or other governmental scientific research bodies could result in a misinterpretation and mislead Coastal States on the role of engagement of such institutions to cable route survey activities. In the opinion of the author the involvement of these institutions within EEZ disputed areas should be avoided, unless they are subcontracted by a commercial entity or form spin-off companies and engage directly in commercial activities.

3.2.6.5. Request for permit by a Coastal State

Mobilization of survey vessels in advance of all survey operational permits being issued is bad industry practice and can result in:

1. Inability to commence operations upon arrival on site and unreasonable delays
2. Dislocation of planned survey phase sequence
3. Vessel standby and contractual claims
4. Possible non-productive vessel transits that affect project timelines and milestones.
5. Increased costs imposing mitigation measures
6. Substantial overall project time shift on sequential project phases, e.g. installation vessels idle waiting on survey data and installation permits
7. Increasing requirement for marine operational permits in EEZs particularly for non-landing countries in “apparent” contravention of UNCLOS provisions has further negatively impacted permit lead time and project progress

All permits issued by coastal states and communicated via NAVTEX**, should clearly indicate that a cable route survey is to be performed** in order to gain the advantages and the legal flexibility provided under UNCLOS.

We should also note that securing permissions to carry out survey operations vary from coastal state to coastal state and from straightforward to highly complex with lead - times measured in days to possibly many months; associated conditions can include:

- Requirement for all survey team members and vessel crew to undergo security checks, especially in the Eastern Mediterranean region under its current geopolitical status
- The imposition of restrictions on certain nationalities within the survey team and/or vessel crew; and even the country where the survey contractor’s company is registered. Careful examination of flag state endorsements should be accounted per coastal state regulations.
- Requirement for survey operations to be witnessed by security officers.
- Mandate for survey work be conducted by national research institutes to pre-agreed hand over locations
- Requirement for copies of survey data to be made available to the coastal state upon completion of the survey and/or copies of reports. This is usually a standard requirement at the close out phase of each survey project concerning submarine routing.

3.2.6.6. UNCLOS Facts

In areas, not subject to the sovereignty of the coastal State, there are no provisions in UNCLOS governing surveys on the high seas, in the EEZ or on the continental shelf. It can be argued that such surveys are a traditional freedom of the seas. When conducted in the EEZ, a

cable route survey is arguably "an internationally lawful use of the sea" related to the freedom to lay submarine cables, as provided in article 58(1) of the UNCLOS.

Part V of UNCLOS contains no provision suggesting that a coastal State has jurisdiction to regulate cable route surveys in its EEZ. Article 56(1)(b) of UNCLOS provides that in the EEZ, the coastal State has jurisdiction as provided for in the relevant provisions of this Convention regarding:

(i) The establishment and use of artificial islands, installations and structures;

(ii) Marine scientific research;

(iii) The protection and preservation of the marine environment;

In the EEZ a coastal State only has "jurisdiction as provided in the relevant provisions of this Convention". It has no residual jurisdiction. Therefore, unless there is a provision in UNCLOS if a coastal State has jurisdiction over survey activities in its EEZ, or on the continental shelf, it would have no jurisdiction to pass laws and regulations on cable route surveys outside its territorial sea.

This warrants a consideration of the UNCLOS provisions in Part VI on the continental shelf. Part VI does not make a distinction between the rights and jurisdiction of the coastal State.

Article 77 provides that the coastal State has sovereign rights for the purpose of exploring the continental shelf itself as well as for the purpose of exploiting its natural resources.

On the other hand, Article 79(2) deals specifically with the laying and maintenance of submarine cables, and provides that subject to its right to take reasonable measures for the exploration of the continental shelf, the coastal State may not impede the laying of submarine cables.

4. CONCLUSIONS

1. A coastal State has the right to impose reasonable measures for the exploration of the continental shelf and that such measures might include adopting laws and regulations on cable route surveys. It would seem reasonable for the coastal State to adopt regulations to ensure that a cable route survey ship is not engaged in the exploration of the natural resources of the continental shelf and these regulations should be clearly reflected in NAVTEX notifications and the permit itself.
2. Cable surveys are not constituting marine scientific research surveys, so UNCLOS Article 56 and article 246 do not apply.
    a. **UNCLOS Art 40** states clearly that "During transit passage, foreign ships, including marine scientific research and hydrographic survey ships, may not carry out any research or survey activities without the prior authorization of the States bordering straits", thus: UNCLOS makes a very clear distinction between hydrographic and marine scientific research surveys.
    b. **Article 19(1)(j)** is also consistent with this analysis, as it mentions "research or survey activities", implying that they are separate activities.
3. The right of coastal States to impose conditions on cable route survey ships in maritime zones subject to their sovereignty is unquestioned.
4. Their right to impose conditions on cable route survey ships is doubtful if they claim that such surveys are a form of marine scientific research. However, they may have a credible argument to regulate such ships as reasonable measures relating to the exploration of the continental shelf under Article 78 and 79 of UNCLOS.
5. Given that the continental shelf is for all intents and purposes a resource zone, this may give them a legitimate basis for imposing conditions to ensure that the cable route survey ship is not engaging in the exploration of the natural resources of the shelf.
6. **States have the unquestionable right to lay and operate submarine cables and pipelines.**
7. Whereas in the territorial sea the Coastal State can determine the conditions for such laying and operation, and, impose taxes as transit fees, in the Continental Shelf and the EEZ zones, the Coastal State can only object to such undertakings if they seriously obstruct the rights of exploration and exploitation of the natural resources of those areas.

8. UNCLOS refers to Coastal States rights, not companies and private business, thus the flag states are the mediators in case of disputes.
9. Stability of the operation and legal certainty are necessary to promote huge investments necessary for the construction and commencing of such projects.
10. The Law of the Sea Convention and the Energy Charter Treaty aim to ensure, legal protection and undisrupted non-discriminatory flow of the energy products.
11. Although not all possible legal questions have been resolved by the mentioned Treaties, they provide solid and clear legal framework for the successful construction and operation of land/submarine cables and pipelines, having in mind the interests of both State and private business. It is necessary that all Member States ensure that their national legislation provides for all obligations that the named Treaties legislate
12. For countries that have not ratified the UNCLOS, (despite the fact of legal precedence in UNCLOS rules application, as is the case of Turkey), issues are still unclear.
13. It is a standard policy of all cable survey companies and cable supplies to plan projects based on the UNCLOS, recognized as the only international legal instrument regulating activities within the EEZ.
14. If a Coastal State denies a cable route passage/corridor due to planned oil and gas activities, oil and gas development plans should be published and disseminated through the official government's gazette. Otherwise, this can cause a possible justification for claims base on Abuse of Right by a Coastal State clauses described in the UNCLOS.

5. Geopolitical considerations at the Eastern Mediterranean Sea – The Turkish actor

According to the AKP itself and its supporters, the AKP victory in the November 2015 parliamentary elections, was followed by one word: "Stability"; when temporarily the Turkish lira picked up against dollar, equities spiked and bond yields fell.

Unfortunately, this euphoric climate was plasmatic and rapidly changed when the interest rate increased due to dollar climbing in the international market.

Turkey, in 2016, is at a threshold; it requires far-reaching reforms and international investments to keep the economy running in high levels of development. In that sense, 2016 could be considered a milestone year for the Turkish economy due to the fact that Turkey needed to proceed with constitutional changes that would create a presidential system in order to achieve the far-reaching implications.

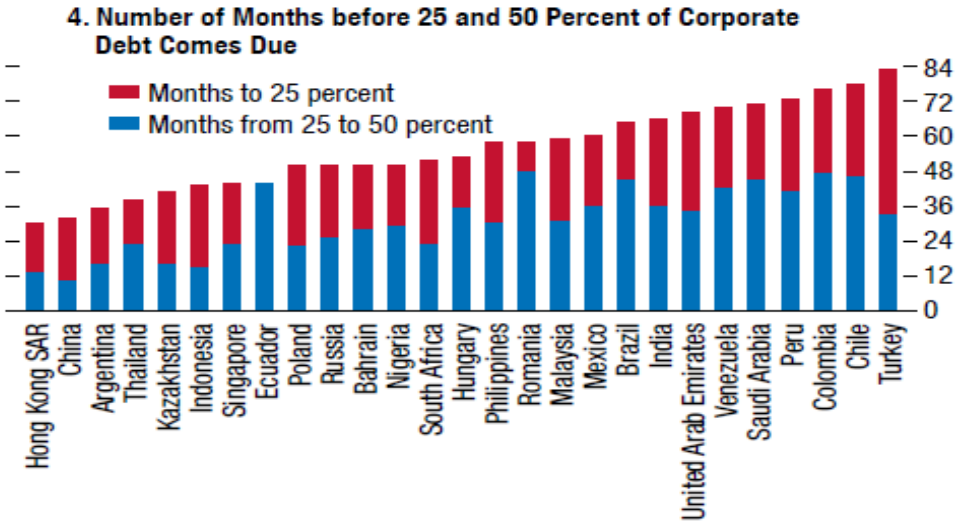
In turkey of 2016, and after the failed coup attempt, there are still two risk indicators that clearly show that the economic bubble is going to blow up soon, unless something changes rapidly:

1. A first look at the financial status of the Turkish telecommunication operators show a rapid increase in the outstanding payments of consumers
2. During the second semester of 2016, there is a downfall in the real estate market.

In Turkey, a future collapse is obviously a matter of time. Credit cards in Turkey are bouncing and loans cannot be paid. The stability of the Turkish Banking system is under threat.

Another concern is report to the last IMF report on Turkey: Turkey is in the list of countries where due to External Imbalances they are Particularly Vulnerable to Shocks [See figure below]. Turkey continues to have significant external imbalances, despite being net oil importers. It is also mentioned that Turkey's domestic-demand driven growth leads to persistent import growth and the need to finance the current account deficit with portfolio flows exposes the economy to external shocks.

According to IMF Global Financial Stability Report, Turkey is in the late stage of the credit cycle and are faced with persistent inflationary pressures, leaving little room for monetary policy easing because of the risk that it may reinforce currency weakness.



Sources: Bloomberg, L.P.; and IMF staff calculations.

Sovereign risk perceptions appear acute in Brazil, Colombia, South Africa, and Turkey.

There is also another striking remark with regards to the Turkish society: The number of expensive phones owned by Turkish citizens is very high, especially when the prices of smartphones in Turkey is somewhat 50% more that the European markets.

Nevertheless, with this situation at hand, it is obvious that the political confrontation between the EU and Turkey will not come to a compromising solution easily. EU is - or should be - aware of a possible economic collapse of the Turkish Economy.

Turkey has been characterized by Morgan Stanley in 2013, as one of the "5 fragile" emerging market countries most likely to be affected by foreign investments. The account deficit of 5% needs considerable **external financing**. GDP per capita is stagnating at circa 10.000 USD, thus caught in what we could call the "middle income trap". Turkey is also suffering [and will suffer even more in the near future] of qualified graduates, lack of competence of the workforce with higher education. Having been in the Oil and Gas industry, a striking remark is usually made by colleagues in the social media: Turkey does not have qualified air gun mechanics or data processors in the international market, no one has ever heard of Turk engineers or data processors in the industry, despite the fact that TPAO purchased the most sophisticated equipment and vessels the last decade. Up to now, the Turkish work force in the Oil and Gas industry seems to be rather limited. I have limited knowledge of other technological areas, but a few facts, regarding the Turkish economy are presented below:

The most critical economic activity in Turkey is real estate and the construction industry, supported mostly from a loose credit policy of Turkish Banks. After all the real estate lobby, has supported AKP strongly in the past years. In order to support the two indicators presented above, this is where Turkey stands: Erdogan recently announced to the public that banks taking measures against customers with outstanding payments will be considered "traitors"[1].

Obviously, the symptoms described above, clearly indicate that this is not a healthy economic and financial environment and most probably AKP is trying to find alternative solutions to boost the economy, by intervening in "out-of-country getaways", aiming at external financing that will boost again the economy. The strengthening of the Turkish-Russian relationship, the recent signature of the of Turkish Stream, the invasion to Syria in order to stop the unified Kurdistan and keep a "clean trade corridor" with Iran, the "Unified Cyprus regime" that will enable Turkey to open the energy corridor in the Eastern

[1] https://www.bloomberg.com/news/articles/2016-11-03/erdogan-leans-on-turkey-s-banks-and-slowly-rates-come-down

Mediterranean and the ultimatum to the EU with regards to entering the EU are strong indicators that this is pathway to get external investments and external financing.

And with regards to the banks, a slashing credit-driven consumption and alleviating concerns over the independence of the central bank and regulatory authorities should, or is, part of the reforms that AKP will attempt in 2016 or early 2017, at least when the situation in the country stabilizes following the coup attempt. We should not forget that before the coup, a switch to a presidential system has risen upcoming economic turmoil and public scepticism, even among AKP supporters.

Setting aside the coup for now, the economy is the top of the public's agenda in 2016, perhaps for the first time since the economic crisis of 2008. Whether this time headlines mention 'crisis' or 'reform' will depend on the choices the country's leadership makes. Judging by the initial debate on the constitution, politics seems more likely to dictate the economy in 2016 than the other way around. And the strengthening of Erdogan's position as a political leader, will aim at reforming the Turkish economy by introducing foreign actors and allies in this geopolitical play.

It is obvious that the EU Projects of Common Interest plans do not coincide with Turkey's aims for geostrategic depth in the region; tension between Greece, Cyprus and Turkey will likely rise gradually when these projects enter implementation and construction phases.

We should also note that the EEZ regime in the eastern Mediterranean is still unresolved. The position of Turkey, in all occasions, present unreasonable arguments with regards to the EEZ delimitation and its geostrategic aims [14], especially in the case of Cyprus, where the Turkish position with regards to disputed areas is clearly not based on reasonable arguments, as shown in Figure 5

Figure 5: Turkish claims in Offshore Areas included in the Cypriot EEZ.

Source: TPAO

Pipeline and cable owners should have the following consideration in mind:

At each end of the submarine pipeline lies a terminal situated on the coast, and therefore under the complete jurisdiction of the Coastal State. Based on these segments (since the longest part of the pipeline/cable lies in the EEZ areas), the complete length of the pipeline (or cable) **could be considered** as a single unit determined by a single legal system, based on unilateral legal framework agreed between connected States, upholding the provisions of UNCLOS and the Energy Treaty.

Another possibility is to register the submarine pipeline in the ship registry of the Flag State, by identifying, through the provision of the UNCLOS and the national legislation, the genuine link between the pipeline (or perhaps a high voltage power cable?) and one of the Coastal States as the Flag State. The International Energy Treaty or a set of Agreements between the involved States and companies can also determine the legal nature of the pipeline/cable. If this is not done, and a dispute arises where it would be necessary to

determine that status, national courts would have the final saying (implementing the provision of the UNCLOS, The Energy Charter Treaty, and other relevant international and national legislation).

The clear property status of the pipeline is necessary as to have normal property rights over the pipeline, court jurisdiction and safety standards and norms. Additionally, the clear property status of the pipeline is necessary as to be able to establish security interests like liens and mortgages.

Another issue that may rise during installation is prevention: The Coastal State has, in the EEZ and the Continental Shelf, a right of prevention of the laying of the submarine pipelines and cables, should they prevent the Coastal States from exercising the rights of exploration and exploitation of the natural resources in those areas. Should the Flag State (survey of laying ship) wish to challenge such regulations, this is to be done through the provisions set in the Art 297 of UNCLOS. What exactly such a challenge would comprise of is not defined by the UNCLOS, and is left to the dispute settlement system to determine in a case of a dispute.

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CITIES AND ENHANCEMENT OF THEIR HISTORIC CENTRE AND HERITAGE: EDUCATIONAL COMMUNITIES' AND VISITORS' PERSPECTIVES

Isabel COSTA
UTAD/Centre for Transdisciplinary Development Studies (CETRAD), UTAD/Centre for Research and Intervention in Education (CIIE)
isacosta@utad.pt

Veronika JOUKES
UTAD/Centre for Transdisciplinary Development Studies (CETRAD)
veronika@utad.pt

Francisco DINIZ
UTAD/Centre for Transdisciplinary Development Studies (CETRAD)
fdiniz@utad.pt

Ana C. CANTANTE
UTAD/Centre for Transdisciplinary Development Studies (CETRAD)
acordeiro@utad.pt

Abstract
Several movements conceptualise cities' educational, cultural and urban/regional/transnational development aspects, such as Educating Cities, Children's City, or URBACT's. Cultural tourism/Edutourism, seen as a non-formal, lifelong education formula led by the individuals, has also played an important role, enhancing the value of cities in the broader sense. Monitoring people's opinion about the city and getting them to actively participate also enlightens those movements. This paper presents a research on the renewal of Chaves's historic centre (HC), whose rationale considered educational communities as partners. Results showed that teachers value urban renewal processes, while being critical, though. They emphasize the need for information and training. The HC should be a space for families to live in and is referred to as a multiple use educational resource.

Keywords: Cities and learning, historic centre renewal, municipalities and development, cultural/heritage tourism, educational communities' participation
JEL classification:

1. Introduction

This article results from a research project designed to understand educational communities' and visitors' perceptions about a town's historic centre renewal and heritage enhancement. In the context of a wider endeavor towards enhancing and promoting cultural values and heritage in town, teachers, students and tourist[1] were selected as partners whose perspectives and demands were considered especially relevant to ensure the historic centre renewal and its role in towns and regional development (Diniz, Costa, Joukes, Morais, and Pereira, 2014).

The theoretical framework relies on the topics of cities as educational/cultural places, the role of heritage, namely historic centres, cities' sustainable development and the way heritage enhancement in urban spaces puts forward different types of educational stances (formal, informal and lifelong learning). A multi-method design was followed and results showed that the participants were attentive to questions involving heritage, though each group was

[1] ONU Statitics Comission devised, in 1983, a conceptual distinctions among "tourists", "visitors" and "day-visitors". Because it was not within the scope of this paper, we leave out the dicussion and use "visitors" and "tourists" as synonymous.

attentive to a different degree; the town and its historic centre were also a *locus* of both individual and collective learning, albeit in different formats.

2. Cities as educational/cultural places

The birth of cities, while closely related to the need for protection and economic development, has ended up in reflecting multiple dimensions which historically has led to their being regarded as crucial places of human development. Cities are also seen as socialization and therefore educational spaces, where learning experiences are likely to occur due to the diversity of actors and contexts offered by the urban environment (despite the violent incidents that have been affecting cities in every continent in recent years and that naturally shape the way people think about them).

It was so in Antiquity, in the Middle Ages, in the Renaissance and it continues to be so across continents today. In reference only to the western world, the notion of place-based learning (in towns, regions or communities) can be followed back to the ancient Greece, although it was not categorised as such (Osborne, Kiernes and Yang, 2013). It was in the late twentieth century that several proposals were made which, in their own different ways, conceptualise, name, test and deepen the cities' social, educational and cultural dimensions. It is the case of the modern concept of a learning city/region, which originated from that of a ''learning society'' and gave way to the UNESCO supported International Platform of Learning Cities (Osborne Kiernes, and Yang, 2013). Learning cities are meant to represent a new approach to urban development, linking lifelong learning, social inclusion and urban generation.

Still, other proposals conceptualize and try-out the educating capacity of cities, as it is the case of the *Educating Cities Movement* (Villar, 1990; Lucio and Neves, 2010). One of the features of this movement is to gather inputs from the citizens and engage their participation, thus consolidating democracy and citizenship (Messina, 2013).

In order to undertake appropriate action, the persons responsible for municipal policy must obtain accurate information on the situation and needs of the inhabitants. Thus, the city shall undertake studies and surveys, which it shall keep up to date and make available to the public and shall establish channels that are constantly open to individuals and groups that allow the formulation of specific proposals and general policies.

Another example worth mentioning is the *Children's City Movement*, inspired by Tonucci (1996). Tonucci's ideas have been at the basis of several working groups in and outside of Europe which have two common denominators: they reject the idea that cities are built for adults, ignoring children's needs; and they put forward proposals to make cities more children friendly, emphasizing their potential to become regional and national development centres.

Some movements may be also integrated in this dynamics, like the *Eurocities*, a European movement that relies on urban/regional/transnational development, emphasizing education and culture (Joukes and Costa, 2015); URBACT[2], another European Union collective learning movement, which includes specific programs for historic cities, such as HERO, which develops around the concept of heritage "as an opportunity".

The movements that have been referred to one way or the other conceptualize cities as human development spaces and, among other things, list objectives and strategies that basically pertain to the informal education sphere. When one thinks of Europe, however, one notices that cities have been gaining more protagonism even at the political level in the field of formal education as well. Suffice to look at the decentralisation policies in recent decades that reinforce the role of municipalities in education (Araújo *et al*., 2013; Costa *et al.,* 2013).

In short, none of these movements designed to think and live in the urban space can be ignored, and cities are now viewed as places of formal as well as informal education and lifelong learning. More than ever, the urban space has an educating identity that can be described through concepts such as *learning in* the city – since it contains plenty of pedagogical facilities, like schools, museums, etc. – and *learning from* the city – referring to the informal learning opportunities offered by the city (De Visscher, 2015). In fact, in

[2] It is a European Exchange and Learning Program promoting sustainable urban development.

international foruns, cities are being more and more the target of multidisciplinary discussions "on what can be learned in and from urban spaces, as well as on how different stakeholders perceive the city as an educational space, taking into account pedagogical theories, existing concepts and intervention programs" (see De Vissher and Lucio, 2015).

3. Notes on historic centres' renewal

What is now known as a city's historic centre used to be referred to as the "old part of town" until the middle of the twentieth century; besides the concept does already correspond to the enhancement of the places where present cities have actually come into existence (Santos, 2014). It should be noted that by "centre" one does not always mean geometric centre but rather bestows upon it a symbolic meaning by acknowledging its centrality to history and everyday life and its importance as the origin of the city, something that is widely accepted and increases its symbolic role. Although nowadays the intrinsic value of these places has been established, until arriving at the concept of historic centre there has been a whole trajectory that, particularly in Europe, would lead to an awareness of how important these old urban tissues are and has had an impact on other parts of the world as well

So much so that in the beginning of the twentieth century some initiatives took place that together precede and endorse the concept of historic centre as we know it in the twenty first century. A few key moments in this evolutionary process should be singled out. First and foremost, there is the Athens Charter which, in 1921 pointed out necessary criteria for the preservation of old buildings, drawing the attention to the fact that these bear witness to History; in 1964, the Venice Charter extended the concept of heritage to buildings in an urban environment and introduced the idea of "reuse" based on the notion that preserving the traditional town of itself was no guarantee of future. The Tendenza group, responsible for the Bologna's Historic Centre Regulation Plan that was designed in 1971, used a methodology of analysis and project/proposal that has become a reference in Europe. In 1975, the Amsterdam Charter suggested that preservation/reuse rested on a social spirit, while advocating inhabitants/residents in historic centres remain there once these had been renovated (García Vázquez, 2004).

After the 1960s, the tendency for what one now refers to as historic centres to become an urban concern and the object of a more systematic study and methodology grew stronger (Garcia Lamas, 2000), and turned into a spiral that in the 1980s led to historic centres being recognized as one of cities' major issues (Salgueiro, 1992). It followed that in 1986, the Charter for the Conservation of Historic Towns and Urban Areas was drafted under the auspices of ICOMOS, identifying goals for the preservation of historic towns. The views expressed in this Charter apply to "historic urban areas, large and small, including cities, towns and historic centres or quarters, together with their natural and man-made environments. Beyond their role as historical documents, these areas embody the values of traditional urban cultures […]. The values to be preserved are the historic character of the town together with the set of material and spiritual elements that express its image" (Salgueiro, 1992: 391). Therefore, the essential features of what is now called the historic centre were designed, notwithstanding, as has been pointed out by Fernandes (2010), that the concept of historic centre is constantly undergoing a revision process.

Especially in the last decades of the twentieth century, the state of decay of parts of most historic centres led to the appearance and reinforcement of several movements of urban planners and municipalities set on establishing intervention policies to revitalise historic centres (e.g., WH, 2002). Several European and American towns have developed urban regeneration dynamics[3] that are more or less focussed on heritage/historic centres, depending on each town's specific circumstances.

[3] Because it was not within the scope of this paper, the intense theoretical dicussion around such concepts as renewal, revitalization, regeneration or requalification has been deliberately left out.

4. Heritage enhancement, educational communities and cultural tourism as mutually reinforcing factors in historic centres

Regarding the concept of heritage, some considerations must be made. Today, heritage means something very different from what it used to in the past, when it had a narrower meaning and was mostly related to built heritage. In fact, this concept was always associated with the idea of "value" and referred to everything that was material, physical and visible. The evolution of the concept of heritage was addressed in detail by Harvey (2010: 327) whom, relying on Tunbridge's and Ashworth's definition of heritage as "a contemporary product shaped from history", underlined that heritage is, above all, a process, or "a value-laden concept, related to processes of commodification, but intrinsically reflective of a relationship with the past, however that `past' is perceived and defined" (Harvey, 2010: 327).

Therefore, communities have a say when defining heritage (Waterton and Smith, 2010); thus, a community's understanding of heritage must be considered. Regarding the relationship between perspectives on cultural heritage and community, "the local understanding of cultural heritage becomes a social process rather than a physical object to be preserved. In other words, cultural heritage is seen as an instrument for the development of social experiences, relations, exchanges and so forth" (Mydland and Grahn, 2012: 583).

This directs us to the educational dimension of heritage. This dimension, as part of the concept of heritage, has been regarded as one of the richest and most likely to bring people together (González, 2012), around the idea that material and immaterial heritage are worth being past into future generations and as such be considered as an educational goal within both formal and informal education. In fact, cultural heritage can be "an effective educational tool for formal, non-formal and informal education, life-long learning and training" (CEU, 2014: 2).

Historic centres and heritage play an inescapable role in how cities work and therefore should be attractive to both residents and visitors. New synergies that feed each other have been taking place, that is, local residents' interest for the historic centres attracts visitors who, in turn, encourage locals to preserve and renew these centres, promoting cities and becoming yet another resource as far as local development is concerned. Tourism has also played an important role in that awakening of interest, and cultural tourism in particular. We should bear in mind that, when speaking about cultural tourism, we often talk about heritage tourism. According to Timothy and Boyd (2006: 1), "heritage tourism, which typically falls under the purview of cultural tourism (and vice versa), is one of the most notable and widespread types of tourism and is among the very oldest forms of travel". Especially since the 17th and 18th centuries' *grand tour*, in Europe, the notion of *travelling as a learning experience* has become increasingly prominent (Martínez, 2015).

According to the World Tourism Organisation (WTO, 1985), cultural tourism corresponds to all movements of persons that "satisfy the human need for diversity, tending to raise the cultural level of the individual and giving rise to new knowledge, experience and encounters". Richards (2003) points out that the WTO's wide spread definition enhances the learning aspect of cultural tourism, which is supposed to contribute to personal development. In other words, the learning componenet of cultural tourism is widely recognized (Pitman *et al.* 2010), it is closely linked to educational tourism or edutourism and it is not always easy to tell them apart. In fact, cultural tourism can be considered a form of non-formal, lifelong learning, a process controlled by the individuals themselves, who choose their destinations according to their educational/cultural interests. Anyway, as it is noticed by Falk *et al.* (2012), the relationship between travel and learning is not yet sufficientely studied.

It should also be pointed out that the movements which deal with public spaces, mainly urban spaces, whether targeting historic centres or not, depart from the principle that "any recommendation based on research about urban public space cannot replace the direct participation of the public, the unparalleled possibility of those who will actually use the space" (Alves, 2003: 298). Changes in the urban space, which are often not understood by the populations, directly affect people's everyday life and so must be fully disclosed and duly explained. As Guerra, Jaume and Castells (2011) put it, the interpretation of heritage is an effective strategy to preserve it but it will only work as an educational activity if local communities are involved. Still according to these authors, the best way to bring territory,

heritage and community together is within a municipal context, listening to the population living in the areas that are being rehabilitated. Educational communities, teachers and students, as leading actors in formal education processes and the cultural tourists, as actors of self-directed lifelong learning processes, should naturally be heard in the course of any urban regeneration and heritage enhancement process.

This work is part of a research[4] that has been developed in Chaves (a middle-sized border town in northern Portugal, integrating Chaves-Verín Eurocity) and looked into educational communities as partners responsible for their own development which, to a large extent, is based on valuing the heritage (in this paper, we refer historic centres and heritage as almost overlapping concepts) and tourism thereof ensuing. The research is part of the "*Chaves Monumental – Valorização e Promoção dos Valores Culturais e Patrimoniais*"[5] candidacy within the Strategic Program of the Urban Network for Competitiveness and Innovation. This candidacy is focused in the historic centre renewal[6] and is based on the assumption that the way a town/region is able to make itself attractive results from several factors that have to do with culture and heritage upon which local economies depend. In fact, these resources must be preserved and valued so that they can be passed on to future generations if they are to remain competitive, attractive and distinctive.

The main goals of the research were to identify how valuing the heritage is perceived by the region's educational communities and tourists and to help the various communities committed to develop both the program and the region know more about each other.

5. Methodology

In the course of this research, several studies were conducted, following a multi-method approach with recourse to complementing quantitative and qualitative techniques.

Methodological options resulted from the authors' understanding that it will not be easy to know much about social phenomena, if only a quantitative perspective is taken into account or if it becomes pivotal. As a matter of fact, one's knowledge about the complexity of social phenomena will be far more extensive and heuristically productive if it rests on different techniques and methodological frameworks (Hitchcook and Hughes, 1995; Guba and Lincoln, 1996). Methodological diversity becomes particularly relevant when one wishes to know how events impact educational communities and visitors and the latter's perceptions, bearing in mind that both populations have clearly distinctive characteristics. Besides, the mixed approach has been favoured by most research studies on these segments and populations, whenever the intention is to go beyond mere market studies.

Particularly, it has been assumed that culture must be looked at through the eyes of those who live it and not only through the scientist's observations, as argued by Velasco and Díaz (2006), as regards education, and by Denker (2010) regarding tourism.

Selection of samples and participants and the orientation of data gathering tools took into account the results of exploratory studies carried out over different periods (different years) and contexts (although they had not been conducted for the express purpose of this study). They were small studies (ethnographic methodology, in loco observation and informal interviews around archeological heritage, Costa, 2009) undertaken by different members of the team (who have been long expressing an interest regarding this subject), which ended up being very useful for the present study. Exploratory studies made it possible to justify methodological options related to sample selection (educational communities and visitors; residents were also inquired but they are not considered in this paper), places of access, questions to ask and ways of recording information, for instance.

In methodological terms, two pathways were followed: questionnaires applied to visitors (209) and students (58) and semi-structured interviews with students (41) and teachers (12);

[4] Diniz, Costa, Joukes, Morais and Pereira, 2014.

[5] Monumental Chaves – Valuing and Promoting Cultural Values and Heritage

[6] Chaves' historic centre limits were established in 1995 and for this official area a set of plans and interventions was elaborated, some of which were executed (Diniz, Costa, Joukes, Duarte, and Pereira, 2014).

in the case of the teachers, the interviews were also in-depth. The participating students were 15–22 years old. Although questionnaires were mostly quantitative and subject to statistical analysis, they also included open questions with content analysis. The interviews were analysed through content analysis techniques (Bardin, 1977; Esteves, 2006). After interviews with students had been analyzed, focus group discussions followed in order to provide a better understanding of some aspects.[7]

5.1. Data analysis and discussion: Enhancing and promoting cultural values and heritage in Chaves (Portugal).

Regarding this paper, we were particularly interested in finding out what these groups think about the potential of the historic centre as a learning platform, how the historic centre "educates" them and whether they actively or passively benefit from all that potential represents.

5.2. About the impacts on educational communities

5.2.1. Teachers on the historic centre:

As regards teachers, it was possible to notice that in their statements, when questioned about the historic centre, they do not refered only to it, but rather included the town and its rural environment, which they saw as a whole territory that makes the town a good place to live in. Almost all of them refered the beauty of the town, namely the riverside that has been intervened by the Polis Program [8].

Not surprisingly, teachers were very much aware of all that has to do with heritage. In fact, they were willing to participate in all kinds of actions related to valuing heritage and promoting urban revitalization, which they thought had been positive so far but still needed to be improved in some areas that they identify. In their opinion, the community should be able to decide the role of the historic centre in the town's/region's development and elaborate clear strategies resulting from those decisions. They were critical of specific aspects like the decline of some areas of the historic centre, the difficulties of everyday life in that particular part of town, the need to go back to urban planning concepts and practices from past decades or the deficit in private investment compared to public one. Nevertheless, they know this is no simple matter, and that is why they value every initiative however small.

The teachers' statements emphasised that information, training and dissemination were extremely relevant and clearly showed how much they valued information and training for they are essential in involving everybody in decision-making, strategic urban and development planning and carrying out those plans. In other words, it was the teachers' strong belief that nothing can be achieved without the articulate participation of all the population, decision makers and participants. Besides, they did not focus on individual or institutional responsibilities; on the contrary, they highlighted the importance of the community as a whole.

Regardless of the choices that eventually will be made, these should take into account the key importance of the Roman Thermal Spa (see Carneiro 2013). In this regard, they clearly advocated the need to unravel study and divulge the heritage, suggesting a number of initiatives to develop both the historic centre and the town.

Teachers on students and the historic centre:

According to the teachers, when stimulated, students end up being actively and permanently interested in the heritage. As they see it, depending on the use of adequate educational practices, students will surely have an important and active role in preserving the municipality's heritage.

[7] We are very thankful to all the participants. Special thanks to the schools' principals who supported the research; the students, especially those who participated in the interviews and focus groups, and the teachers, who offered their time to in-depth interviews.

[8] The Polis Program aimed at promoting interventions of an urban and environmental nature in order to improve quality of life in towns, increasing urban centres' attractiveness and competitiveness. It was implemented in many towns in Portugal (in Chaves, from 2002 to 2008).

The historic centre is deemed a unique educational space and it and the town, in general, have much to gain from students participating actively in global strategies. For their part, teachers were more than willing to give their contribution, educating and encouraging students. To this end, they have presented a number of suggestions in terms of teaching strategies to get students to commit themselves to revitalizing the historic centre, always following a clearly educational purpose.

In their long and enthusiastic statements – even when one or another are disappointed or skeptical about the future of middle sized towns like Chaves vis-à-vis the country's new tendencies – teachers provided an interesting set of suggestions and reflections, at the heart of which lies the notion of a participating community. It is up to the community to assess and clearly decide what they want for Chaves historic centre, showing they were really committed to give it the central place and function it deserves.

5.2.2. Students - the "enlarged" historic centre as an ideal place for socialization:

Still regarding educational communities, the overall assessment of the inquiries applied to the students (interviews and questionnaires) is jointly interpreted in this paper. The students' analysis was initially structured along two categories: the great majority who were interviewed shared a positive perspective regarding revitalizing the historic centre, whereas only a few were profoundly skeptical. Both groups have made criticism and plenty of suggestions, though.

The students' view of the historic centre was much based on their daily life, marked by their experiences as youths: night visits to pubs – highly appreciated – strolls along the town's main shopping streets (old streets integrating the historic centre) and walks along the Tâmega riverside. When referring to the historic centre they did not focus solely on the castle, the medieval streets, or those dating back from the 19th century (Santo António Street) or even the old houses that are part of what is officially described as the historic centre. In fact, content analysis of the interviews clearly shows the greens areas surrounding the Tâmega riverside, near the modern Thermal Spa[9] and the river (out of the historic centre borders) as being particularly liked by students. In their responses, especially during interviews, students' perception of the historic centre was then broader than the official one, since it includes the riverbank, which is not included in the official historic centre. Students always found a way to mention the green areas surrounding the riverbank which underwent a process of phased urban regeneration in recent years (Polis Program), thus, somehow 'redefining' the historic centre limits.

Students knew and appreciated, although to varying degrees, the Roman Thermal Spa, whose only future, according to them, is to become a Museum. They placed great faith in the Roman Thermal Spa's being able to develop the town's economy, namely by attracting more tourists. They were aware of the state of decay of some historic centre buildings and the general poor environment it causes. They consistently regreted the lack of a shopping mall, because they would like more shops and brands to be available to their budgets. But what really came as a surprise was their extensive list of suggestions to revitalize the historic centre, of which stand out the thematic Roman Fairs, the development of culture and arts, especially music, providing information and knowledge about the historic centre and initiatives to make it known. In other words, they advocated that culture and learning be integrated in entertaining, leisure and teaching contexts, without ignoring the wish to be able to do shopping. Those of them who were more critical wanted the historic centre to be safer and more easily accessed (namely by disabled people), and have more information and better road signs.

5.3. Visitors and the historic centre

As regards visitors, cultural tourism, health and wellness tourism and culinary or food tourism were pointed out by visitors looking for information in Chaves tourist office as the

[99] Presently, Chaves has a modern Thermal Spa and a recently discovered millennial Roman Thermal Spa, both located near the river, but in different places.

main reasons for visiting the town (TPNP, 2013). As for the respondents in this study, most of them were frequent visitors, often coming to Chaves, not only for a day, but usually staying overnight (on average up to 3 nights). What causes them to visit Chaves again is the wish to visit friends and family, spend holidays or weekends, see the cultural heritage and taste local cuisine.

Tourists find Chaves and its historic centre unique. They knew and appreciated how rich its culture and heritage are and clearly acknowledged its touristic potential. Based on their experiences as tourists or one-day visitors, which they consider positive, they recommend other visitors to come and visit the town and suggested public and private authorities to make a continuous effort to endow the city with infrastructures and facilities capable of making the city more attractive to both residents and tourists. Therefore, it is imperative that Chaves' cultural material and non-material heritage be preserved through investing in preserving and revitalizing its centre. As they see it, it is necessary to keep making Chaves attractive to tourists, in a clever and sustainable way, improving infrastructures, renovating more monuments and renewing spaces, while respecting the deadlines for these conservation works as much as possible.

Visitors expressed the opinion there is still much to be done and that it should be complemented with several types of touristic related activities, with guided tours receiving the highest demand. It is not enough to have impressive infrastructures, buildings, spaces and monuments; new life and regeneration must be brought to them.

6. Conclusions: City/historic centres as places for learning: different perceptions and usages.

The main goal of this article was to reflect about the potential of cities/historic centres as places for learning, using the case study of Chaves, a middle-sized town in the North of Portugal focussing on the education community and the visitors.

In short, cities, and especially historic centres are spaces where different types of learning are acquired by different audiences in different ways. However, different types of learning with different meanings can be identified, that is, learning goals and processes vary depending on whether one is considering teachers, students or visitors.

6.1. The historic centre as a formal learning space mediated by teachers and by the school

For teachers, more than a tourist attraction, the historic centre should be a space where families have their everyday life improved. In addition, the town, and especially its historic centre/heritage, is an educational resource of multiple usages in the context of formal education. They are seen as resources, places and objects that facilitate learning, sometimes even creative learning. As regards to their educational purposes, their choice is mostly and plainly within the socio constructivist paradigm of development (Rocha, 1988). In that perspective, teachers assumed a mediating role in their students' learning processes. Teachers repeatedly and spontaneously recognized the historic centre as a suitable place where their students can learn. They had no doubt that, when properly guided, students were aware of the historic centre's value and training capacity. That is why they included references and visits to see the town's heritage both in their lesson plans and in the school's educational projects. The historic centre was seen by teachers, then, as a clear space for students' to learn in the city.

6.2. An "enlarged" historic centre and a socializing space for students

Students took over the historic centre as a locus for self and/or collective, autonomous and informal practices. In an almost hegemonic way and broad perspective, students had this perception of the historic centre as a place of rich and intense life experiences, rather than a locus for formal learning.

In fact, there is a contrast between teachers' statements, who look at the historic centre as a possibility for formal learning to occur, and the students', who never mention that aspect. As a matter of fact, students identified the historic centre with life experiences, that is, with a

socialization locus. For students, the historic centre that extends to the green areas on either side of the riverbank was a spatial set of unmediated learning and self-regulated socialization. Thus, the historic centre was appropriated by the students as a space for learning in and from urban spaces.

6.3. Tourists - built heritage and nature as locus of lifelong non formal learning

As for visitors, they enjoyed heritage, nature and history, and guided tours are especially sought-after, which underlines the dimension of lifelong informal learning. Both students and visitors "extended" the historic centre to the river, combining nature with built heritage.

In sum, these findings showed that teachers demonstrated a deep understanding of the historic centre limits and problematics; in addition, for teachers, the historic centre was seen as a formal learning space mediated by teachers and by the school. As for students and visitors, unaware of the officially defined limits of the historic centre, they easily extended it to specific green areas of the town. In addition, they were open to learning in and from the city/historic centre – its heritage and nature together, and whatever opportunities it offered. However, at the same time, they wanted to enjoy and, especially the students, to socialize in the "extended" historic centre. This led to new reflections on territorial and conceptual boundaries in urban environments, namely when what was being considered were spaces with immense symbolic value, such as the historic centres, as suggested by Fernandes (2010). These findings also showed the importance of citizen audition in the process of change in the cities, which focused on the educational community and cultural tourism, according to the concept of actual participation and involving the community in preserving and divulging local heritage.

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INDICATORS AND A MECHANISM TO ENSURE ECONOMIC SECURITY OF THE REGIONS

Irina V. CHISTNIKOVA
candidate of Economic Sciences, associate Professor at the Department of economics and the modeling of production processes, Belgorod State National Research University
Chistnikova@bsu.edu.ru

Marina V. ANTONOVA
candidate of Economic Sciences, associate Professor at the Department of finance and customs income, Belgorod University of Cooperation, Economics and Law
Antonovamv@yandex.ru

Svetlana V. YAKIMCHUK
candidate of Economic Sciences, associate Professor at the Department of economics and the modeling of production processes, Belgorod State National Research University
Yakimchuk@bsu.edu.ru

Anastasia S. GLOTOVA
candidate of Economic Sciences, associate Professor at the Department of economics and the modeling of production processes, Belgorod State National Research University
Glotova@bsu.edu.ru

Yevgeniy A. DYNNIKOV
candidate of Economic Sciences, associate Professor at the Department of economics and the modeling of production processes, Belgorod State National Research University
Dynnikov@bsu.edu.ru

Abstract
Economic security of regions is one of the most important components of national security of the state, for any state it is important to solve the problem of ensuring their economic security. To ensure the economic security of the regions it is necessary to develop mechanism and indicators. In article the system of indicators of economic security of the region. Considered signs of classification of the regions to identify threshold levels of performance indicators of economic security. The proposed mechanism of ensuring economic security of the region, the algorithm of development strategy of economic security, the stages of formation of system of economic security of the region.

Keywords: Economic security of the region, indicators of economic security, economic security, the region's economy
JEL classification: O20, P25, R10

1. Introduction

Economic security is a strategic direction in the activities of the state and its regions. This trend is enhanced by the fact that the process of economic globalization is an irreversible natural evolutionary process of societal development.

The changes in the international environment necessitate new approaches to comparative assessment of the level of political, economic and military security in different countries of the world community. It is obvious that an effective system of ensuring economic security is an important issue in any region. This is even more important for today's Russia, seeking to take its rightful place in the global geopolitical and economic space.

The state of economic security of the region can be estimated using special tools: indicators, evaluation criteria, developed and used in government statistics and in various fields of science.

2. The system of economic security indicators of socio-economic systems

Regional socio-economic interests, threats and thresholds of the indicators should take into account the specificity of economy and social sphere of the region, the relevant parameters in this field in Russia as a whole.

In the economic literature there is no single approach to formation of system of economic security indicators the socio-economic system and their threshold values.

In Russia, common system indicators, which includes four projections: economic development, social development, innovative development and environmental development.

Analysis of the developed system showed the feasibility of its improvement by increasing the number of projections and unification of structure of indicators, taking into account new challenges and threats, as well as a number of other factors, emphasizing features of particular regions. In choosing an indicator we used the following considerations:

- availability of source data
- a single frequency output of information – one year
- a limited number of indicators.

The entire system of economic security indicators of socio-economic systems includes ten projections describing various aspects of economic security.

To assess the level of economic security of Russian scientists currently use a variety of methods that can be represented in the form of five groups:

1. Monitoring of the main macroeconomic indicators and their comparison with the thresholds
2. Expert assessment method to rank the regions in terms of threats
3. An assessment of the rate of economic growth in the main macroeconomic indicators and dynamics of their changes
4. Methods of applied mathematics such as multivariate statistical analysis
5. The use of economic instruments when assessing the impact of security threats through quantification. The main problem when using the observation method of the main macroeconomic indicators is the selection of those indicators which compare with the thresholds will allow a comprehensive assessment of the state of the economy, to allocate an objective threat trends.

One of the most authoritative systems of indicators of economic security of Russia is the system S. Y. Glazyev. Diagnostics and monitoring of economic security of the state are conducted on the basis of 22 indicative indicators, each of which defined an individual threshold value. Exceeding these values leads to violation of state security (mainly the threshold value was set by expert). Indicators of economic security, in which Glazyev and cover various areas: industrial, financial, foreign trade, etc., which in turn, allows to judge about the comprehensiveness of the resulting estimates, which is very important when choosing management decisions.

The indicators of economic security S. Glazyev include: gross domestic product, share in industrial production of the manufacturing industry, the share of industrial production engineering, investments, research spending, the share of new products in volume of engineering products, the share in the population of people with incomes below the subsistence level, life expectancy, crime rates, unemployment, inflation, the volume of domestic debt, external debt, budget deficit, money supply, the share of imports in domestic consumption.

Analyzing the presented system of indicators of economic security of different authors, it should be noted one common drawback: they cannot be called a methods of estimation of economic safety, since in these systems there are no algorithms determining the values of the indicators (although in many cases such algorithms are derived directly from the name of the indicator); the interactions between the indicators and the rules for obtaining synthetic estimates based on the aggregate indicative targets; General rules for estimating the States of security; approaches to the assessment of the interaction of various factors and indicators, etc. (Glazyev, 2015).

The criterion of economic security to assess the state of the economy from the point of view of the most important processes, reflecting the essence of economic security.

Criterion assessment of economic safety includes evaluation of:

- resource potential and its development
- the level of efficiency of resource use, capital and labour and its conformity with the level of the most developed countries, as well as the level at which threats to internal and external nature can be reduced to a minimum
- the competitiveness of the economy
- the integrity of the territory and economic space
- sovereignty, independence and the possibility of facing threats
- social stability and conditions for preventing and resolving social conflicts.

For the purposes of comprehensive coverage of potential factors of socio-economic instability in the region developed synthetic indicators of socio-economic tensions that reflect the following situation: unemployment, crime, political situation, international relations, ecology, as the consumer market, the price index for consumer goods and food products, income of citizens, the state of the economy, the availability of additional factors of potential socio-economic tensions.

As characteristic properties of a mode of economic security to consider the conditions of reproduction. Under these conditions, can be put the system boundary mode indicators balanced functioning of the economy. Crisis-free functioning of the real sector of the economy inevitably means its orientation to the expanded reproduction. (Dorokhova et al., 2015; Kostin, 2012).

To build a system of economic security the most important feature of indicators is their interaction, which always exists only under certain conditions, increase in the force of danger, they go beyond certain limits become extreme, and become obvious.

The accumulation of information about the numerical parameters such interaction is necessary to determine the socio-economic impact of macroeconomic policy decisions, assess the importance of certain threats to economic security.

Assessment of the situation in the regions is carried out using two groups of indicators: the first group consists of verifying the indicators. On their basis is carried out diagnostics of a condition of the district, analyzes the depth of the degradation of the structure of the economy and the inertia of their dynamics. The second group consists of indicators of "potential growth" – that characterize the inner potential of the region, prerequisites and possibilities to overcome the state of depression or retardation due to internal forces and resources, the availability of effective pulses and growth points in order to detect the validity of the region to apply for Federal aid. (Novikov et al., 2010).

3. Signs of classification of the regions to define the threshold values of economic security indicators

An objective assessment of economic security socio-economic system is possible on the basis of a comparison of the obtained indicator values with thresholds.

However, the threshold value is a limit value of specific indicators or criteria, but this paper just lists the indicators and limit values are proposed.

To obtain the threshold values of economic security indicators need to be defined at the level of principle, the country's national interests in the field of Economics. (Lyshchikova et al., 2015; Nikulina et al., 2013; Vladyka et al., 2016).

The basis of the territorial zoning threshold levels of performance indicators of economic security in regions of the Russian Federation allowed a separation of socio-economic space of the country according to a number of fundamental classification criteria.

1. Climatic conditions. The more severe is the climate, the more stringent conditions are imposed on a number of performance indicators of economic security, for example, from the standpoint of investment the economy of the regions and the renewal of fixed assets. On the basis of all the territory of the Russian Federation are divided into the following three groups:

- areas with a relatively favourable climate (average temperature in January does not fall below – 5°C)
- areas with a continental climate (average winter temperature in January can drop below – 20°C. the fluctuation range between average January temperature and average July temperature can reach 45-50°C)

- areas with a cold climate and the Northern territory (the average temperature and January usually falls below – 20°C).

2. The degree of development of the territory, where we can distinguish the following affinity groups:

- long cultivated territory with balanced development of industrial and social spheres
- territories, development of which started not so long ago and continues to the present time (developing area)
- undeveloped areas.

3. The structure of industrial production in the territory. In accordance with this characteristic identifies six territorial groups:

- focused on the mining and production of fuel resources (the share of economic activities associated with the extraction and production of fuel resources, in the structure of industrial production is more than 30%)
- areas where the prevailing position in the industrial production is production related to the production of non-ferrous metals and products from them (their share is more than 30-35% in the structure of industrial production)
- areas with a highly developed wood processing and production of wood products and pulp and paper production (these productions occupy a dominant position among other economic activities related to the production of industrial products, and their share exceeds 25%)
- areas with highly developed industries related to the production of products of light (textile and garments manufacturing: manufacture of leather, products from leather and footwear manufacturing) or food (manufacture of food products, beverages and tobacco) industry (one of these productions has a dominant position in the structure of industrial production)
- areas with highly developed metallurgical production and production of ready products made of ferrous metals, as well as engineering and Metalworking (one of these productions has a dominant position in the structure of industrial production and its share in the structure exceeds 30% or the sum of the proportions of both types of production exceed 40-45%)
- the rest of the territory not included in any of the five re-numbering groups.

4. The security of a territory of their own mineral resources. Primarily on the basis of the territory differenciate depending on the type of mineral resources (mineral resources, metal ores or other mineral fork) and the degree of security of territories of different types of minerals. The result is divided into the following groups:

- territory with its own resources of oil or gas, and the resources available in 3-5 times or more exceeds the demand of the territory in these types of fuel and energy resources
- territory with its own resources of oil, gas or coal, while the volume of resources is approximately equal to the requirement or exceeds it somewhat. In addition, this group includes areas with significant own resources of non-ferrous metals
- areas with significant own resources of iron ore
- areas with insignificant amount of own resources of minerals or with their complete absence.

5. The security of a territory of its own fuel resources. This characteristic is used to differentiate threshold values for a number of indicative indicators of energy security of the territory, and is a special case of the previous characteristic. The result of this symptom among the subjects of the Russian Federation allocated only two threshold groups:

- areas with significant fuel resources and ensuring their need for them more than 30-40%
- areas with little of its own fuel resources or complete absence.

6. The strength of transport links the territory with other territories. In the differentiation threshold values indicative figures among the subjects of the Russian Federation in this case there are three affinity groups:

- areas with strong transport links. Such areas are, first, developed railway links with other territories, and secondly, a high degree of development of two or more other types of external transport links (road, air, river or sea)

- areas with connections of medium strength. These areas have railway connection with other areas (but not very strong), and one or more of the other types of external transport links
- areas with weak transport links. These areas have virtually no rail and road connections with other areas. All deliveries to these areas are mostly aviation and water transport.

7. The strength of transport links the territory with other territories from the point of view of supply of fuel resources. By analogy with the fifth sign of the considered characteristic is used to differentiate the thresholds of the indicators of energy security, and is a special case of the previous characteristic. In addition, when forming the threshold groups it takes into account climatic conditions. With that said among the subjects of the Russian Federation are the following affinity groups:

- the territory, with railway connection of medium strength, on non-pipeline transport relations with gas producing territories
- areas that do not have rail and gas pipeline links with external suppliers; fuel resources are taken either from own sources or are delivered by water or air transport. This group includes also the territory of group 1 with severe climatic conditions.

8. The power electrical connections of the territory with power systems of other territories or integrated electricity system. This symptom is regarded as a special case of the 6-th lines, and generates the requirements for energy security in terms of availability of its own generating sources.

9. The development of scientific schools and scientific potential of the territory. This characteristic is used in the zoning thresholds on indicators of science and technology security and consolidation includes three threshold groups:

- the territory, the largest centers of science
- areas with well-developed science of individual lines of which have national significance
- the territory where science developed mostly at the local level and is of a purely applied nature.

10. The development of the higher education system. In accordance with this characteristic differentiates between two territorial groups:

- areas with a developed system of higher education, including the universities of different directions, and profiles, many of which are of Federal significance
- the area where the higher education system is mainly focused on the local needs of skilled workers, given the structure and orientation of the economy, or territory where the system of institutions of higher professional education is not developed.

11. The level of development and orientation of the structure of industrial production in the territory. On the basis of this symptom is zoning thresholds for indicators that assess innovation capacity and performance innovation sphere territories. Are seven territorial groups:

- developed and developed areas with highly developed industry
- developed and Mature areas with well-developed industries, however, traditionally agricultural regions of the country
- developed and developed territory with underdeveloped industry
- areas with developing industry which has a dominant position among the other spheres of production of goods and services
- underdeveloped territories, where the industry does not occupy a dominant position among the other industrial areas
- undeveloped areas in which the industry has received initial level of development and in future it is planned its dominant position among the other industrial areas
- undeveloped territory, where in the near future is planned large-scale development of industrial production.

12. The degree of development and concentration of industrial production in the territory. This characteristic is largely similar to the previous one, but unlike it does not take into account the level of development of other spheres of production complex. Therefore, the

number of threshold groups among the subjects of the Russian Federation on this basis is somewhat less than in the previous case; it is possible to allocate five groups:

- the territory with a highly developed and highly concentrated industry
- areas with highly developed industry, but its concentration is uneven (there are areas with very high concentration, and there are areas where the industrial production is practically absent)
- areas with a developing industry with the uneven concentration of industrial production
- areas with underdeveloped industry
- underdeveloped and undeveloped areas.

13. The export potential of the territory. On this basis, all areas in General, can be divided into two large groups:

- areas with high export potential, where a significant part of industrial production is export-oriented products
- areas with low or low export potential. These areas, usually heavily deficient in their natural and mineral resources.

14. The geographical position of the territory. In the first place in the division of the territories on similar groups regarded their proximity to boundaries, the development of transport communications and infrastructure of export-import operations. As a result, all socio-economic space of Russia can be divided into three large groups:

- border area. This group includes the territory, the largest logistics centres, where many traffic flows
- a territory distant from the state borders but having strong transport links to most parts of the country and with foreign countries
- a territory distant from the state borders (land) or bordering weak States and weak transport links with other regions of the country and with countries abroad.

15. Proximity to foreign countries, and the presence of paths of movement of the migrants from these States. Is a special case of the previous characteristic and is intended for zoning of the constituent entities of the Russian Federation on indicators which take into account migration flows, residence of foreigners and their employment in the economy. When the enlarged classification on the basis of this stand two territorial groups:

- the land bordering foreign States, or through which the main migration flows
- the rest of the territory.

16. The degree of population of the territory. For zoning of subjects of the Russian Federation on this basis uses the rate of population density on the basis of which there are four territorial groups:

- well-developed and densely populated areas
- undeveloped and developed areas
- the new territories
- underdeveloped and undeveloped areas.

17. Production potential and financial security areas, which are assessed on a per capita GRP of the territory. Based on this characteristic among the regions of the Russian Federation there are three groups of areas:

- areas in which per capita GRP relative to the average level is more than 120% (areas with strong production and financial potential)
- areas in which per capita GRP relative to the average level is in the range from 70 to 120% (areas with an average production and financial capacity)
- areas in which per capita GRP relative to the average level reaches 70% (areas with low production and financial potential).

18. The age of the asset population. Analyses on the proportion of the population older than working age in the total population of the territories. On this basis, among the regions of the Russian Federation it is possible to allocate three groups of areas:

- with the well-established age composition of the population. The share of population over working age is more than 20%
- with a dynamically developing economy, where the share of population over working age, usually lies in the range of 15-20%
- with the share of population over working age, not pre-visausa 15%.

19. The proportion of women of childbearing age (15-49 years) in total population; regions of the Russian Federation are divided into two groups site:
   - the territory in which the proportion of women of childbearing age in the total population exceeds 27%
   - the territory in which the proportion of women of childbearing age in the total population less than 27%.

20. Percentage of population under able-bodied and of working age in the total population. Based on this characteristic among the regions of the Russian Federation, two groups of territories:
   - the territory in which the proportion of the population younger than working age and working age in the total population exceeds 80%
   - the territory in which the proportion of the population younger than working age and working age in the General population of less than 80%.

22. Climatic conditions in combination with the structure of production and the availability of energy-intensive industries. This characteristic is used for zoning threshold values of indicative indicators of the energy intensity of the economy of the territories. Among the regions of the Russian Federation under the sign of the coarsening is possible to distinguish the following three affinity groups:
   - areas with cold and temperate climate with a predominance of energy-intensive industries
   - the remaining areas with cold and temperate climate
   - the southern territory.

4. The mechanism of ensuring economic security of the region

The mechanism of ensuring economic security should be a system of procedures and economic instruments allowing the state to effectively exercise its function of protecting the economic security of Russia.

During the formation of this mechanism should clearly set out the responsibilities of the Federal Executive authorities and authorities of subjects of the Russian Federation for the protection of economic security of the country and to act at all stages of economic activities of the state bodies: in the analysis and forecasting of socio-economic development of the country, the development and approval of the state budget, adoption of major regulatory acts and government decisions on the economy, etc. (Yakimchuk, 2015).

The algorithm of realization of this function primarily involves the formalization of national interests in the economic sphere.

For the normal functioning of the economic system need a strategy of economic security, both short-term and in the long term. Some economists argue that at present the main thing – the survival of the economy, then its stabilization, and only in the long term – development. At the core of this strategy lies the idea of the "mighty hand of the market". This understanding has a right to exist, and in terms of Economics it is theoretically justified.

The algorithm of development strategy of economic security socio-economic system consists of the following sequential steps:

1. Articulating interests in the region
2. The identification of threats to economic security of the region
3. Assessment of threats to economic security, as various indicators (socio-demographic, economic, food security, investment, financial, institutional transformations)
4. Comparison of the indicators with the thresholds and determining the status of socio-economic system (normal, pre-crisis, crisis, critical)
5. The formation of economic policy of the region
6. Monitoring the implementation of the measures
7. Implementation of measures to ensure economic security of the territory

Measures and mechanisms of economic policy formulated and implemented at Federal and regional levels, should be aimed at preventing internal and external threats of economic security of the Russian Federation in the following areas:

1. The most important elements of the mechanism of ensuring economic security of the Russian Federation are monitoring and forecasting of the determinants of threats to economic security.

2. Development of criteria and parameters (the threshold) economic security of the regions.

3. The activities of the state in ensuring economic security of the regions is performed in the following main areas:

- identify cases when the actual PLI projected parameters of economic development deviates from a threshold value of economic security and the development of a comprehensive state measures for the country's exit from the danger zone
- organization of work to implement a complex of measures to overcome or prevent the emergence of threats to economic security of the Russian Federation. In the course of this work the security Council of the Russian Federation considers the concept of the Federal budget from the point of view of ensuring economic security of the state; The government of the Russian Federation coordinates the work of Federal Executive bodies, Executive bodies of constituent entities of the Russian Federation in order to implement complex of measures to overcome or to prevent threats of economic safety of the country, including in preparation of legislative and other normative legal acts
- examination of decisions on financial and economic questions on the economic security of the Russian Federation. Legislative and other normative legal acts they must pass an examination on the subject of economic security of the Russian Federation. The procedure for the conduct of the said examination is determined by the President of the Russian Federation. Implementation of measures to eliminate threats to the economic security of the Russian Federation requires a system of control over their execution. The control system should take into account the rights and responsibilities of the owner.

The structure of socio-economic security socio-economic system must be a complex economic, environmental, legal, geopolitical, and other conditions that are designed to ensure: first, the protection of the vital interests of the country and its territories resource potential; second, the preconditions for the conservation and survival of the regional structures of Russia in the conditions of a possible crisis and future development; third, the competitiveness of regions in the domestic and world markets and the stability of the financial situation of the country; fourth, the creation of internal and external security from the destabilizing effects; fifth, the conditions for stable and normal reproduction of social processes.

Formation of system of economic security socio-economic system consists of seven blocks:

1. The concept of economic security
2. Regional interests in the economic sphere
3. The indicators of economic security
4. Threshold values of economic security threats to the region's economy
5. The organization for economic security
6. Legal and institutional economic security

The concept of economic security socio-economic system must contain the analysis of the current socio-economic situation of the region; an analysis of his socio - economic status compared to other regions; the definition of the objectives, principles and criteria for sustainable and safe development; the main parameters of the strategy of economic security of the region and measures for its implementation.

The concept of economic security socio-economic system should be based on long-term and future interests of the territory. Formulating the most important directions and principles of regional (territorial) policy, the concept thus provides the basis for developing concrete programmes and organizational documents, among which a special place must be a strategy for economic security. The economic security strategy socio-economic system is a normative - legal and organizational-methodical document that will reflect the actions of subjects of management of the region to achieve strategic and tactical goals of its economic security. At the stage of development of strategy of economic security socio-economic system, which is

the stage of prevention of critical situations (preventive phase of managing critical situation), actually implemented analytical and prognostic function of management.

Thus, to assess the economic security of socio-economic systems of different levels can be used a whole range of indicators. The use of a system of indicators of economic safety of region with their threshold values will help to identify points of increased risk in food production, infrastructure, financial, social and innovative sectors of the economy of the region, beyond which there is a threat of disequilibrium and development of the constituent elements of the regional system, followed by the onset of the crisis.

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REGIONAL STRATEGIES FOR DEALING WITH STRUCTURAL CHANGE

Eleonora CUTRINI
Associate Professor, Department of Law, University of Macerata
eleonora.cutrini@unimc.it

Enzo VALENTINI
Research Fellow,Department of Political Sciences, Communication and International Relations, University of Macerata
enzo.valentini@unimc.it

Abstract

In recent decades, the low economic performance of European countries has been mainly responsible for the emergence of an economic policy increasingly intended to strengthen the innovative and technology capacity of regions. In particular, the European periphery is lagging behind in the transition to a knowledge driven and eventually service-oriented economy. In a general context of de-industrialization and transition to service economy, and bearing in mind the policy debate at the EU level, the aim of this paper is to analyze the factors driving knowledge-intensive service specialization at the regional level in Italy. Our main research questions here can be summarized as follows: What determines the transition to Services and the specialization in Knowledge-Intensive Services (KIS) in Italy? What are the structural characteristics that may explain the regional variation of employment share in high-knowledge services? Using data on Italian regions over the period 1995-2014 (and spatial panel models as a methodology), the analysis carried out in the paper suggests some considerations: the "mere" (but needed) transition to service activities can be positively associated with R&D Personnel, Tertiary Education, University Attractiveness, Tourism and efficient infrastructure (Railroad). But the transition to Knowledge Intensive Services, supposed to pay higher wages, may deserve a more appropriate and focused public intervention, in view of the fact that it seems to be mainly associated with Public R&D, Tertiary Education and University Attractiveness.

Keywords: Structural Change, Specialization, Spatial Panels, Regional Economy
JEL classification: I25, O32, R11, R12

1. Introduction

In recent decades, the low economic performance of European countries has been mainly responsible for the emergence of an economic policy increasingly intended to strengthen the innovative and technology capacity of regions. The Lisbon Strategy aims to guide economic development and structural change towards a knowledge-based economy. The strategy has involved several important actions, among them better policies to enhance the level of investment in R&D. The Lisbon Strategy was relaunched in 2005, with its focus on the goals of growth and employment and its use as an instrument to put Europe back on the road to development and cohesion. A dual purpose was therefore assigned to the cohesion policy, whose prime objective had previously been the reduction of regional disparities and backwardness typical of marginal areas. In developing national strategic frameworks and operational programs for the period 2007-2013, Member States were invited to pay particular attention to supporting innovation, research and improving education and vocational training.

More recently, the Europe 2020 strategy further relaunched innovation as a key driver of regional development and structural change. In this respect, it is important to note that the European Commission has put a special emphasis on a set of technologies - labelled as 'Key Enabling Technologies' - which, because of their pervasiveness, may enable process, product and service innovation throughout the economy, thus favoring the structural transformation towards a 'knowledge-based' and 'low-carbon' economy. Technology-driven structural change and/or specialization is also a central ingredient of the 'Smart Specialization' strategy in the framework of the EU Cohesion Policy 2014-2020. In particular, the 'Research and Innovation Strategies for Smart Specialization' (RIS3) EU strategy encourages EU regions

and cities to strengthen their distinctive technological bases, to concentrate the available resources on their actual or potential areas of comparative advantages, to diversify into technologies, products and services that are closely related to existing dominant technologies and the regional skills base (European Commission, 2011, 2014).

The European periphery is lagging behind in the transition to a knowledge driven and eventually service-oriented economy. The distribution of high-tech industries was more geographically clustered than traditional industries in Europe already in 1990 (Paci and Usai, 2000). The increasing polarization of knowledge intensive industries during the 1990s (see Cutrini, 2010 for evidence) has favored Northern European countries and is usually associated with a wider availability of highly skilled labour. During the 1990s, structural changes in Northern Europe occurred towards greater specialization in high-technology manufacturing industries, while Southern regions lagged behind.

Italy has some characteristics that can explain a certain development path. In particular, specialization in traditional light industries dates back to the post-war period and the subsequent development of industrial districts (IDs) that derived their competitive advantages from the so-called Marshallian external economies. A substantial body of literature on Italian IDs has provided the underlying reasons for Italy's particular form of economic development. Other authors considered the result of an incomplete development path, both from a sectoral and territorial point of view.

In a general context of de-industrialization and transition to service economy, and bearing in mind the policy debate at the EU level, the aim of this paper is to analyze the factors driving knowledge-intensive service specialization at the regional level in Italy.

Our main research questions here can be summarized as follows: What determines the transition to Services and the specialization in Knowledge-Intensive Services (KIS) in Italy? What are the structural characteristics that may explain the regional variation of employment share in high-knowledge services?

The paper is organized as follows: section two presents a brief review of the literature on the Italian structural change during recent years; section three illustrates methodology and data of the empirical analysis; section four presents the results; section five draws some conclusions and policy implications.

2. Literature Review

We review two lines of research that are related to this paper. The empirical literature on the persistent manufacturing specialization in low-tech industries and the more recent literature on the transition from industry to the service sector, focusing on the Italian economy.

2.1. The Italian Way (1): manufacturing specialization in low-tech industries

Some authors have considered at the specialization patterns of Italy and their determinants from a national perspective (Epifani, 1999; Onida, 1999). On the basis of normalized shares of exports, Epifani (1999) showed that Italy was characterized by a weak performance in the so-called scale-intensive industries (transport equipment, chemicals, basic metals, etc..), in capital-intensive and large-scale industries, and in the so-called science-based industries (telecommunications, measuring and testing instruments, chemical and pharmaceutical products, etc), marked by an intensive use of technical and scientific knowledge inputs. The Italian model of specialization, instead, is defined by an outstanding performance in labour-intensive traditional industries, and in the so-called specialized suppliers (particularly, specialized machinery) characterized by intermediate intensity of physical capital.

Epifani (1999) argued that in the second post-war period Italy was a labour-abundant country relative to its trade partners, and particularly relative to other European countries. It therefore specialized in labour-abundant traditional industries.

On the basis of the idea that, in the presence of significant external economies, international specialization may be fully driven by the initial comparative advantages, Epifani (1999) argued that, despite the capital accumulation of the subsequent decades, the Italian model of specialization did not follow the change in its comparative advantages, as instead happened in rapidly catching-up countries like Japan and Spain. The persistence of the Italian

specialization pattern may be thus explained by the advantages of the industrial districts that dominate the territorial organization of traditional industries in Italy. Italy was therefore locked in in its specialization in traditional industries because of its important external economies in those industries.

Other authors contend that the reason for Italy's low specialization in high-technology industries is the manifestation of an 'incomplete' development path. From this perspective, the Italian anomaly is deeply rooted in the past century when - after 1960 - Italy drastically reduced, sometime to the point of discarding completely, its productive capacity in capital-, technology and knowledge-intensive industries such as chemicals, pharmaceuticals, informatics and consumer electronics, although it had long occupied a leading position in these industries at the international level. The abandonment of these industries, which can be considered strategic for self-sustained and balanced economic development was, according to some authors, the result of complex political choices instead of the natural consequence of market-based competition (Gallino, 2003).

Differences in the sectoral composition of regional manufacturing activity underpin the persistence of a deep regional divide between the North and the South of the country. Some authors have considered the regional convergence-divergence process in the Italian development path and have confirmed that the persistence of the North-South divide has been driven by a growing technology divide in recent decades (Terrasi, 1999; Lanzafame, 2006).

2.2. The transition from Industry to Services (and the Great Recession?)

It is well known that Italy - like other so-called advanced economies with high per-capita income - experienced during the past two decades a process of de-industrialization and a shift towards tertiary sectors.

Italy entered this transition in the context of a general slowdown of the European economy and with a set of fragilities in common with other economic systems of the European Periphery (namely Spain, Portugal and Greece): a low-tech oriented industrial structure, a high incidence of low-skilled workforce, and a significant educational gap with the other OECD countries; the persistence of this distinctive features over time caused a decrease of the overall labor productivity, according to some empirical studies (e.g. Da Silva and Teixeira (2012) for an analysis of Italy and Spain since 1995).

To date, only few works focus on the structural change dynamics of the Italian economy including the period of the Great Recession.

Moreover, the literature on this topic suggests that there are important regional differences. For example, Quatraro (2009) investigated structural change in the Italian regions between 1980 and 2003, and found that, at least within late-industrialized regions -the so-called NEC regions (see Fuà and Zacchia (1983)- the manufacturing sector was still playing a crucial role. Within early industrialized macro regions (The North-West of the country), notwithstanding the diminishing importance of the manufacturing sector, knowledge based services did not reach a large scale either. Accetturo et al. (2015) focus on the structural change to a service economy in the North West macro region and confirm this tendency for the recent period. In particular, a too slow transition towards technology-intensive manufacturing sectors and to knowledge intensive services, is considered as one of the main factors explaining the recent slow growth of the North West region.

Bellandi and Lombardi (2016) provided evidence of a de-industrialization which is evident by a strong employment decrease by the manufacturing industry in the decade 2001-2011 (-19.4% at the national level), with huge heterogeneity across regions both in terms of employment and number of local units. Within the manufacturing industry, the incidence of sectors with higher technology content decreased during the period 2007-2013. Also in this case there are large regional differences.

Valentini et al., (2016) suggest two main tendencies of the recent structural change in the Italian economy: (1) a slow transition to services mainly oriented towards low paid jobs like services to persons (such as nursing, housecleaning and other very low skilled jobs) while it was negligible in "advanced" services, and (2) the persistence of specialization within the manufacturing industry in low-wage and low-tech manufacturing industries (like textiles, textile products, leather and footwear). The progressive contraction of the aggregated income,

which has negatively affected aggregated demand may have been influenced to some extent, and among other factors, by these two types of structural tendencies.

This evidence seems consistent with the theory of "extended crisis" proposed by Delli Gatti et al. (2012) for a symmetric interpretation of the crises of 1929 and 2008. Their main hypothesis is that, in the presence of barriers to labor mobility towards a "new" sector, the falling incomes in the manufacturing (agricolture in '29) industry reverberated in the rest of the economy, via a low demand for goods and services. Suppose that a long period of productivity growth hits the large distinctive sector - i.e manufacturing, and, in particular, low-tech and less-knowledge intensive industries in the 2008 crisis. Since traditional manufacturing industries are supposed to face inelastic, slower growing demand for goods, the growth of productivity implies a reduction of labor, thus employment falls. In a frictionless world, this should not be a problem. Nonetheless, in the real world many difficulties prevent a fast migration of workers from one sector to another, even within the manufacturing industry (e.g. blue-collars considered as high-skilled workers in the textiles industry need to acquire different qualifications if they aim to be hired by firms operating in the biotech industry). Thus, since it is costly to move to knowledge-intensive industries or services, there will be a lower sectoral income for a large economic sector. Therefore, the effect will be a decrease of the global income in the economy, hence a reduction in the demand for other sectors' output, and lower prices in the manufacturing industry. In turn, this scenario may reduce the demand for services by the manufacturing firms.

Actually, there is some evidence that the rise of unemployment during the Eurozone crisis is not just a cyclical phenomenon but has some structural causes. Although structural unemployment was already very high in the euro area before the crisis, the euro area Beveridge curve, which summarizes unemployment developments at a given level of labour demand (or vacancies), suggests the emergence of a structural mismatch across euro area labour markets during the crisis. Moreover, the analysis of skill mismatch suggests a notable increase in the disparity between the skills of the labour force and the skills required by employers at regional, country and euro area level (Draghi, 2014).

The shift to a knowledge-oriented economy can be further slowed down by the lack of vertical integration between the so-called KIBS (Knowledge Intensive Business Services) and high-tech and low-tech industries, that characterized the Italian manufacturing system compared to France, Germany and United Kingdom (See Ciriaci and Palma, 2012, for evidence). Knowledge intensive business services (KIBs) are considered a characteristic feature of a knowledge-driven economy. They are important to improve the sources of knowledge creation (Miles et al., 1995), and they includes activities in which modern technologies, specific abilities and professional knowledge are intensively used (Miozzo; Grimshaw, 2006). KIBs encompass different categories of services that are important fo improve the firms' capacity of innovation and internationalization: R&D services, technical/IT services for production and information/communication functions, economic services for management and administration functions, marketing/Advertising (Strambach et al. (2007)). They are usually provided in close interaction with the firm since they aim to meet the needs of clients by offering individualized solutions.

3. In Search of Determinants of Service Specialization

In view of the above arguments, the following analysis tries to contribute to understand what are the factors that could enhance an inter-sectoral migration from the low productivity and low-wages sectors to high productivity and high-wages sectors, and contribute to define appropriate policies in order to foster long-run economic growth but also to overcome the demand-side crisis that hit Italy and other countries mainly of the European Periphery.

Most of the empirical literature on technological specialization has been carried out at a national level. Notable exceptions that consider regions as basic units of analysis are Peter and Frietsch (2009), Breschi (2000), Paci and Usai (2000), Montresor and Quatraro (2015). For a more recent period, and on the basis of patent data, Usai (2011) analyses inventive activities across regions of main OECD economies and Evangelista et al. (2016) investigate the effects of KETs on regional growth for NUTS2 regions taking into account the period 1996-2011.

The literature to date has not addressed the issue of what determines the regional specialization in Services and Knowledge Intensive Services at the regional level. With the aim of achieving deeper understanding of the determinants of regional specialization, this section presents the result of a spatial panel analysis. The empirical analysis is carried out at a NUTS2 level using data for Italian regions over the period 1995-2014.

The results of the "classical" panel regression approaches might be biased, because they neglect any sort of spatial correlation. To take into account possible local spillover effects of regressors and possible spatial dependence in the patterns of specialization, it is recommended to follow the methodology proposed by Belotti et al. (2013a), who base their work on Lee and Yu (2010), Elhorst (2010) and Cameron et al. (2011). It consists of testing the presence of a spatially dependent scheme and to run different tests to determine the most appropriate model.

The following one is a general specification for Spatial Panel models (Belotti et al., 2013a):

$$y_{i,t} = \alpha+\tau y_{i,t-1}+\rho\sum_{j=1}^{n} w_{ij}y_{j,t}+\sum_{k=1}^{K} x_{i,t,k}\beta_k+\sum_{k=1}^{K}\sum_{j=1}^{n} w_{ij}x_{j,t,k}\theta_k+\mu_i+\gamma_t+\nu_{i,t}$$
$$\nu_{i,t} = \lambda\sum_{j=1}^{n} m_{ij}\nu_{i,t}+\epsilon_{i,t} \quad i=1,...,n \quad t=1,...,T \tag{1}$$

where *i* and *j* identify the regions; $\epsilon_{i,t}$ is a normally distributed error term; w_{ij} are the elements of the spatial matrix *W*, used for the autoregressive component and for the spatially lagged independent variables (we use an inverse distance matrix based on the geographical distance between the regions' centroids in which $w_{ij} = \frac{1}{d_{ij}}$. Data on regional administrative boundaries are drawn from ISTAT); m_{ij} are the elements of the spatial matrix for the idiosyncratic error component; μ_i is the individual fixed or random effect and γ_t is the potential time fixed effect. Given the not very high number of observations and the high number of parameters to estimate, in particular with regional fixed effects, time fixed effects will be excluded.

The ratio of Service, or Knowledge Intensive Services, employment to total employment will be used as dependent variable (y_i), alternatively. Sources, Eurostat Datasets: "Employment in technology and knowledge-intensive sectors by NUTS 2 regions and sex (1994-2008, NACE Rev. 1.1)" [htec_emp_reg] and "Employment in technology and knowledge-intensive sectors by NUTS 2 regions and sex (from 2008 onwards, NACE Rev. 2)" [htec_emp_reg2].

The independent variables (x_i) will be considered one at time in each estimation, because of the low number of observations in our dataset and the high number of parameters needed to be estimated. The independent variables are:

- **Research and Development Personnel** (full time equivalent per 1000 inhabitant). R&D functions may be located in urban areas and metropolitan regions characterized by a higher degree of service orientation. The functional specialization of urban regions with headquarters and business services clustered in larger cities (see Duranton and Puga, 2005) may attract larger firms endowed with R&D labs. Bade et al. (2015) provide evidence of increasing co-localization of R&D and headquarters for some manufacturing industries in Germany. Hence, R&D personnel density can be positively associated with the regional specialization in service activities.
- **Public Expenditure for R&D** (% gdp). We aim to consider the role played by the public provision of material infrastructure and the quality of immaterial infrastructures. In particular, for the latter, we consider the share of public expenditure in R&D over gdp. Moreover, it can be a good way to face the current crisis in view of the arguments of Delli Gatti et al. (2012): Public Expenditure for R&D can sustain the aggregate demand in the short run (in the case of a drop in employment in manufacturing), and facilitate the transition to (knowledge based) services in the long run.
- **Tertiary Education** (university, doctoral and specialization courses), % of 15-64 population. To foster the inter-sectoral migration toward higher-wages jobs, it is necessary to improve the matching of labour supply and demand in terms of skill requirements. In this

view, the share of active population with a tertiary education aims to capture the need of a specific human capital to favor the transition of regional economic systems towards services, and, in particular, towards knowledge-intensive activities.

- **Index of Attractiveness of Universities** (ratio between the net migration of students and the total number of enrolled students, %). The attractiveness of the regional university system intended to measure the quality of the university system could be related to a more developed service sector (again, usually metropolitan regions are endowed with both a better educational systems and a more service-oriented economic structure).
- **Rail Network** on regional surface (km per hundred square km). A well developed railway infrastructure may be associated either to a balanced regional urban system so as to connect the whole regional territory, or to the presence of a metropolitan area. Both kinds of urban systems should be associated to the development of services but not necessary to knowledge-intensive services which do not need material infrastructure for its development (for KISs, it is probably more important the quality of immaterial infrastructure, as our results confirm.).

Source for "Tertiary education (university, doctoral and specialization courses), % of 15-64 population": ISTAT online database "I.Stat". Source for all the remaining variables: ISTAT, "Banca dati indicatori territoriali per le politiche di sviluppo" (http://www.istat.it/it/archivio/16777). Data range from 1995 to 2014. For all the variables, we use the logarithmic transformations.

Going back to equation (1), different model specifications derive from different values of some key parameters:

- Static Models (τ=0) and Dynamic Models (τ≠0);
- if θ =0: Spatial Autoregressive Model with Auto Regressive disturbances (SAC);
- if λ=0: Spatial Durbin Model (SDM);
- if λ=0 and θ =0: Spatial Autoregressive Model (SAR);
- if ρ=0 and θ =0: Spatial Error Model (SEM)

The possibile alternative spatial models have been tested by the tools proposed by Belotti et al. (2013a). The only spatial model which can be excluded with some confidence, in all the specifications, is the SAR one (we tested the hypothesis of λ=0 and Θ=0 in our models, by comparing Log-pseudolikelihood, BIC and AIC of SDM and SAR models, as suggested by Belotti et al. 2013b).

4. Results

Tables 1-6 present the results of the other models (SDM, SAC and SEM). In all the models, a cluster-correlated robust estimate of variance is used (Rogers, 1993; Williams, 2000; Wooldridge, 2002; Froot, 1989). We comment the results only as correlations.

The results can be briefly summed up: the "mere" (but needed) transition to service activities can be positively associated with R&D Personnel, Tertiary Education, University Attractiveness, Tourism and an efficient Railroad (considered as a proxy of infrastructure). But the transition to Knowledge Intensive Services, supposed to pay higher wages, may deserve a more appropriate and focused public intervention, in view of the fact that it seems to be mainly associated with Public R&D, Tertiary Education and University Attractiveness.

Table 1. Research and Development Personnel (full time equivalent per 1000 inhabitant)

Dep. Var: **Services** employment /total employment							Dep. Var: **Knowledge Intensive Services** employment /total employment					
	sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)			sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)
Services (t-1)	0.444***						KIServices (t-1)	0.452***				
R&D personnel	0.025**	0.032**	0.025**	0.043***	0.040***		**R&D personnel**	0.026	0.026	0.079**	0.055	0.046
cons					4.158***		cons					3.393***
R&D personnel (Wx)	-0.009	0.018					**R&D personnel (Wx)**	-0.039	0.114			
ρ	0.447***	0.665***	0.843***				ρ	0.571***	0.765***	0.848***		
λ			-1.022**	0.800***	0.803***		λ			-0.189	0.879***	0.877***
N	187	204	204	204	204		N	187	204	204	204	204
n	17	17	17	17	17		n	17	17	17	17	17
Log-pseudolikelihood	539.506	558.206	561.872	550.632	491.740		Log-pseudolikelihood	344.256	319.489	316.997	310.216	269.856
AIC	-1069.012	-1108.413	-1115.745	-1095.263	-973.479		AIC	-678.512	-630.977	-625.994	-614.431	-529.713
BIC	-1052.856	-1095.140	-1102.472	-1085.309	-956.889		BIC	-662.357	-617.705	-612.721	-604.477	-513.122
R-sq within	0.744	0.606	0.606	0.479	0.479		R-sq within	0.731	0.635	0.630	0.404	0.404
R-sq overall	0.867	0.010	0.022	0.001	0.001		R-sq overall	0.730	0.287	0.270	0.050	0.050
R-sq between	0.952	0.045	0.038	0.021	0.021		R-sq between	0.931	0.025	0.000	0.003	0.003
Prob>=chi2 (hausmann)	0.000	0.000		0.605			Prob>=chi2 (hausmann)	0.000	0.000		0.641	

Significance: ⋆: 10%, ⋆⋆: 5%, ⋆⋆⋆: 1%. Robust Standard Errors. Source: own calculation on ISTAT and Eurostat data (see text for details)

Table 2. Public Expenditure for R&D (% gdp)

Dep. Var: **Services** employment /total employment							Dep. Var: **Knowledge Intensive Services** employment /total employment					
	sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)			sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)
Services (t-1)	0.464***						KIServices (t-1)	0.412***				
Public R&D	0.004	0.002	-0.001	-0.002	0.000		**Public R&D**	0.042**	0.114**	0.118***	0.107**	0.093***
cons					4.199***		cons					3.506***
Public R&D (Wx)	0.037*	0.071**					**Public R&D (Wx)**	-0.046	0.009			
ρ	0.443***	0.772***	-0.810**				ρ	0.585***	0.876***	0.837***		
λ			0.914***	0.827***	0.825***		λ			0.255	0.889***	0.885***
N	170	187	187	187	187		N	170	187	187	187	187
n	17	17	17	17	17		n	17	17	17	17	17
Log-pseudolikelihood	487.284	504.562	502.187	500.246	443.032		Log-pseudolikelihood	309.710	294.671	294.934	293.409	252.866
AIC	-964.567	-1001.124	-996.374	-994.493	-876.065		AIC	-609.421	-581.342	-581.868	-580.818	-495.732
BIC	-948.888	-988.199	-983.449	-984.799	-859.909		BIC	-593.742	-568.417	-568.943	-571.125	-479.577
R-sq within	0.691	0.287	0.012	0.040	0.040		R-sq within	0.708	0.260	0.253	0.087	0.087
R-sq overall	0.905	0.035	0.067	0.073	0.073		R-sq overall	0.676	0.098	0.081	0.045	0.045
R-sq between	0.965	0.012	0.073	0.076	0.076		R-sq between	0.817	0.031	0.034	0.053	0.053
Prob>=chi2 (hausmann)	0.000	0.000		0.334			Prob>=chi2 (hausmann)	0.000	0.000		0.054	

Significance: ⋆: 10%, ⋆⋆: 5%, ⋆⋆⋆: 1%. Robust Standard Errors. Source: own calculation on ISTAT and Eurostat data (see text for details)

Table 3. Tertiary education (university, doctoral and specialization courses), % 15-64 population

Dep. Var: **Services** employment /total employment							Dep. Var: **Knowledge Intensive Services** employment /total employment					
	sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)			sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)
Services (t-1)	0.361***						KIServices (t-1)	0.409***				
Tertiary Education	0.056*	0.110**	0.099**	0.181***	0.180***		**Tertiary Education**	0.171**	0.264**	0.273**	0.361**	0.313**
cons					3.734***		cons					2.653***
Tertiary Education (Wx)	0.087**	0.058					**Tertiary Education (Wx)**	-0.184*	-0.097			
ρ	0.029	0.138	0.498**				ρ	0.625***	0.728***	0.550**		
λ			-0.634	0.158	0.164		λ			0.375	0.778***	0.793***
N	200	220	220	220	220		N	200	220	220	220	220
n	20	20	20	20	20		n	20	20	20	20	20
Log-pseudolikelihood	626.986	632.490	633.357	626.419	556.651		Log-pseudolikelihood	405.728	377.394	377.929	373.168	322.111
AIC	-1243.972	-1256.980	-1258.714	-1246.838	-1103.303		AIC	-801.455	-746.788	-747.859	-740.337	-634.222
BIC	-1227.481	-1243.405	-1245.139	-1236.657	-1086.335		BIC	-784.964	-733.214	-734.284	-730.156	-617.254
R-sq within	0.807	0.724	0.723	0.708	0.708		R-sq within	0.729	0.600	0.599	0.577	0.577
R-sq overall	0.809	0.049	0.053	0.043	0.043		R-sq overall	0.643	0.189	0.179	0.111	0.111
R-sq between	0.911	0.001	0.001	0.004	0.004		R-sq between	0.730	0.000	0.000	0.001	0.001
Prob>=chi2 (hausmann)	0.000	0.094		0.708			Prob>=chi2 (hausmann)	0.000	0.000		0.332	

Significance: ⋆: 10%, ⋆⋆: 5%, ⋆⋆⋆: 1%. Robust Standard Errors. Source: own calculation on ISTAT and Eurostat data (see text for details)

Table 4. Index of attractiveness of universities (Ratio between the net migration of students and the total number of enrolled students, %)

Dep. Var: **Services** employment /total employment							Dep. Var: **Knowledge Intensive Services** employment /total employment					
	sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)			sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)
Services (t-1)	0.631***						KIServices (t-1)	0.374***				
University Attract.	0.017***	0.030***	0.024***	0.030***	0.030***		**University Attract.**	0.016**	0.055***	0.053***	0.054***	0.052***
cons					4.021***		cons					3.120***
University Attract. (Wx)	-0.018	-0.019					**University Attract. (Wx)**	0.019	-0.032			
ρ	0.353***	0.845***	-1.253***				ρ	0.531***	0.906***	-0.082		
λ			0.944***	0.831***	0.847***		λ			0.915***	0.907***	0.905***
N	285	304	304	304	304		N	285	304	304	304	304
n	19	19	19	19	19		n	19	19	19	19	19
Log-pseudolikelihood	795.053	736.631	744.902	736.572	674.276		Log-pseudolikelihood	513.075	462.232	462.199	462.155	415.355
AIC	-1580.106	-1465.262	-1481.805	-1467.144	-1338.553		AIC	-1016.151	-916.464	-916.397	-918.310	-820.710
BIC	-1561.843	-1450.394	-1466.936	-1455.993	-1319.968		BIC	-997.889	-901.596	-901.529	-907.159	-802.125
R-sq within	0.831	0.077	0.022	0.039	0.039		R-sq within	0.833	0.104	0.021	0.023	0.023
R-sq overall	0.939	0.023	0.038	0.023			R-sq overall	0.781	0.031	0.009	0.009	0.009
R-sq between	0.992	0.015	0.043	0.021	0.021		R-sq between	0.960	0.001	0.005	0.004	0.004
Prob>=chi2 (hausmann)	0.000	0.000		0.721			Prob>=chi2 (hausmann)	0.000	0.000		0.606	

Significance: ⋆: 10%, ⋆⋆: 5%, ⋆⋆⋆: 1%. Robust Standard Errors. Source: own calculation on ISTAT and Eurostat data (see text for details)

Table 5. Tourism: Nights spent in accommodation establishments (per inhabitant)

Dep. Var: **Services** employment /total employment							Dep. Var: **Knowledge Intensive Services** employment /total employment					
	sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)			sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)
Services (t-1)	0.686***						KIServices (t-1)	0.540***				
Tourism	0.019*	0.069**	0.025**	0.072**	0.066**		**Tourism**	0.001	0.021	0.023	0.021	0.012
cons					4.068***		cons					3.353***
Tourism (Wx)	-0.028*	-0.011					**Tourism (Wx)**	0.010	0.117**			
ρ	0.289***	0.786***	0.932***				ρ	0.469***	0.873***	-0.514		
λ			-1.741***	0.831***	0.832***		λ			0.946***	0.912***	0.911***
N	361	380	380	380	380		N	361	380	380	380	380
n	19	19	19	19	19		n	19	19	19	19	19
Log-pseudolikelihood	973.622	863.885	882.165	859.869	795.891		Log-pseudolikelihood	629.922	560.268	553.846	551.751	503.191
AIC	-1937.244	-1719.770	-1756.330	-1713.737	-1581.782		AIC	-1249.843	-1112.537	-1099.693	-1097.502	-996.382
BIC	-1917.799	-1704.009	-1740.570	-1701.917	-1562.081		BIC	-1230.399	-1096.776	-1083.932	-1085.681	-976.682
R-sq within	0.866	0.474	0.471	0.308	0.308		R-sq within	0.876	0.452	0.135	0.226	0.226
R-sq overall	0.936	0.029	0.072	0.021	0.021		R-sq overall	0.844	0.219	0.002	0.003	0.003
R-sq between	0.972	0.001	0.000	0.011	0.011		R-sq between	0.996	0.034	0.000	0.002	0.002
Prob>=chi2 (hausmann)	0.000	0.016		0.262			Prob>=chi2 (hausmann)	0.006	0.016		0.648	

Significance: ⋆: 10%, ⋆⋆: 5%, ⋆⋆⋆: 1%. Robust Standard Errors. Source: own calculation on ISTAT and Eurostat data (see text for details)

Table 6. Railroad: Rail network on regional surface (km per hundred square km)

Dep. Var: **Services** employment /total employment							Dep. Var: **Knowledge Intensive Services** employment /total employment					
	sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)			sdm (fe)	sdm (fe)	sac (fe)	sem (fe)	sem (re)
Services (t-1)	0.447***						KIServices (t-1)	0.434***				
Railroad	0.055***	0.118***	0.117***	0.094***	0.081**		**Railroad**	-0.071	-0.030	-0.053	-0.052	-0.016
cons					4.061***		cons					3.494***
Railroad (Wx)	0.035	0.224					**Railroad (Wx)**	-0.715**	0.309			
ρ	0.478***	0.797***	0.940***				ρ	0.557***	0.885***	-0.123		
λ			-1.582***	0.837***	0.837***		λ			0.906***	0.892***	0.888***
N	220	240	240	240	240		N	220	240	240	240	240
n	20	20	20	20	20		n	20	20	20	20	20
Log-pseudolikelihood	647.564	636.234	646.369	631.780	564.867		Log-pseudolikelihood	411.357	378.256	377.869	377.794	329.971
AIC	-1285.129	-1264.468	-1284.739	-1257.560	-1119.735		AIC	-812.713	-748.511	-747.737	-749.588	-649.942
BIC	-1268.161	-1250.545	-1270.816	-1247.118	-1102.332		BIC	-795.745	-734.589	-733.815	-739.146	-632.539
R-sq within	0.752	0.281	0.276	0.062	0.062		R-sq within	0.701	0.201	0.003	0.004	0.004
R-sq overall	0.790	0.045	0.024	0.004	0.004		R-sq overall	0.540	0.073	0.001	0.001	0.001
R-sq between	0.826	0.027	0.009	0.003	0.003		R-sq between	0.496	0.010	0.002	0.002	0.002
Prob>=chi2 (hausmann)	0.000	0.102		0.648			Prob>=chi2 (hausmann)	0.000	0.000		0.491	

Significance: ⋆: 10%, ⋆⋆: 5%, ⋆⋆⋆: 1%. Robust Standard Errors. Source: own calculation on ISTAT and Eurostat data (see text for details)

In the context of the Smart Specialization strategy, some other considerations are worth examining. It goes without saying that not all regions can be specialized in the same activities. Moreover, knowledge-intensive services can facilitate the production of different goods with very different technological and innovation content. Hence, they are important to facilitate the modernization of production processes and firm organization even in traditional sectors (particularly KIBs).

What takes place at the microeconomic level has also an impact at the regional level, hence the path-dependence in manufacturing specialization patterns or diversification of the regional industrial base is not good or bad in itself, but should be considered in the light of the capacity of the existing industrial system to connect with high-skilled sectors (both within the industrial sector or in the service sector).

Therefore, the effort to acquire competencies in knowledge-intensive services is not inconsistent with a strategy aimed at consolidating the long-term comparative advantages of regions, even if it is on traditional industries. Conversely, it is worth noting that our results suggest that enhancing tourism may not be enough to drive the transition from a manufacturing based economic system towards a knowledge-driven or services based one.

5. Comments

There is a generalized consensus that Italy needs a new economic policy aimed at restarting growth, but this consensus does not define what its pillars should be.

This paper aims to provide a contribution to the ongoing debate and to the formulation of an appropriate economic policy for Italy by examining some drivers, at the regional level, of services and KIS specialization.

Our results suggest that economic activities linked to tourism inevitably constitute an important driver of the transition towards services, due to an evident and historical comparative advantage. But public authorities can play a major role in directing the transition also towards KIServices, by investing in public R&D and in the university and educational system.

Sustaining the development of knowledge-intensive services is desirable not only to overcome the crisis of aggregate demand, but also to improve the capacity of Italian firms to foster their innovation, their international activities and compete in global markets, even if the Italian industry will continue to be based on traditional manufacturing sectors. In this view, the challenge is to strengthen the link between the material production know as Made in Italy and other activities with high innovation potential, mainly Knowledge Intensive Business Services. The effort to acquire competencies in these activities is not inconsistent with a strategy aiming at consolidating the long-term comparative advantages of regions.

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Appendix: Dataset

Region	Services	Knowledge Intensive Services	Research and Development Personnel	Public Expenditure for R&D	Tertiary education	Universities attractiveness	Tourism	Railroad
	% employment	% employment	Full time equivalent per 1000 inhabitant	% gdp	% of 15-64 population	Ratio between the net migration of students and the total number of enrolled students	Nights spent in accommodation establishments (per inhabitant)	km per hundred square km
Abruzzo	63	27	2.5	.53	16	12	5.2	5.7
Basilicata	60	28		.42	13	-207	2.8	5.4
Calabria	70	32		.4	13	-62	3.6	7.1
Campania	70	31	2.3	.66	12	-12	3.3	10
Emilia-Romagna	60	27	5.1	.49	16	34	8.8	6.9
Friuli-Venezia G.	63	29	4.4	.63	14	10	7.1	6.1
Lazio	79	37	5.9	1.1	19	19	5.2	7.9
Liguria	75	33	3.9	.52	17	-13	9.2	9.7
Lombardia	60	29	4.2	.29	15	11	2.9	8.5
Marche	57	25	2.6	.36	16	3.5	7.9	4
Molise	62	28		.35	15	-44	1.9	6.1
Piemonte	60	28	5.1	.36	14	-5	2.3	7.8
Puglia	64	28	1.6	.51	11	-40	2.6	7.5
Sardegna	70	30	1.9	.61	12	-21	6.2	4.3
Sicilia	72	33	1.7	.59	12	-14	2.6	5.8
Toscana	65	28	3.8	.68	15	18	11	6.8
Trentino-Alto Adige	68	32	3.9	.46	14	-12		3.1
Umbria	64	28	3	.63	17	19	6.4	6.1
Valle d'Aosta	72	32	2.1	.10	12		26	2.5
Veneto	57	25	3.5	.34	13	-8.7	12	6.7
Total	66	30	3.1	.5	14	-29	8.4	6.4

Source: Eurostat/Istat

THE RELATIONSHIP BETWEEN GREENSPACE AGREEMENT, EXTERNAL DISECONOMY AND RESIDENTS' RISK ASSESMENT

Kenichi SHIMAMOTO
Associate Professor, Hirao School of Management, Konan University
kenichi@center.konan-u.ac.jp

Abstract

The greenspace agreement is an effective method to promote the conservation and creation of greenspace. In this paper, the mechanism of the formation of the greenspace agreement is analysed using the coalition game. As a result, it was identified that the greenspace agreement requires a certain level of supporters in order to be formed and the most desirable situation is when there is a universal agreement. It also identified the possibility of the existence of free riders which could prevent a unanimous support of the greenspace agreement. The number of supporters of the greenspace agreement and number of free riders are dependent on the size of the external diseconomy caused by the lack of consideration for greenspace, the government's enforceability of taxes on the diseconomy and the decline in land prices due to the external diseconomies from the neglect of greenspace. Furthermore, it was found that it was also influenced by the residents and stakeholder's risk assessment based on their view towards the government's enforceability of taxes and the rate of decline in land prices.

Keywords: Greenspace agreement, coalition game, free rider, external diseconomy
JEL classification: H2, Q5, R0

1. Introduction

Urban greenspace provides environmental and social services such as wind block, fire protection, prevention of soil erosion, dust control, sound insulation, air purification, climate balance, conservation of biodiversity, environmental protection function such as the formation of resource-circulating society and amenity functions such as scenery, space and comfort (e.g. Hoyano and Hagiwara, 1983; McPherson, 1992; Minemura et al., 2002; Tabata, 2011). Recent studies on the health benefits of greenspace is especially active (Ambrey, 2016; Willis et. al, 2015; Gilbert, 2016). However, with the emphasis on economic development, liberal building policy and unified national approach towards development, Japan has neglected consideration for greenspace (Ministry of Land, Infrastructure, Transport and Tourism/ Ministry of Agriculture, Forestry and Fisheries/Ministry of the Environment, 2004). As global endeavours towards sustainable development such as the Rio Summit has progressed, Japan's interest in greenspace has risen (Ministry of Land, Infrastructure, Transport and Tourism, 2014).

This has led to the establishment and amendments to the Urban Green Space Conservation Act and the encouragement of developing with greenspace and afforestation consideration (In the 1973 Urban Green Space Conservation Act, the greenspace agreement focused on increasing greenspace, whereas in the 1995 amendment, the concept of greenspace consideration was added.). Included in Article 45 is the concept of a universal agreement concerning the conservation and formation of greenspace and as an effective method, the greenspace agreement is introduced. Article 54 includes the concept of a one person agreement as one type of agreement. However, this paper focuses on an agreement with a certain number of participants, so will limit the analysis to the coverage of Article 45. Since its introduction, the number of universal green space agreement has grown to 521 in 2014 (Ministry of Land, Infrastructure, Transport and Tourism, 2014). A greenspace agreement supported by the land owners and stakeholders of a City Planning Area or an area of land along a considerable sized Quasi-City Planning Area, road or river, enables the establishment of developed and detailed standards concerning greenspace conservation and creation. In this way, through a greenspace agreement, residents are actively able to establish greenspace regulations and take part in an important role in the conservation and creation of greenspace.

This paper focuses on the mechanism of the formation of a greenspace agreement, which is a tool used to maintain greenspace and applies the coalition game for the analysis. According to the Broken Windows Theory (Wilson and Kelling, 1982), the deterioration of the environment can lead to increased crime and decline in sanitation levels leading to further deterioration of the environment. There are past studies on the influence of urban greenspace in crime preventions (e.g. Branas et al., 2011; Kuo and Sullivan, 2001). Hence, it will be necessary to consider the introduction of taxes to cover the cost of addressing the negative externalities from the neglect in greenspace. Moreover, such decline in the environment has the potential to reduce land prices and there are studies which support the positive impact greenspace has on land and housing value (e.g. Conway et al. 2010, Jim and Chen, 2006). Taking these points into consideration, since the negligence of greenspace may cause external diseconomy and affect the decline in land prices, the model takes into consideration the incurrence of such related cost.

Since there are many factors of uncertainties in society, there is a need to include this in the analysis process. The model takes into consideration such uncertainties as the tax burden to cover the cost to address the external diseconomies from greenspace neglect; the possibility of a decline in land prices from the neglect; and the residents' attitude towards risk.

From this analysis, the results confirmed that in order for a greenspace agreement to be formed, a certain level of supporters is required and the optimal situation is when there is a universal agreement. It also confirmed the possibility of the existence of free riders which can prevent a universal agreement. Furthermore, the number of supporters and the number of free riders are dependent on the size of the external diseconomy caused by greenspace neglect and the ability for the government to enforce taxes. It was also influenced by land prices; the rate of decline in land prices from the external diseconomy from the neglect in green space; and the residents' risk assessment based on their view towards the government's enforceability of taxes and the rate of decline in land prices.

In Section 2, the analysis on landscape agreements using the coalition game is conducted with the consideration of the residents' risk assessment towards the government's ability to enforce taxes on the external diseconomy from the neglect in landscape and the decline in land prices due to the neglect. Section 3 will provide the results and conclusion.

2. Greenspace Agreement and the Coalition Game

We will assume a new development site. A greenspace agreement will be considered by the participants for the conservation and creation of greenspace for this development. When households plan building with consideration for greenspace before the construction starts, the cost per unit area is Y yen for each household. On the other hand, if construction starts without greenspace consideration, cost such as from external diseconomy may be incurred. For example, according to the Broken Windows Theory, the deterioration of the environment can have a number of negative impacts such as increased crime, decline in sanitation levels leading to further deterioration of the environment and a decline in land prices. Therefore, the cost from the external diseconomy will be split in two in the analysis. First, there will be the cost of the burden to each household for the external diseconomy from the neglect in greenspace. This is when a Pigovian tax is imposed on each household. The second will be the cost to each household from the decline in land prices due to greenspace neglect. These costs to the households will be calculated based on per unit area and will be assumed to be $\rho T+\delta L$ yen. Here, T will represent the tax to cover the cost to address the external diseconomy from greenspace neglect and p will be the rate of enforceability by the government concerning this tax and δ will be the rate of decline in land prices effected by greenspace neglect and L will represent the land price. If we assume that x households build without greenspace consideration, the cost to rectify this will be $x(\rho T+\delta L)$ yen per unit area for each household.

Here, the set of players in the coalition game is defined as N. The subset of players within the set will be coalition S and any other coalition will be represented as N-S. In this case, the number of members within coalition S will be s and the number of members in coalition N-S will be n-s.

There is an element of uncertainty concerning the government's capability of the enforcement of the tax to cover the cost of addressing the external diseconomy from

greenspace neglect, as well as uncertainty concerning the decline in land prices due to this neglect. Hence, the residents' subjective assessment may come into play. This is taken into consideration by assuming that there will be a neutral, pessimistic and optimistic view towards the risk of tax enforcement and decline in land prices. Therefore, there will be 9 types of risk assessment and due to limitation of space, we will assume that the risk assessment will be consistent with all of the subject matters. This provides three types of risk assessment towards the tax enforceability for the cost of addressing the external diseconomy from greenspace neglect and the decline in land prices from the neglect. They are (risk neutral, risk neutral), (risk pessimistic, risk pessimistic) and (risk optimistic, risk optimistic).

2.1. Residents with a neutral assessment towards the risk

First, we will examine the case where the residents will have a neutral view towards the risk of the introduction of tax and the decline in land prices from the external diseconomy of the neglect in greenspace. In this case, since there will be no over estimation or under estimation of the government's enforceability of the tax or decline in land prices, they can each be represented as , respectively. Taking this into consideration, the cost function for each case is as described below.

When both coalition *S* and coalition *N*-S build with greenspace consideration, the cost to coalition *S* is

$$C(S) = sY. \quad (1)$$

When both coalition *S* and coalition *N*-S build with greenspace consideration, the cost to coalition *N-S* is

$$C(N-S) = (n-s)Y. \quad (2)$$

When coalition *S* builds with greenspace consideration and coalition *N-S* does not, the cost to coalition *S* is

$$A(S) = s\{Y + (n-s)(\rho T + \delta L)\}. \quad (3)$$

When coalition *S* builds with greenspace consideration and coalition *N-S* does not, the cost to coalition *N-S* is

$$D(N-S) = (n-s)^2(\rho T + \delta L). \quad (4)$$

When coalition *S* does not build with greenspace consideration and coalition *N-S* does, the cost to coalition *S* is

$$D(S) = s^2(\rho T + \delta L). \quad (5)$$

When coalition *S* does not build with greenspace consideration and coalition *N-S* does, the cost to coalition *N-S* is

$$A(N-S) = (n-s)\{Y + s(\rho T + \delta L)\}. \quad (6)$$

When both coalition *S* and coalition *N*-S do not build with greenspace consideration, the cost to coalition *S* is

$$B(S) = sn(\rho T + \delta L). \quad (7)$$

When both coalition *S* and coalition *N*-S do not build with greenspace consideration, the cost to coalition *N-S* is

$$B(N-S) = (n-s)n(\rho T + \delta L). \quad (8)$$

When the cost to coalition S is greater when coalition S builds with greenspace consideration and coalition N-S does not; than the cost to coalition S when both coalition S and coalition N-S do not build with greenspace consideration, in other words, when $A(S) > B(S)$, from (3) and (7), $s\{Y + (n-s)(\rho T + \delta L)\} > sn(\rho T + \delta L)$ is derived and the following is obtained.

$$s < {}^{Y}/_{(\rho T + \delta L)}. \quad (9)$$

Hence, this suggests that when the number of supporters are less than a certain level, the greenspace agreement is not formed. In further detail, when the number of supporters of the greenspace agreement is less than the ratio of the cost of building with greenspace consideration to the cost of building without, the greenspace agreement is not established.

On the other hand, when the cost to coalition S is less when coalition S builds with greenspace consideration and coalition N-S does not; than the cost to coalition S when both coalition S and coalition N-S do not build with greenspace consideration, in other words, when $A(S) < B(S)$, from (3) and (7), $s\{Y + (n-s)(\rho T + \delta L)\} < sn(\rho T + \delta L)$ and $n \geq s$, obtaining the following.

$$n \geq s > {}^{Y}/_{(\rho T + \delta L)}. \quad (10)$$

Proposition 1

When the number of supporters of the greenspace agreement is greater than the ratio of the cost of building with greenspace consideration to the cost of building without, the greenspace agreement is formed.

This implies that when the number of supporters of the greenspace agreement are over a certain level, the greenspace agreement is formed. It also suggests that the greater the number of supporters of the agreement, the cost to improve the deterioration of the greenspace per household will be less. Thus, it is understood that the best outcome is a unanimous support of the greenspace agreement.

Furthermore, if we observe the relationship between each variable and the number of supporters of the green space agreement in results (10), we learn that the cheaper the cost of supporting the agreement, the agreement is able to be formed with fewer supporters. Moreover, the greater the cost to address the external diseconomy due to green space neglect, the agreement is also formed with fewer supporters. The greater the ability of the government to enforce taxes to address the external diseconomy from green space neglect also enables a greenspace agreement with fewer number of supporters. It was also found that the higher the price of land, the agreement is formed with fewer number of supporters. Finally, it was observed that the greater the decline in land prices, the fewer number of supporters required for a green space agreement to be formed.

However, it is not a certainty that all residents and stakeholders will participate in the greenspace agreement. Next, we will attempt to examine the situation where a unanimous agreement is reached by all residents and stakeholders within an area.

Here, we will first assume that a coalition S was formed and a green space agreement was established and building with green space consideration was conducted based on this. The cost to remaining coalition N-S to build with green space consideration and the cost to build without will be (2), (4) respectively. $C(N-S) > D(N-S)$, in other words, when the cost for coalition N-S to build without green space consideration is less than to build with consideration, then the following is obtained.

$$(n-s)Y \geq (n-s)^2(\rho T + \delta L). \quad (11)$$

(11) can be rewritten as follows.

$$n - s \leq Y/(\rho T + \delta L). \quad (12)$$

Proposition 2

When coalition S, which builds with green space consideration exists and the number of participants in the remaining group N-S is less than the ratio of the cost of greenspace considerate building to the cost of building without greenspace consideration, the remaining group N-S will not form a green space agreement.

From the results above, we learn that there is a case where the cost is cheaper for coalition S to build with greenspace consideration than without and cheaper for coalition N-S to build without. In this case, if the green space considerate building by coalition S has an impact on the external economy to the area and coalition N-S within, coalition N-S can be considered a free rider. Then the dominant strategy for each coalition S and coalition N-S will be (building with greenspace consideration, building without greenspace consideration) and the strategy will be at an equilibrium. In other words, it suggests the possibility of two groups to be formed, the coalition that is proactively considerate of the greenspace and a coalition that is passive about greenspace consideration. This means that the number of members in the group who are active about building with greenspace consideration will not exceed the border of $B/(\rho T + \delta L)$.

Furthermore, if we observe each variable and the number of supporters of the green space agreement in results (12), we learn that the capability to host free riders is greater when the cost from the result of the green space agreement is higher. Moreover, when the cost to address the external diseconomy due to green space neglect is greater, the ability to host free riders is fewer. When the government's ability to enforce these taxes is greater, the capacity to host free riders is fewer. The higher the land prices also limits the free riders as well as the greater the decline in land prices due to green space neglect.

2.2. Residents with a pessimistic assessment towards risk

Next, we will examine the case of the residents with a pessimistic assessment towards risk. Residents with a pessimistic view are inclined to overestimate the government's enforceability of the tax to address the negative externalities from greenspace neglect. Hence, the enforceable tax rate by the government will be estimated as follows.

$$(1 + h_T)\rho \quad (13)$$

Here, h_T represents the rate of overestimation. Moreover, it suggests $0 < h_T < (1-\rho)/\rho$.

Risk pessimistic residents tend to overestimate the rate of decline of land prices due to greenspace neglect. Thus, the rate of land price decline due to greenspace neglect will be estimated as follows.

$$(1 + h_L)\delta. \quad (14)$$

Here, h_L represents the rate of overestimation. Moreover, it suggests $0 < h_L < (1-\rho)/\rho$.

The number of participants of the greenspace agreement from (13), (14) with the consideration of the risk pessimistic residents, (10) can be rewritten as follows.

$$n \geq s > {}^{Y}/_{\{(1+h_T)\rho T + (1+h_L)\delta L\}}. \quad (15)$$

Proposition 3

The greater the h_T, the greenspace agreement is able to form with fewer supporters. In the same way, the greater the h_L, the fewer supporters necessary for the greenspace agreement to be established.

In other words, since risk pessimistic types will overestimate the tax enforcement ability of the government to implement taxes to address the negative externalities from greenspace neglect, the greenspace agreement can be established with fewer supporters. Moreover, since they will also overestimate the rate of decline in land prices from greenspace neglect, the greenspace agreement can be formed with fewer supporters.

On the other hand, concerning the capacity to include free riders concerning greenspace consideration, if we consider the risk pessimistic residents from (13) and (14), (12) can be rewritten as follows.

$$n - s < Y/\{(1+h_T)\rho T + (1+h_L)\delta L\}. \quad (16)$$

Proposition 4

The greater the h_T, the capacity to include free riders concerning the greenspace will be less. Similarly, the greater the h_L, the capacity to include free riders will be less.

Hence, since risk pessimistic types will overestimate the tax enforcement ability of the government to implement taxes to address the negative externalities from greenspace neglect, the capacity to include free riders will be fewer. Moreover, since they will also overestimate the rate of decline in land prices from greenspace neglect, in other words have a pessimistic view, the ability to include free riders will be less.

2.3. Residents with an optimistic assessment towards risk

Finally, we will examine the case of residents with an optimistic view towards risk. The risk optimistic residents will tend to underestimate the tax enforcing ability of the government to implement taxes to address the negative externalities from greenspace neglect. Thus, the rate of enforceability by the government for the tax to address the negative externalities from greenspace neglect will be estimated as follows.

$$(1 - l_T)\rho. \quad (17)$$

Here, l_T represents the rate of underestimation. Furthermore, it suggests $1 - (\frac{1}{\delta}) < l_T < 1$.

Risk optimistic residents have a tendency to underestimate the rate of decline in land prices. Hence, the rate of decline of land prices due to greenspace neglect will be as follows.

$$(1 - l_L)\delta. \quad (18)$$

Here, $l_L$represents the rate of underestimation. Moreover, it suggests 1-(1/δ)$< l_L < 1$.

From (17), (18) and consideration for the risk optimistic residents, (10) can be rewritten as follows.

$$n \geq s > {}^{Y}/_{\{(1-l_T)\rho T + (1-l_L)\delta L\}}. \quad (19)$$

Proposition 5

The greater the l_T, the greenspace agreement will require greater number of supporters. In the same way, the greater the l_L, the greater number of supporters necessary for the greenspace agreement to be established.

By way of explanation, since risk optimistic types will underestimate the tax enforcement ability of the government to implement taxes to address the negative externalities from greenspace neglect, the greenspace agreement will require the support of a greater number to be formed. Similarly, since they will also underestimate the rate of decline in land prices from greenspace neglect, the greenspace agreement will require a greater number of supporters.

However, concerning the capacity to include free riders, if we consider the risk optimistic residents from (17) and (18), (12) can be rewritten as follows.

$$n - s < Y/\{(1 - l_T)\rho T + (1 - l_L)\delta L\}. \quad (20)$$

Proposition 6

The greater the l_T, the capacity to include free riders concerning the greenspace will be greater. In the same way, the greater the l_L, the capacity to include free riders will be greater.

In other words, the risk optimistic type of residents will underestimate the tax enforcement ability of the government to implement taxes to address the negative externalities, the capacity to include free riders will be greater. Furthermore, it was identified that these residents will underestimate the rate of decline in land prices from greenspace neglect, in other words have an optimistic view, the ability to include free riders will be greater.

3. Conclusion

With the global focus on sustainable development and Japan's interest in greenspace continues to grow, this paper uses the coalition game to attempt to analyse the mechanism of the formation of a greenspace agreement. The model takes into consideration the cost incurred from the external diseconomy and decline in land prices caused by greenspace neglect. As a result, the greenspace agreement is only possible when a certain level of supporters is gained and the most preferable outcome is when the support is unanimous. On the other hand, the possibility of the existence of free riders was identified which can prevent a unanimous support of the green space agreement. Moreover, the number of supporters of the greenspace agreement and the number of free riders depends on the size of the external diseconomy from greenspace neglect; the enforceability of taxes by the government; land prices; and the rate of decline of land prices from the external diseconomy from the neglect in greenspace. The influence of the residents' assessment of risk based on their view towards the government's enforceability of taxes and the rate of decline in land prices, was also identified.

By taking these observations into consideration, the situation of the support of greenspace agreement and the occurrence of free riders can be understood and may provide insight into future policies concerning greenspace conservation and development.

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THE UNCOVERD INTEREST PARITY PUZZLE (UIP): EVIDENCE FROM MAJOR CURRENCIES

Athanasios PETSAS
MSc. Hellenic Open University
apetsa@tee.gr

Theodoros PELAGIDIS
Professor, University of Piraeus & NR Senior Fellow, Brookings Institution, US. 21, Lambraki str., GR-18533
pelagidi@unipi.gr.

Abstract
This paper investigates empirically the Uncovered Interest Parity puzzle, highlighting the weak relationship between exchange rates and interest rates in particular, using data for the exchange and interest rates from four countries, in different time horizons, running from 3 to 60 months. The analysis in particular focuses on the deviations from rational expectations as a possible explanation of the UIP puzzle.
Keywords: UIP, PPP, Exchange rates
JEL classification: F41, Macro focus

1. Introduction

For the Uncovered Interest Parity (UIP) to hold, expected changes in exchange rates must equal changes in interest rates. In case of perfect capital mobility, UIP does not suffices as expected nominal changes in exchange rates have to equal inflation differentials. In other words, Purchasing Power Parity (PPP) has also to hold so as capital mobility to be perfect. As a result the difference in real interest rates should equal any real exchange rates changes. This paper investigates empirically the Uncovered Interest Parity puzzle, highlighting the weak relationship between exchange rates and interest rates in particular, using data for the exchange and interest rates from four countries, in different time horizons, running from 3 to 60 months. The analysis in particular focuses on the deviations from rational expectations as a possible explanation of the UIP puzzle. Below, we present the model that we estimate. Then, we briefly describe the data and make a quick note about Unit Root Tests and Stationarity. To briefly describe our findings, the estimates of ex post changes generate a slope coefficient that is less than one, different from zero and usually negative at the conventional levels of statistical significance. One interesting characteristic of the regressions is that, although the coefficients are typically different from zero, the proportion of total variation is typically very small.

2. The model and the data

2.1. The model

As the exchange rate of a country is the price of the foreign currency in units of the domestic currency, an increase in the exchange rate is depreciation in the home currency. S_t denotes the nominal spot exchange rate, and $s_t \equiv \log(S_t)$. Defining lamda at time t as:

$$\lambda_t \equiv i_t^* + E_t s_{t+1} - s_t - i_t \tag{2.1}$$

re-arranging we get:

$$s_t \equiv -(i_t - i_t^*) - \lambda_t + E_t s_{t+1} \tag{2.2}$$

Explaining the above equation we observe that if the domestic to foreign short-term interest differential, $i_t - i_t^*$, goes up ,other thing being equal, then the exchange rate will

appreciate. Same story here if we assume an increase in the expected excess return on the foreign deposit, this is also associated, other thing being equal, with an exchange rate appreciation. Holding interest rates and expected excess return constant, a higher expected future exchange rate implies depreciation. The existing literature on UIP, summarized in Obstefeld and Rogoff (2001) for the past four decades ignores the expected excess return on the foreign deposit setting it to zero.

Defining:

q = log of the real exchange rate the relative foreign to domestic consumer price levels, expressed in common units,

p = log of the domestic consumer price index (CPI),

p* = log of the foreign CPI in foreign-currency units

Then we get: $q_t = s_t + p_t^* - p_t$, and ignoring λ, equation (4.2) can be rewritten as:

$$s_t \equiv -(i_t - i_t^*) + E_t\pi_{t+1} - E_t\pi_{t+1}^* + p_t - p_t^* + E_t q_{t+1} = -(i_t - i_t^*) + p_t - p_t^* + E_t q_{t+1} \quad (2.3)$$

Where we have set $\pi_{t+1} \equiv p_{t+1} - p_t$ and $r_t \equiv i_t - E_t\pi_{t+1}$ being the domestic inflation rate and the domestic ex ante real interest rate respectively.

If we forwardly iterate (2.3) we will get:

$$\begin{aligned} s_t &\equiv -\sum_{j=0}^{\infty} E_t(i_{t+j} - i_{t+j}^*) + \lim_{j\to\infty} E_t s_{t+j+1} \\ &= -\sum_{j=0}^{\infty} E_t(i_{t+j} - i_{t+j}^*) + \sum_{j=0}^{\infty} E_t(\pi_{t+j+1} - \pi_{t+j+1}^*) + p_t - p_t^* + \lim_{j\to\infty} E_t q_{t+j+1} \\ &= -\sum_{j=0}^{\infty} E_t(r_{t+j} - r_{t+j}^*) + p_t - p_t^* + \lim_{j\to\infty} E_t q_{t+j+1}. \end{aligned} \quad (2.4)$$

Besides algebra there is much to say here. This equation is the epitome of the existing literature that considers λ equal to zero thus assuming perfect markets across countries.

Monetary models of exchange rates have placed their primary focus on the role of economic policy in determining the money circulation by defining interest rates and controlling inflation. The aforementioned models have at the same time asserted the macroeconomic determinants of the expected real and nominal future interest rates, and at the same time the expected future inflation.

The following limit $\lim_{j\to\infty} E_t q_{t+j+1}$ could represent the long-run real exchange rate. At this point we would like to stress the fact that this paper is not about the determinants of general equilibrium real exchange rates. It is about nominal exchange rates. Fluctuations in nominal exchange rates are related to real exchange rates and relative prices, so the focus is on models that real and nominal values are interdependent. Moreover, the term $p_t - p_t^*$ corresponds to the Purchasing Power Parity (PPP) that answers questions regarding the nominal exchange rate, inflation, and exchange rate volatility. This could help us understand the stability versus the risk of a small open economy, but again this is not our scope here.

Most of recent theoretical studies that try to pin down exchange rates nominal or real, study the behavior of λ. If foreign versus domestic deposits are not perfect substitutes and there is a risk premium, eg. to foreign deposits due to capital immobility, like capital controls, then this liquidity handicap will make λ not equal to zero. The very definition of λ requires a representative agent with rational expectations, but agents' market behavior might be driven by a sub-optimal, intuitive, possible rule of thumb algorithm. If we assume imperfect information, then we study idiosyncratic versus aggregate risk so in equilibrium the following condition might not hold $i_t^* + E_t s_{t+1} - s_t = i_t$. A deviation from rational expectations can be assumed in this case and as mentioned before this may lead to a phenomenon named as

rational inattention. Then a departure from the neoclassical General Equilibrium might be the case here, where new Keynesian Models with incomplete nominal adjustments and price rigidities could explain better the behavior of the agents, both individually and on the aggregate. The Equity Premium Puzzle can be explained by introducing Epstein-Zin (1989) preferences in a General Equilibrium model. Under the same logic, that is mostly inherited by Cohrane's (2005), any obstacle to capital liquidity could be introduce to improve the empirical performance of exchange rate models. The same thing applies here with the q-theory of investment. Again problems of poor empirical performance of standard q-models can be solved introducing and unified model of investment to account for capital constrains and transaction cost. The picture gets better, using those tools, but there is a long way to go before solving those problems. Taking all this into account we can generalize equation (2.4) as follows:

$$\begin{aligned} s \equiv & -\sum_{j=0}^{\infty} E_t(i_{t+j} - i^*_{t+j}) - \sum_{j=0}^{\infty} E_t \lambda_{t+j} + \lim_{j\to\infty} E_t s_{t+j+1} \\ = & -\sum_{j=0}^{\infty} E_t(i_{t+j} - i^*_{t+j}) + \sum_{j=0}^{\infty} E_t(\pi_{t+j+1} - \pi^*_{t+j+1}) \\ & -\sum_{j=0}^{\infty} E_t \lambda_{t+j} + p_t - p^*_t + \lim_{j\to\infty} E_t q_{t+j+1} \\ = & -\sum_{j=0}^{\infty} E_t(r_{t+j} - r^*_{t+j}) - \sum_{j=0}^{\infty} E_t \lambda_{t+j} + p_t - p^*_t + \lim_{j\to\infty} E_t q_{t+j+1} \end{aligned} \quad (2.5)$$

This shows that we have to take into consideration the fact that other than the current values of λ the expected future values of λ indeed determine the exchange rate. Both equations (2.4) and (2.5) make clear that there are three channels which intervention can affect the exchange rate. The first one is the expected future values of the interest differential, the second is the current and expected future values and the last one the long run expected future exchange rate.

One could not neglect the aforementioned theories of λ_t that might account for the uncovered interest parity puzzle. Like the risk premium puzzle this is empirical puzzle dictates the fact that the slope coefficient in the equation bellow

$$s_{t+1} = a + b(i_t - i^*_t) + u_{t+1} \ . \quad (2.6)$$

is less than one and often negative when regressed with real data over many time intervals for many currency pairs. Under the null hypothesis that λ equals to zero in equation (2.1), the slope coefficient should equal to one and the constant equal to zero (a=0 and b=1 at the same time).

Embarking on the empirical estimation of our model, confronting a variation of equation (2.6) and Fama (1984) equation with real data running the following regression:

$$S_{t+k} - S_t = a + b(i_{t,k} - i^*_{t,k}) + u_{t+k} \quad (2.7)$$

Where k=3, 6…12 months in our data set. For example: $i_{date,3}$ is the 3-month interest rate given say by a bank at some specific date.

2.2. The Data

Monthly data are obtained for the exchange rates of the U.S. Dollar - Sterling Pound, the U.S. Dollar - German Mark and the U.S. Dollar - Canadian Dollar as zero coupon rates (yields) for the U.S., the U.K., Germany, and Canada, spanning the period January 1986 to May 2009 (for the period of the introduction of the Euro (1-1-1999) the EURO-German Mark irrevocable conversion rate is used in order to estimate the U.S. Dollar - German Mark (Euro) exchange rate). Zero coupon rates have a maturity of 3, 6 up to 60 months. Summary statistics for all variables are reported in Table 1. The variables used are measured in percentage points per year and the monthly rates of depreciation are multiplied by 1,200 to become annualized. Zero coupon rates were obtained from the website of Professor Jonathan H. Wright (2011) and exchange rates were obtained from Datastream.

2.3. Unit root tests

Although a part of the literature considers the variables in the UIP regression to be stationary, we will conduct efficient unit root tests to the levels of interest rates to ensure that we avoid the risk of running spurious regressions. In other words, a critical assumption needed is that the interest rate differential is stationary. The ADF unit root test (DF-GLS by Elliot, Rothenberg and Stock, 1996) and the point optimal test, Pt (Elliot et al., 1996) are used to test the stationarity of interest rates (yields). Tables 2, 3, 4 and 5 report the DF-GLS and Pt statistics for the U.S., the U.K., Germany and Canada interest rates, respectively. The results indicate that the null hypothesis of a unit root in interest rates series is rejected for all maturities with the exception for the German interest rates (Table 4).

2.4. Stationarity

In time series models, non-stationarity is of paramount importance. There are two reasons why non-stationary variables must be treated differently from stationary ones. First, a non-stationarity time series can only be studied during the period under consideration because it cannot be generalized to later periods; this would be extrapolation. Therefore, it would not be useful for forecasting, where all variables must have the same characteristics between past and future periods. Second, using non-stationary variables can generate spurious regressions. For example, when simulating two random stationary series one would expect them to be independent. Their correlation should be close to zero and any model that regresses one against the other would not have statistically significant slope (uninformative model) and its R-squared would be very low. However, if the two generated (random) variables are trending over time, and therefore are non-stationary, one could generate a model – with significant estimated coefficients and high R-squared – that regress one against the other. This would be a so called 'spurious regression'. Furthermore, this model would violate the standard assumptions for asymptotic analysis. Its error terms would not be independent and the F-statistic, measuring the significance of the estimated coefficients, would not follow an F-distribution. So the tests will not be reliable.

Table 1: Summary statistics for all variables

I. Depreciation Rate $s_{t+3} - s_t$	Mean	Std. Deviation	Autocorrelation
Sterling Pound	0.17	21.83	0.72
German Mark	-5.02445	53.45027	0.815323
Canadian Dollar	0.77333	14.28044	0.661805
II. Interest rates r_t			
US			
3-month	4.34	2.01	0.99
6-month	4.67	2.09	0.99
12-month	4.84	2.10	0.99
UK			
3-month	7.18	3.27	0.99
6-month	6.81	3.05	0.99
12-month	6.71	2.82	0.99
GERMAN			
3-month	4.49	2.19	0.99
6-month	4.50	2.13	0.99
12-month	4.55	2.05	0.99
CANADIAN			
3-month	5.63	3.05	0.99
6-month	5.65	2.95	0.99
12-month	5.75	2.81	0.99

Data are monthly and the sample is from January 1986 to May 2009 (281 observations)

Table 2: Unit root tests for US interest rates (1986:01-2009:05)

maturity	3	6	9	12	24
Φ - 1	– 0.02	– 0.03	– 0.40	– 0.04	– 0.05
Std. Error	0.01	0.009	0.01	0.01	0.01
φ	0.98	0.97	0.96	0.96	0.95
DF – GLS	– 3.17*	– 3.51**	– 3.17*	– 3.08*	– 3.04*
P_T	3.70**	2.12**	2.47**	2.05**	3.43**

Statistical significance is indicated by the asterisk symbol (*) for the 5 % level, by two asterisks (**) for the 1 % level. We test for unit root in levels, including in the testing equation both an intercept and a time trend.

Table 3: Unit Root Test for UK Interest Rates (1986:01-2009:05)

maturity	3	6	9	12	24
Φ - 1	– 0.04	– 0.04	– 0.04	– 0.05	– 0.06
Std. Error	0.01	0.01	0.01	0.01	0.02
φ	0.96	0.96	0.96	0.95	0.94
DF – GLS	– 3.45*	– 3.09*	– 3.21*	– 3.28*	– 3.45*
PT	3.57**	3.98**	3.44**	2.97**	2.59**

Statistical significance is indicated by an asterisk (*) for the 5 % level, by two asterisks (**) for the 1 % level. We test for unit root in levels, including in the testing equation both an intercept and a time trend.

Table 4: Unit Root Test for German Interest Rates (1986:01-2009:05)

maturity	3	6	9	12	24
Φ - 1	– 0.03	– 0.02	– 0.02	– 0.02	– 0.02
Std. Error	0.01	0.01	0.01	0.01	0.01
φ	0.97	0.98	0.98	0.98	0.98
DF – GLS	– 2.61	– 2.35	– 2.31	– 2.24	– 2.11
PT	2.68**	2.52**	2.84**	3.37**	5.27**

Statistical significance is indicated by an asterisk (*) for the 5 % level, by two asterisks (**) for the 1 % level. We test for unit root in levels, including in the testing equation both an intercept and a time trend.

Table 5: Unit Root Test for Canadian Interest Rates (1986:01-2009:05)

maturity	3	6	9	12	24
Φ - 1	– 0.06	– 0.06	– 0.07	– 0.07	– 0.08
Std. Error	0.02	0.02	0.02	0.02	0.02
φ	0.94	0.94	0.93	0.93	0.92
DF – GLS	– 3.64**	– 3.61**	– 3.54**	– 3.44*	– 3.24*
PT	2.11**	3.67**	3.51**	3.52**	3.57**

Statistical significance is indicated by an asterisk (*) for the 5 % level, by two asterisks (**) for the 1 % level. We test for unit root in levels, including in the testing equation both an intercept and a time trend.

Table 6: Forward premium regressions

I. Sterling Pound	a	b
3-month	2.3138	0.7470

	(3.1201)	(1.4722)
6-month	1.1282	0.5304
	(2.7518)	(1.5083)
12-month	0.7184	0.1532
	(2.4834)	(1.3339)
24-month	0.8509	0.0998
	(1.8710)	(1.1474)
36-month	1.4305	0.5339
	(1.8459)	(0.9524)
48-month	1.6333	0.7163
	(1.7313)	(0.9160)
60-month	1.8226	0.9575
	(1.3882)	(0.6493)
II. German mark		
3-month	-4.1823	5.8572
	(5.8332)	(2.2426)
6-month	-5.3093	6.2605
	(5.7546)	(2.2904)
12-month	-4.7693	6.6867
	(4.7781)	(2.1805)
24-month	-4.8793	6.4760
	(4.3303)	(1.4332)
36-month	-4.7312	6.4591
	(3.8320)	(0.9335)
48-month	-5.0358	5.0358
	(3.2233)	(1.4636)
60-month	-5.4377	4.3380
	(2.5535)	(1.5642)
III. Canadian Dollar		
3-month	0.0115	-0.5880
	(1.8765)	(0.5642)
6-month	0.2098	-0.4010
	(1.7968)	(0.6676)
12-month	0.5992	-0.2449
	(1.6635)	(0.8981)
24-month	0.9396	-0.1370
	(1.6795)	(1.1467)
36-month	1.1466	0.3085
	(1.6535)	(1.1348)
48-month	1.3637	0.7109
	(1.8658)	(1.2826)
60-month	1.5826	1.1575
	(1.8156)	(1.1509)

Notes: The table presents estimates of the slope coefficients of the regression model for the period from January 1986 to April 2009.

3. Empirical results

It is obvious from our regression results in Table 6 the almost unanimous failure of UIP. Moreover, we test the theory for a variety of different time periods, and our findings are indeed in line with other empirical studies. In particular, the case of the Canadian dollar it is highlighted that while the coefficient is negative it decreases in absolute value as we increase the horizon. More specifically, from -0.5880 at the 3-month horizon, it increases to -0.4010 at the 6-month horizon, going up again to -0.2449 and -0.1370 for the 12- and 24-month horizons, respectively to become positive at the 36-month time frame, reaching the value of 0.3085 and, finally, going up all the way to (almost) unity for the 48- and 60-month horizons.

Neither the German Mark nor the British Pound exhibits this nice pattern. The British Pound has some consistency, having a slope coefficient of 0.7470 for the 3-month frequency, but it goes down to 0.5304, 0.1532 and 0.0998 for the 6-, 12- and 24-month horizons, respectively. However, the problem seems to correct itself moving forward to the 36-month period, when the slope coefficient goes up to 0.5339 and 0.7163 for the 36- and 48-month horizons, to reach again almost unity again for the long 60-month period.

At this point it is important to highlight the fact that UIP is almost impossible to be tested when confronted with real life data. This could be attributed to the indisputable fact that it is impossible to observe the expected exchange rate changes. In the vast majority of the empirical studies of the current literature, most tests are actually joint tests of the UIP and the rational expectations hypothesis. To make things worse, the empirical findings do not support the combined hypothesis of UIP and rational expectations. If we regress the realized changes of the spot exchange rate on the interest differentials often generates an estimated value for a slope coefficient that it is not only different from one, but in fact it turns out to be negative presenting only conventional statistical significance. This holds for all major currencies at horizons up to a year.

In contrast, when we investigate longer horizons, then sample findings are more in favor of the combined aforementioned hypothesis (UIP and rational expectations). The empirical result that the joint hypothesis holds better at longer horizons than at shorter seems to be robust. However, some caution should be indispensable here.

Coming back on what we shortly mentioned before as for the statistical significance of the slope coefficient, although it demonstrates only conventional statistical, like we said, the measure of how close the data are to the fitted regression is typically very small. To make matters worse, if we erase the mavericks of extreme values going to the adjusted R-squared, its value can be even negative.

4. Conclusion

The subject of relating non-traditional monetary policy to exchange rates is indeed difficult. However, this paper provides compelling evidence that a relationship does exist. If we had to investigate real interest rates, we would have to look deeply into two major pillars, nominal interest rates and the rate at which the currency of one country would have to be converted into that of another country to buy the same amount of goods and services in each country. In other words, the two major determinates of the real interest parity (RIP) are the uncovered interest parity (UIP) and the purchasing power parity (PPP), combining the law of one price and interest parity conditions. (Obstfeld and Rogoff 2001, Rogoff 1996)

Thus, any deviation from any of the three aforementioned parities could lead to a market failure, and that, in this case, the international financial markets would no longer be integrated, facts that could not be ignored by portfolio managers, institutional investors, policy makers and central banks. Finding exactly how strong is the link between RIP, CIP/UIP and PPP, could be a valuable tool indicating the optimum assets for optimal portfolio allocation and risk diversification. The electiveness of international policy making together with the success or failure of the investment strategy of hedge funds do rely in research on this interesting and full of unsolved puzzles theme.

In this paper, we used data for the exchange rate and interest rate from four countries and many different time horizons, running from 3 to 60 months and we observed that in many cases the slope coefficient was not only significantly different from unity, but also it had a negative sign. After making the necessary unit root testing and highlighting on the importance of the stationarity of the series, the analysis provided evidence that this phenomenon tends to fade but not completely disappear as we moved from short to longer horizons.

One interesting finding is the fact that regression of the ex post change produces a slope coefficient proving that is not different from unity, and being negative and different from zero at conventional levels of statistical significance. One interesting characteristic of these regressions is that, although the coefficients are typically different, in a statistical sense, from zero, the proportion of total variation is typically very small; it is not rare to obtain adjusted negative R-squared coefficients.

Concluding, using exchange rate and interest rate data from various developed countries for many different time frames, long and short, we observed that in some cases the slope coefficient had the wrong sign. We made the necessary unit root test and commented on the importance of the stationarity of the series. However, being again in line with the majority of the other empirical studies, this phenomenon tends to fade but not completely disappears as we move from short to longer horizons.

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WHO CARES ABOUT REGIONAL INEQUALITIES? EFFECTS OF FISCAL CONSOLIDATION

Vinko MUSTRA
Assistant professor Faculty of Economics, University of Split, Cvite Fiskovića 5, 21000 Split, Croatia
vmustra@efst.hr

Abstract

The most recent global economic crisis and the concerns about long-term (un)sustainability of public finances has supported the implementation of budgetary consolidation measures. Although there are relatively large number of papers investigating the impact of fiscal consolidation on different aspect of economy this paper represent unique attempt of investigating the effects of fiscal consolidation on regional inequalities.

We test the hypothesis that in the period of fiscal consolidation, when some spending cut and/or tax hikes, less developed regions are not in position to protect themselves against undesired redistributive policies which put them in more disadvantaged position and increase regional inequalities.

In empirical part of the paper we explore the impact of fiscal consolidation on regional inequalities on national levels among 13 EU member countries for period 1995-2009. Two groups of variables are particularly important for this study: measure of regional inequality and fiscal consolidation. Due to fact that recent literature recognizes problems with using cyclically-adjusted primary budget balance (CAPB) as a measure for fiscal consolidation we extend regional empirical literature by using a new database of fiscal consolidation that successfully tackles all this issues.

The results indicate that fiscal consolidation led by tax hikes increases regional inequalities and that fiscal consolidation led by spending cuts doesn't have significant influence on regional inequalities. Finally, the paper highlights that fiscal consolidation is not only the matter of the public debt levels or economic growth, but also important regional issue.

Keywords: Regional inequalities, Fiscal consolidation, European Union
JEL classification: R12, E62, H23

1. Introduction

The financial turmoil that emerged in 2008 led to the implementation of the large fiscal stimulus programs which, combined with cyclical revenue losses, resulted in sharp increases in budget deficits in the large number of countries. The increasing budget deficits with the uncertainty regarding the economic path resulted with the concerns about long-term (un)sustainability of public finances. Thus, policy makers have decided to implement budgetary consolidation measures hoping that this will bring a normalization of the debt growth.

However, fiscal consolidation doesn't have only influence on the public debt levels, but also on the different aspects of economy. This issues have been recognized by researchers that have published large number of papers looking at the potential impact on economic growth (e.g. Castro 2007, 2011, Heim 2010a, 2010b, Afonso and Jalles, 2011). Recently, special attention have been dedicated to the impact of fiscal consolidation on distribution issue. In first place, researches focused at the income distributional effects of fiscal policy. They find evidence that net government spending reduces income inequality (Wolff and Zacharias, 2007) or that lower public expenditure is linked with the increasing income inequality (Bertola, 2010). Only a few studies have looked directly on the influence of the specific action in fiscal policy, fiscal consolidation on income distribution. Smeeding (2000) specifies that fiscal consolidation result with the increase in income inequality and Agnello and Sousa (2012) find that income inequality significantly rises during period of fiscal consolidation, especially if the fiscal policy is driven by spending cuts. At this basis, it is obvious that there are relatively large number of evidence that fiscal consolidation have significant impact on income distribution.

At same time regional dimension of the fiscal consolidation have remained unexplored. Traditionally argument why we care for "regional issue" has two dimensions, theoretical and empirical. Theoretical dimension includes two fundamental explanations: economic efficiency and social equity (Gardiner et al., 2010). Economic efficiency can be disturbed by persistent regional disparities since the underutilization and underperformance of labour and capital in less prosperous regions mean that national wealth is lower than it could otherwise be if those resources were fully and more productively employed. (p 2, Gardiner et al., 2010). Second reason, social equity, has a motivation in the belief that individuals should not be seriously and systematically socially disadvantaged with respect to the basic needs (e.g. job opportunities, housing conditions, access to public services, Gardiner et al., 2010). Finally, regional inequalities tend to increase socio-political instability and have a negative impact on economic growth (e.g. Alesina and Perotti, 1996, Dutt and Mitra, 2008, Kim 2008). Empirical dimension involves the large number of studies that indicate that level of the regional inequalities didn't decrease in the world, especially in the world largest economy, EU (e.g. Boldrin and Canova, 2001.; Canova, 2004; Magrini, 2004; Petrakos and Artelaris 2009, Petrakos, 2009, Doran and Jordan, 2013). At same time it seems to be little consensus on a list of effective policy instruments which may reduce regional inequalities (Kim, 2008). This can be, at least partially, explained by the fact that almost all fiscal policy measures have influence on the regional inequalities and that only right combination of the policy measures can be successful. Considering the theoretical and empirical dimension of the "regional issue" and lack of effective policy instruments the paper offers motivation for analyzing the influence of the fiscal consolidation, as a recently very popular measure among national policy makers, on regional inequalities.

The rest of the paper is organized as follows. In the next section, we give a brief summary of the previous works on regional inequalities, fiscal consolidation and present the institution for the influence of fiscal consolidation on regional inequalities. In section 3 we present data and empirical methodology. We represent empirical results and conclusion in sections 4 and 5.

2. Literarure Review

For understanding regional inequalities it is necessary to stress that the economic theory offers different classes of models which posses different policy implications for dealing with regional inequality.

Arguments in favour of convergence are given by the neoclassical growth with exogenous technological change model (e.g. Solow 1956, 1994). Depending on the assumptions on preferences and demography, this group of models predict unconditional or conditional convergence. Thus, the role of government involvement is relatively limited to infrastructural investments which affect the mobility of goods, labour and other factors (Kim, 2008) On the other hand, divergence is initiated in the theory of endogenous growth (Romer, 1986, 1990) and the "new" theory of international trade triggered by Krugman (1991a) and Krugman (1991b) and Venables (1995) that has motivated so-called models of "new economic geography" (e.g. Krugman, 1991a, 1991b, Fujita and Krugman, 1995, Fujita et al., 1999). The "New economic geography" models based on imperfect competition and increasing returns due to "cumulative causation" forces, self-enforcing nature of increasing returns and inefficient equilibrium market allocations highlight the significantly higher potential for government intervention (p. 9, Kim, 2008). Obviously, these models by emphasizing significance of the fiscal policy actions offer motivation for the investigating the role of fiscal consolidation in the paper.

To deal properly with this issue we should firstly define the fiscal consolidation phenomena. It should be recognized as a policymakers' intentions to reduce the budget deficit and not by a response to prospective economic conditions (Devries et al., 2011). Therefore, except the cases when governments introduce fiscal consolidation measures based on a desire to reduce the budget deficit this phenomena also include the cases when measures have been followed by an adverse shock that distracted countercyclical discretionary stimulus. At same time, fiscal consolidation should not enclosed the cases when the motivation for cutting government spending or raising taxes is restraining domestic demand. In cases when fiscal

consolidation is offset by fiscal actions not primarily motivated by cyclical fluctuations, such as a tax cut motivated by long-run supply-side considerations, the sum of the measures should be computed and, if the overall change in policy yields budgetary savings, consolidation should be note. (p. 5, Devries et al.,2011)

From this point of view, the often used concept in the literature that identifies the fiscal consolidation by using the statistical concept such as the increase in the cyclically-adjusted primary budget balance (CAPB) can be problematic (Devries et al., 2011, Agnello and Sousa, 2012). Firstly, it fails to remove the impact of sharp swings in economic activity and assets prices from fiscal data resulting that CAPB is correlated with economic activity but not necessarily linked to policy actions. Moreover, even if the change in the CAPB accurately reflects discretionary changes in fiscal policy, those can be motivated by a desire to respond to cyclical fluctuations, raising reverse causality concerns. (p. 3., Devries et al., 2011). Also, there is uncertainty about the cyclical adjustment procedure, or to be more precisely, there is certain degree of arbitrariness in the selection of the statistical smoothing technique that is used to net out the automatic impact of the cycle on the headline fiscal figures (Darby and Melitz, 2008; Agnello and Sousa, 2012). Last but not the least, the empirical evidence suggests that elasticises of budgetary components with respect to output can vary over time, the standard methods imply that this elasticises are treated as constant (Jaeger and Schuknecht, 2007, Agnello and Sousa, 2012).

Thus approach introduced by Devries et al. (2011) that has been constructed on similar approaches by Ramey and Shapiro (1998), Ramey (2011), and Romer and Romer (2010) has been implemented recently. This narrative approach identifies episodes of fiscal consolidation based on policy actions motivated by deficit reduction and not looking at fiscal outcomes. As a result the data has been constructed by examining accounts and records of what countries were intending to do at the time of publications (such as the IMF Recent Economic Developments reports, the IMF Staff Reports, or the OECD Economic Surveys) by recording the budgetary effect of the fiscal consolidation measures in the year in which they come into effect (the concept of government corresponds to the general government and budgetary impact has been scaled in the percent of GDP, Devries et al. 2011) There are several advantages of this method comparing to CAPB method. At first place it eliminates the endogeneity of the response of fiscal policy to the economy, as it captures policymakers' decisions, Also, it allows for a quantification of the size and the composition of fiscal consolidation programs based on the fact that it notes is the fiscal consolidation based on tax hikes and/or spending cuts (p. 7. Agnello and Sousa, 2012)

Finally, what is the intuition behind the relationship between fiscal consolidation and regional inequalities. Starting point for our intuition is interpretation of the paper by Tiebout (1956) according to which more developed regions can use different policy instrument at national level to protect themselves against, from their perspective, undesired redistributive policies. This can be especially problematic when regional inequalities are rising and when situation may require intervention from the national level of government in order to provide a higher level of equalization of resources across different regions. For example it can be manifested on the progressivity of the tax system or in the composition of public expenditures. Obviously, if the more developed regions can shape fiscal policy at national level to protect themselves it may result with lower levels of help for less developed regions. Also when regional inequalities are rising more developed regions can seek for higher level of decentralization so that they can protect their income from undesired redistributive policies on national level. Although the literature recognizes that almost all fiscal policy measures have influence on regional inequalities (Kim, 2008) the effects of the abovementioned intuition has been analyzed, up to authors knowledge, only for the link between decentralization and regional inequalities (e.g. Ezcurra and Pascual, 2008; Rodríguez-Pose and Ezcurra, 2010, Lessmann, 2012; Ezcurra and Rodriguez-Pose, 2013). At same time, the influence of the fiscal consolidation on the regional inequalities stays unexplored.

3. Methodology And Data

Before explaining the methodology, we will first describe the data set. Data has been collected for 13 EU member countries (List of countries is available in Appendix 1) from

Eurostat database, World Development indicators and from new dataset of fiscal consolidation constructed by Devries et al (2011) for period 1995-2009. Two groups of variables are particularly important for this study: measure of regional inequality and fiscal consolidation.

Regional inequalities has been measured by the indicator calculated from regional GDP figures based on the European System of Accounts (ESA95). It represents sum of the absolute differences between regional (NUTS II) and national GDP per inhabitant, weighted with the share of population and expressed in percent of the national GDP per inhabitant. This measure in line with standards introduced by Portnov and Felsenstein (2010) which are used to test sensitivity of commonly used (income) inequality measures to changes in the ranking, size and number of regions into which a country is divided for country i in year t.

As it has been already stressed the data from narrative approach by Devries et al. (2011) has several advantages comparing to CAPB method. Thus for the measuring fiscal consolidation this approach introduced by Devries et al. (2011) has been implemented in the paper.

The assumption that regional inequalities have been influenced only by fiscal consolidation is restrictive and empirical findings can suffer from omission of other important determinants.

In order to address this issue, we have tried to include other determinants that literature has recognized as a important by considering relevant papers such as Barrios and Strobl (2009), Rodriguez – Pose and Ezcurra (2010), Lessman (2012) and Ezcurra and Rodríguez-Pose (2013) and at same taking into consideration our data limitations[1].

The first explanatory variable involves the influence of the trade openness on regional inequalities and it has been in first place established by the new economic geography (Daumal, 2010) Although the models of the new economic geography indicate that different outcomes depend on the theoretical assumptions employed in each case, they all confirm the relevance of the trade openness for regional inequalities (e.g. Krugman and Livas Elizondo, 1996; Paluzie, 2001, Crozet and Koenig-Soubeyran's, 2004, Brulhart et al., 2004, Brulhart, 2009, Rodriguez-Pose, 2012). Empirical studies, on single country and cross-country level, also confirm importance of trade openness, but without presenting uniform direction and dimension of this relationship (e.g. Daumal, 2010. Brulhart, 2009, Rodriguez-Pose, 2012). One of the reasons reason why the theoretical and empirical relationship between greater openness and regional inequalities remains ambiguous can be explained by the fact that openness as such may not have same discernible effects on regional inequalities due to different macroeconomic policies, level of development or type of economic institutions (Milanovic, 2005). The lack of uniform empirical results can also have foundation in the use of imprecise measure for trade openness. Alcalá and Ciccone (2004) and Barrios and Strobl (2009) have criticized the use of ratio of total trade (import+export) to GDP in order to measure trade openness and propose instead alternative indices: the real openness index, which is the sum of imports plus exports expressed in common currency (here the euro) relative to the GDP expressed in PPP terms. Thus, we use the indicator expressed as total imports and exports in current US$ divided by GDP in PPP current US$

The second variable to be considered is a decentralization. Since the decentralization has become global trend over the last decays, the interest on the effect of decentralization processes increased considerably, mostly for the link between decentralization and economic growth (e.g. Davoodi and Zou, 1998; Thießen, 2003; Iimi, 2005; Rodríguez-Pose and Ezcurra, 2011). In view of the fact that the recent wave of decentralization has been driven by the rationale that decentralized governments have superior economic efficiency (Rodriguez – Pose and Ezcurra, 2010) it has brought special attention on the role of decentralization for regional inequalities (e.g. Ezcurra and Pascual, 2008; Rodríguez-Pose and Ezcurra, 2010, Lessmann, 2012; Ezcurra and Rodriguez-Pose, 2013). The starting position in theoretical literature points Oates theorem on fiscal decentralization according to which differences in

[1] Due to the lack of comparable and reliable data on variables than will empirically include all aspects of the recent NEG models and the second reaching beyond the purely market access driven framework across the 28 countries

preferences about public goods across regions will require decentralized provision of such goods in order to improve regional economic performance. It should be also stressed that several authors offered different perspective indicating that decentralization might cause coordination problems, excessive regulation, higher administrative costs or poor quality (Tanzi, 1996) or increase corruption and cronyism undermining potential efficiency gain (Lessmann and Markwardt, 2010). Also there are some doubts about what kind of decentralization matter for regional inequalities (e.g. Ezcurra and Rodriguez – Pose, 2013) Despite theoretical doubts, empirical studies offer empirical evidence for significant influence of the decentralization on regional inequalities (e.g. Rodriguez – Pose and Ezcurra, 2010, Lessmann, 2012, and Ezcurra and Rodriguez – Pose 2013). Thus, in order to control for the possible influence of decentralization we use the indicator expressed as the sum of the shares of local and state revenues as a percentage of national GDP.

The last control variable emphasizes the relevance of the level of development in explaining regional disparities. This interest goes back to the pioneer work of Williamson (1965) in which author indicates that regional inequality increase first and then systematically decreases in the following stages of development. The theoretical explanation can follow two basic group of models (Ezcurra and Rodriguez – Pose 2013). In first one, in the early stage of development a economic activity tends to be located in small number of regions due to centripetal agglomeration forces (Baldwin and Martin, 2004). After some level of concentration, centrifugal agglomeration forces prevails suggesting that developed economies benefits of the spatial dispersion of economic activity. (Thisse, 2000). The neoclassical growth model due to existence of decreasing returns to capital offers similar conclusion (Barro and Sala-I-Martin, 1995). Considering abovementioned, our model includes in the list of control variables the national GDP per capita.

There is also a need to control for other factors which may affect the relationship between regional inequality and fiscal consolidation[2]. However, due to lack of comparable and reliable data for the countries covered in the analysis, they cannot be included and tested. We therefore have to assume that these variables are not systematically correlated with any of the other regressors, implying that there is no omitted variable problem in leaving out this conditioning interaction.

Like most of economics relationship, we assumed that regional inequalities are dynamic relationship which means that its current value depends on its past values. Thus we introduce equation which includes dynamic behavior of dependent variable characterized by the presence of lagged dependent variable among the regressors:

$$RIit = \alpha i + \beta 1\ RIit\text{-}1 + \beta 2FCit + \beta 3\ GDPcpit + \beta 4\ TOit + \beta 5DECit + \varepsilon it \qquad (1)$$

- ***RIit*** represents the level of within-country regional inequality in country *i* in year *t,* measured by the sum of the absolute differences between regional (NUTS II level) and national GDP per inhabitant, weighted with the share of population and expressed in percent of the national GDP per inhabitant. The dispersion of regional GDP is zero when the GDP per inhabitant in all regions of a country is identical, and it rises if there is an increase in the distance between a region's GDP per inhabitant and the country mean.
- **FC*it*** stands for the proxy that should capture the fiscal consolidation by examining accounts and records of what countries were intending to do at the time of publications and by recording the budgetary effect of the fiscal consolidation measures in the year in which they come into effect for country *i* in year *t.*
- ***GDPcpit*** denotes GDP per capita, PPP (constant 2011 international $) for country i in year t.

[2] For example regional industrial specialization (Kenen, 1969, Barrios and Strobl, 2009) or institutions (Farole et al., 2011, Rodríguez-Pose, 2013, Muštra and Škrabić, 2014) may affect relationship between regional inequality and fiscal consolidation.

- ***TOit*** represents the total imports and exports in current US$ divided by GDP in PPP current US$ for country i in year t.

DECit stands for the proxy that should capture decentralization measured by the indicator expressed as the sum of the shares of local and state revenues as a percentage of national GDP for country i in year t.

eit is constant term and it is assumed that *eit* are $IID(0,\sigma_\varepsilon^2)$; identically and independently distributed error terms. Also it is assumed that country specific part of error term α_i are $IID(0,\sigma_\alpha^2)$; identically and independently distributed error terms.

In that case the recently used fixed effect estimator[3] is biased and inconsistent because with inclusion of lagged dependent variable RD*it-1* in model, it becomes correlated with α_i. Even though fixed effect estimator becomes consistent when T gets large, bias doesn't vanish as number individuals increases (Nickel, 1981). Therefore, in our case fixed effect estimator is not appropriate. Additionally random effect estimator is also biased and inappropriate for estimation of equation (2)[4].

So for our research it is appropriate to perform some estimator for dynamic panel model. Considering the papers by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) we use Blundell and Bond estimator. Number of instruments used in the models doesn't produce significant bias and it doesn't reduced significantly quality of Sargan test[5]. The validity of the instruments used in model is also tested using the Sargan test. So, result of Sargan shows that instruments are valid and that in specified model there is not problem of endogenity.

4. Emipirical Results And Discussion

The empirical research starts by testing the influence of fiscal consolidation for regional inequalities in selected EU countries but not only the size of the fiscal consolidation program (in percentage of GDP) , but also and its composition. In particular, is there a difference if fiscal adjustments are led by spending cuts or by tax hikes.

For that purpose we estimate three versions of model given by equation (1) with difference that variable FCit represents not only total fiscal consolidation (FC_Total) (Model 1) but also it represent in Model 2 fiscal adjustments led by spending cuts (FC_Spend) and in Model 3 fiscal adjustments led by tax hikes (FC_Tax) for country i and year t.

All aforementioned econometric details have been integrated in our analysis with the results present in Table 1.

Before introducing main findings we should indicate that the coefficients on control variables are all statistical significant. Deviation of coefficients on control variables from expected signs is present only in Model 2 but explanation for that case can be easily provided. More precisely, statistically significant positive effect of decentralization for regional inequalities could be consequences of fact that we use proxy that in first place captures fiscal dimension of the decentralization (measured as the sum of the shares of local and state revenues as a percentage of national GDP for country i in year t) and not the other dimensions of decentralization that are important for the regional inequalities (e.g. Lessmann, 2012).

Finally, by focusing on the impact of fiscal consolidation on regional inequalities in our three models (MODEL 1, Model 2 and Model 3), we can indicate particularly interesting and relevant results.

Table 1. The results of one step Blundell Bond dynamic panel estimator

Variable	Model 1	Model 2	Model 3
Const.	6.380286***	6.650567***	6.327571***

[3] Fixed effect estimator is Least Squared Dummy variable estimator.

[4] For more about bias of Random effect estimator please see Baltagi (2008)

[5] Bowsher (2002) showed that merely keeping the instrument count below N does not safeguard Sargan test (test for the validity of instrumental variables).

Lagged RI	.7746542***	.7642432***	.775718***
FC_total	.0829731		
FC_Spend		-.0521533	
FC_Tax			.1612488*
GDPcap	-0.0000732***	-.0000683***	-0.0000728***
TO	.1101758**	.0854265*	.1091481**
DEC	-.1455225**	0.377292*	-.1412186**
Number of observations	45	45	45
Sargan test (p-value)	.5422	.4613	.5674
*, **, ***- indicate significance at 10%, 5% and 1% level			
Source: Calculation by authors			

In model 1, where we test the importance of the total fiscal consolidation on regional inequalities, the total fiscal consolidation increases regional inequalities but without relevant level of significance. In model 2 the effects of fiscal adjustments led by spending cuts decreases inequalities, but again without relevant level of significance.

At same time, coefficient on fiscal consolidation led by tax hikes (Model 3) is significant and positive which implies that higher taxes in the process of fiscal consolidation lead to the higher levels of regional inequalities. It seems that more developed regions feel less negative influence of the process of fiscal consolidation (in case that fiscal consolidation is led by tax hikes) than less developed regions. Explanation for this results can be two-sided. It can suggest that more developed regions have more resistant economy that can better adapt to the, from their perspective, negative challenges of the fiscal policy. At same time it can be a signal how fiscal policy is shaped, or to be more precisely, how more developed regions can modified fiscal policy instruments at national level to protect themselves against, from their perspective, undesired redistributive policy.

The empirical results provide new perspective for the literature that indicates that fiscal consolidation have relatively stronger negative effect for individuals with lower income (Ahrend et al. 2011; and Rawdanowicz et al, 2013). Moreover, if we take into consideration that share of the people with lower income is higher in less developed regions, it seems that fiscal consolidation should also have negative effect on regional level and increase the regional inequalities.

More precisely, Rawdanowicz et al (2013) indicate that large share of general government spending and revenues has a direct influence on household real disposable incomes. Ahrend et al (2011) in their paper on the sharing of macroeconomic risk in society have found evidence that strong fiscal consolidations have reduced the income share of the two lowest quintiles of the income distribution. Taking into consideration that changing the structure and the size of the government spending is more relevant for individuals with lower income and that share of people with lower income is higher in less developed regions, it is easy to recognize how spending cuts will not help reducing regional inequalities.

On other hand, increasing tax revenues should hurt more people with higher incomes, especially if the structure of tax hikes doesn't change dominant structure of public revenues. (Rawdanowicz et al (2013) indicate that personal and corporate income taxes and social security contributions represents some 60% of total revenues on average and consumption taxes about a third of total revenues).

However, our results indicate tax hikes hurts relatively more less developed regions and increase regional inequalities. Obviously, this indicate that less developed regions are less protected in case that fiscal consolidation is led by tax hikes, or in other words, that more developed regions can easily modified fiscal consolidation led by tax hikes at national level to protect themselves.

Last but not the least additional value *of the results* in the paper make the prospect for further research much clearer. Namely, empirical findings for this paper should be tested not only for developed countries but also for developing countries where higher income groups or regions can even easier shape fiscal consolidation to protect themselves against undesired

redistributive policies. Also it should be the significant signal that fiscal consolidation is not only the matter of the public debt levels or economic growth, but also important regional issue.

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Appendix 1.

List of the countries included in research

1. Austria
2. Belgium
3. Denmark
4. Finland
5. France
6. Germany
7. Ireland
8. Italy
9. Netherlands
10. Portugal
11. Spain
12. Sweden
13. United Kingdom

LIVE HERE…? NO, THANK YOU! MIGRATION AND ITS CAUSES IN MOENCHENGLADBACH – A CITY FOR LIVING AND WORKING

Rüdiger HAMM
Head of the Niederrhein Institute for Regional and Structural Research (NIERS) at the Niederrhein University of Applied Sciences in Moenchengladbach, Germany, Richard-Wagner-Straße 140, 41065 Moenchengladbach, +4921611866411
ruediger.hamm@hs-niederrhein.de

Geogr. Katja KEGGENHOFF
Research Assistant at the Niederrhein Institute for Regional and Structural Research (NIERS) at the Niederrhein University of Applied Sciences in Moenchengladbach, Germany
Richard-Wagner-Straße 140, 41065 Moenchengladbach, +4921611866424, katja.keggenhoff@hs-niederrhein.de

Angelika JAGER
Research Assistant at the Niederrhein Institute for Regional and Structural Research (NIERS) at the Niederrhein University of Applied Sciences in Moenchengladbach, Germany, Richard-Wagner-Straße 140, 41065 Moenchengladbach, +4921611866432, angelika.a.jaeger@gmail.com

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Abstract

One of the essential tasks and goals of local policy makers and administrations is to provide a high quality of life and work for citizens and employees in a specified location. This especially applies in times of demographic change, in which cities are increasingly facing the challenge of an aging and shrinking population in the inter-municipal competition. Hence, key questions arise, such as: Which factors determine choice of location of private households? How are these factors evaluated in the living and working area of Moenchengladbach?

In order to answer these questions, in a first step the migration processes of the city of Moncheng-ladbach are examined based on secondary statistics. In a second step, three primary statistical sur-veys are conducted in order to reveal information on which crucial factors influence the choice of residence for the observed migration processes and how the quality of Moenchengladbach as a resi-dential location is evaluated.

Keywords: Migration, Urban development, Locational factors, Citizens' satisfaction, Job mobility

JEL classification: R21, R32

1. Introduction

Urban population structures are in a constant state of flux. On the basis of migration analyzes, this study illustrates group differentiated results in regards to the development and structure of migration and the demands on the city of Moenchengladbach.

An attractive yet affordable apartment, an interesting job; the availability of excellent childcare, primary schools and secondary schools; as well as a variety of shops, clean parks and fresh air- this may well be the wish list of many a city resident, and this list poses great challenges for those responsible for making political and regional decisions. Especially in times of demographic change, when populations are aging and shrinking thus fueling competition amongst cities for residents and workers, it is important that the decision makers know which regional migration movements exist and which factors influence people's decisions when it comes to choosing a residential community. In light of this competition for residents, analyzes are useful for marketing regional strengths more effectively and for identifying points of weakness more efficiently.

This article describes substantial results in accordance with such analyses in the case of the German city of Moenchengladbach. In a project commissioned by The Development Society

of Moenchengladbach (EWMG: (Entwicklungsgesellschaft Moenchengladbach GmbH), NIERS conducted a group specific analysis of migration and the potential determining factors for living and working in Moenchengladbach. The following questions will be answered according to surveys and by a study of secondary information: How has migration flux developed within the past few years and how can this migration be explained? Which demands are being made on the city of Moenchengladbach? How happy are the residents of Moenchengladbach with their city?

Upon deeper analysis (s. ibid) Moenchengladbach can be viewed in one way as a unified city and in another way as a conglomerate of individual districts and neighborhoods with their own individual strengths and weaknesses. This multifaceted approach of examination is especially relevant considering the fact that Moenchengladbach is a city with two distinct city centers- Moenchengladbach and Rheydt. This regional peculiarity is exemplified by fact that it is the only city in Germany with two official central railway stations. However for the purposes of this study, the city is dealt with as unified whole.

The young and searching- who is packing their bags?

When a person packs their bags and voluntarily sets forth, they may do so alone or as a part of a group. In either case, one thing is certain; the person has decided to put their current existence behind them and to move on to a new place and a new start. Age plays an important role in determining decisions to migrate. Young adults, people between the ages of 20 and 30, move most often. During this period, people usually choose a location based on professional training and subsequently for the beginning of their career. People between the ages of 30 and 40 usually move with their families and migration tends to subside substantially with increasing age. However, there is an increase in migration which can be noticed at a much older age > 80 years of age. This is the so called retirement migration [see PROSKE 2011, p. 82].

Why do people migrate? Motivations for migration can be roughly categorized according to the following [see PROSKE 2011, S. 266 ff.]:

- Migration due to professional motivation
- Migration due to personal life situation
- Migration due to housing situation
- Migration due to infrastructure
- Migration due to subjective evaluation of soft locational factors

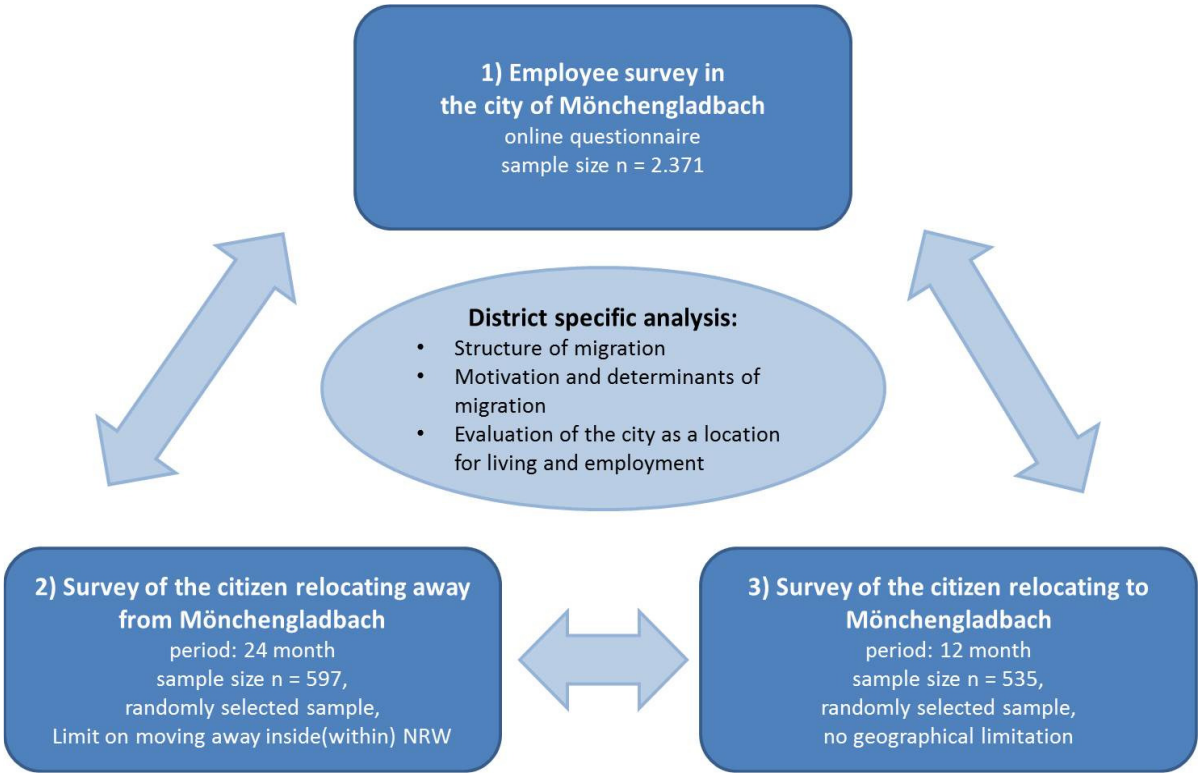
Hard migration factors directly affect the economic situation of the individual and ultimately their existence. This includes factors such as the labor market, standard of living costs and the availability of housing. In comparison, soft factors of migration are not existential; instead they determine the quality of life within a region. This includes factors such as the cultural and art scene, leisure activities, social environment, cityscape, shopping facilities and the availability of childcare [see GEIS 2004, S. 62].

The methodological approach

How was it investigated?

On the basis of certified secondary statistics from IT.NRW and from the city's citizen registry, the people moving to and from as well as net migration for the city of Moenchengladbach will be examined. Whenever possible, the total number will be differentiated according to sex, nationality and city district in order to give a more exact understanding of migration movements. Along with the purely empirical descriptive observation, the project titled 'MG Moves' should give additional information regarding which factors inspired people to either relocate to or away from the city. Ultimately, this will help to draw conclusions on the quality of life in Moenchengladbach. Different primary statistical surveys were conducted within the framework of the project. On the one hand, this was achieved through the use of an online questionnaire in which people who work in Moenchengladbach were asked which factors determine residency choice and how they would evaluate the quality of these factors in Moenchengladbach. On the hand, individuals who had relocated either to or away from the city were asked about their motivations for migration. In total a sample size of n = 3.503 was collected and evaluated.

Figure 1: Primary statistical data within the frame work of the project MG Moves



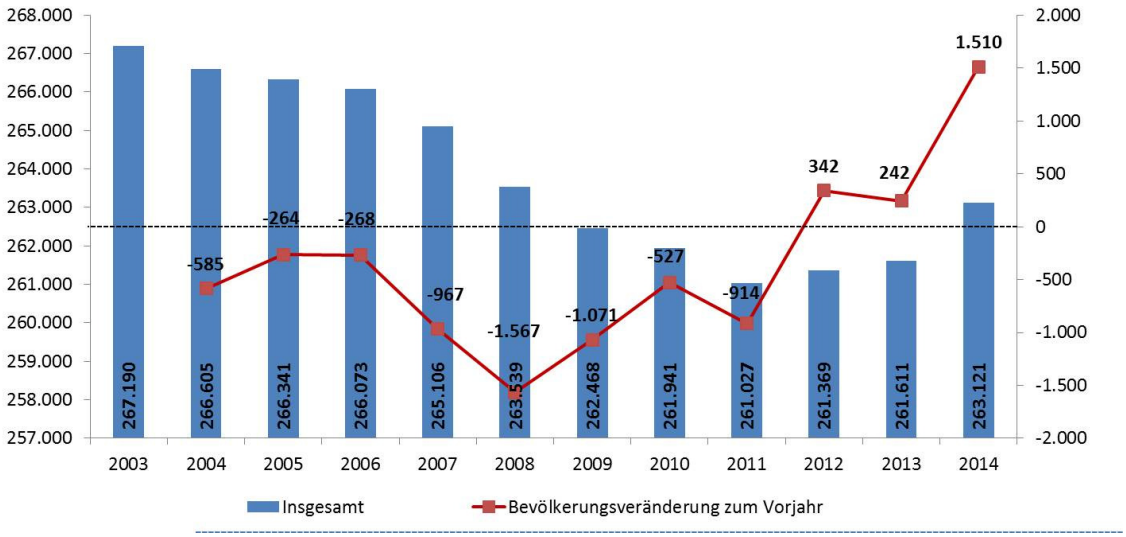
Source: Author's own graph

2. The residents of Moenchengladbach

How many people are coming and going?

Since the year 2003 the population figure of the city of Moenchengladbach has reduced overall. In 2003 the city had a population of around 267,000 people and in 2004 the figure had dropped to 263,000 people. However, there is a noticeable interruption of this trend beginning in 2011. Within the past three years there has been a considerable increase in population. It should be determinable within the next few years if this is a long-term sustainable population increase which is capable of reversing the trend of demographic migration.

Figure 2: Population figures and the development in Moenchengladbach between 2003 and 2014



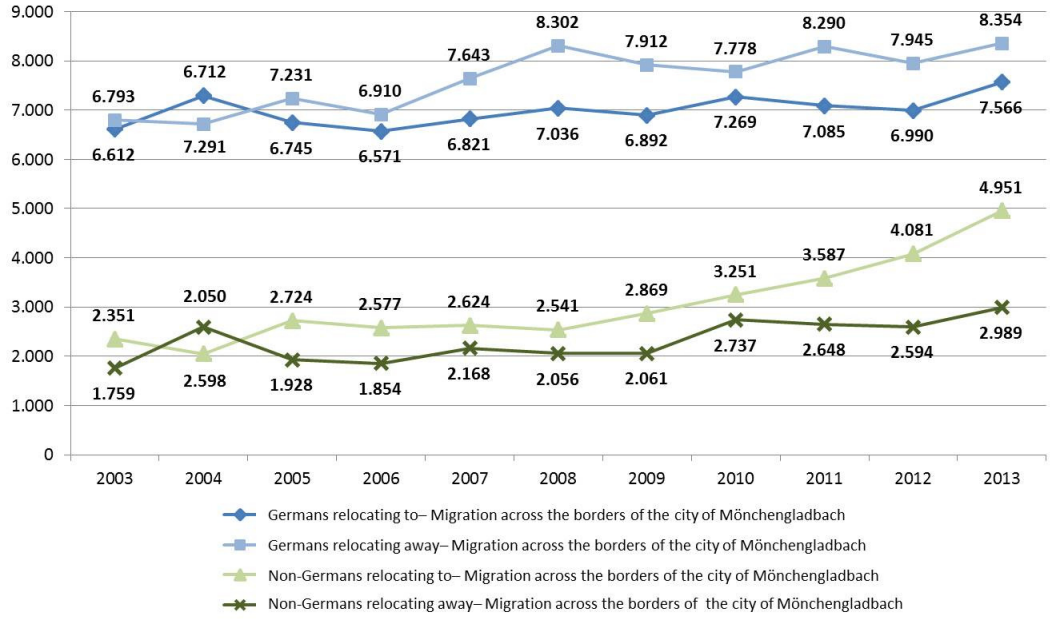
Source: Author's own graph based on data from the city of Moenchengladbach Department of City Development and Planning

Who's coming and going?

When the movements of migration are differentiated according to the origin of the migrant (see figure 3) it can be seen that an exchange process has taken place in Moenchengladbach within the past few years. German citizens are moving away from the city in remarkable numbers according to net migra-tion, whereas a large net number of foreign citizens are moving to the city. In total, Moenchenglad-bach has registered an increase in migration in contrast to other cities and communities. This structure of development, which has been noticeable over many years, has contributed to the fact that the city has a foreign population that is above average in comparison to the state of North Rhine Westphalia. In 2014 around 31,200 foreign citizens around 14.4 percent of the city's total population were living in Moenchengladbach, in comparison to 11.8 percent of the population of the state of North Rhine West-phalia. The two city centers of Moenchengladbach, as well as a few of the inner city districts, show an even higher foreigner population and a relatively high fluctuation of citizens. However, it can be noted that in the more peripheral, and often rurally influenced, districts of Moenchengladbach there is a smaller proportion of foreigners and a lower fluctuation of citizens.

When viewed from a positive perspective, the outlined developments show that Moenchengladbach enjoys great popularity amongst foreign citizens- the city expresses an air of internationality and open-mindedness. When viewed from a more cautious perspective, these developments show that the need for integration in Moenchengladbach has increased tremendously over the past few years and with ever increasing speed.

Figure 3: Migration out of the city limits, classified according to Germans and Non-Germans between 2003 and 2013



Source: Author's own graph on the basis of data from the city of Moenchengladbach Department of City Development and Planning.

An observation according to age group differentiation of migration for the year 2012 shows that there was a net migration amongst all age groups. The only exception to this is people in the age group over 65 years old. According to average age, a comparatively young population is currently living in the city center, whereas the average age in the peripheral city districts is much higher.

Why are they coming and going?

The secondary statistical population analysis was supplemented by a survey of people relocating to and away from Moenchengladbach as well as of professionals working within Moenchengladbach. This survey shows the reasons for the movement of migration and allows an assessment of the quality of life in Moenchengladbach. In general, it shows that the majority of people relocating to or away from the city are doing so on account of a combination of personal, career and housing related factors of influence. In the specific case

of Moenchengladbach, housing related factors as a motive for reloca-tion is of noticeably less significance than that of the first two factors.

Along with these principle similarities, there are also noticeable differences as to why people decide to relocate to or away from the city. These differences could be a result of the specific locational condi-tions of the city and could therefore be the first clues as to why people choose to leave or to come to Moenchengladbach. Being closer to family and friends, job changes and housing prices are all motives for moving to Moenchengladbach. Reasons for moving away from Moenchengladbach tend to be for professional training and studies, buying residential property, the prices for building and purchasing a new house and for better rental apartments.

A city's population is switched

Also, social demographic qualities of those relocating to and from the city show some similarities, initially. Younger people (between the ages of 18 and 29) are more often a part of the migration proc-ess; the same is also true for well qualified individuals with a degree or with vocational training. There are also tends to be differences between those relocating to and from the city. Generally, employed people and married households tend to move away, where as those searching for work and the retired tend to move to the city. Employees with a household income under 3,000€ a month tend to relocate to the city and those households who tend to make more money, over 3,000€ a month, generally tend to leave the city. In summary, a trend towards a process of exchange can be noticed. More often young people and employed people with a very high household income and with a university degree tend to leave Moenchengladbach. Groups of people requiring governmental financial assistance for example the unemployed, the retired and people in the process of professional training tend to move to Moenchengladbach. Therefore, the fact cannot be ignored that the city's internal buying power has developed unfavorably due to the process of this population switch.

Or instead being relocated to the booming cities of the Rhine-Ruhr region?

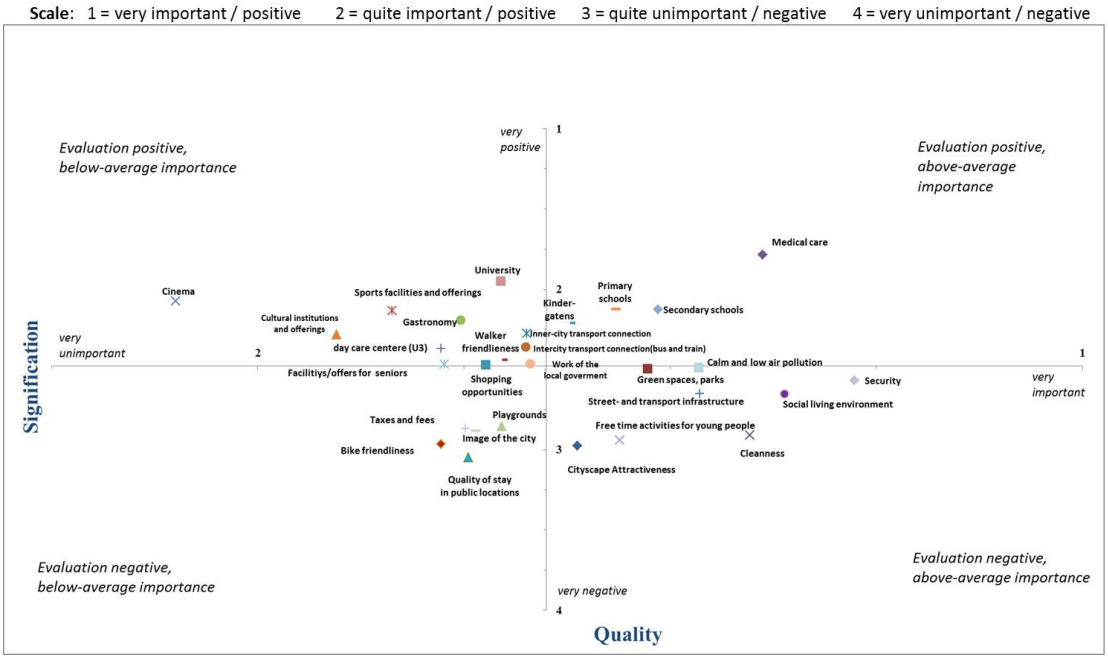
The analysis of the house hunting process shows that Moenchengladbach has reached a positive net migration in the immediate surrounding areas (relocation distance of 5 to 15 kilometers), however, when it comes to a relocation distance of 50 to 100 kilometers a negative net migration is noticeable. When it comes to the immediate surrounding areas more people move to Moenchengladbach than move away, the city however loses residents to the Rhine-Ruhr metropolitan area with its large cities such as Cologne, Bonn, Aachen and the additional cities within the Ruhr urban area. At the same time, more than 40 percent of those who relocated to Moenchengladbach found the search for housing diffi-cult because it wasn't easy for them to find an apartment that met their individual expectations in terms of price or quality. The largest portion of those who have relocated into the city move into a rental apartment- only a few purchase their own home.

The soft factors make a difference

A survey of employees working in Moenchengladbach show that people who work within the city limits but do not live in the city are generally happier with their living situation (factors such as city, neighborhood, housing) than those who both live and work in Moenchengladbach. The survey shows similar results in the case of the satisfaction of those who have relocated to and from the city after their move. People who moved to Moenchengladbach admit that they were happier with their city and their neighborhood from which they came than they are with Moenchengladbach. Only housing is rated more positively in Moenchengladbach. People who have moved away from Moenchengladbach admit that they are happier in their new city, as well as happier with their housing, neighborhood and with the city in general than as they were before they moved. These results, which were sobering for the city, were proven by a series of qualitative statements regarding the city's shortcomings from sur-veyed individuals. The main points of criticism included in the open ended question are street condi-tions and traffic infrastructure, the unattractive cityscape and the lack of cleanliness, as well as a feel-ing of a lack of personal security, weaknesses in social structures and an unattractive downtown area. Along with these negative assessments, there are also a series of positive aspects ascribed to the city of Moenchengladbach. These strengths include the amount of parks and green spaces as well as the city's scenic surroundings, its central location and good transport connections and moderately priced hous-ing.

These results are supplemented by a deeper examination of housing location factors according to the framework of a portfolio-analysis (see figure 4). Here the assessments of location factors are shown according to the level of importance to the surveyed individual (on a scale from 1 = not important to 4 = very important) as well as their quality in Moenchengladbach (on a scale of 1 = very good to 4 = very poor). A classification of factors in the bottom right quadrant shows a negative assessment with a level of high significance. This analysis proves that the city's largest weaknesses, and therefore its largest potential for action, lies within the failing attractiveness of its cityscape, cleanliness, leisure activities for youth, street and traffic infrastructure, social environment, condition of parks and green-spaces as well as its residents feeling of security. Medical treatment, availability of day-care, primary schools and secondary schools, tranquility and limited pollution are all positively assessed.

Figure 4: Significance and Quality of the locational factors in Moenchengladbach



Source: Author's own depiction based on all realized inquires; axis meeting point at the respective mean value of all factors

The basic requirements have been met- it's the icing on the cake that's missing…

Moenchengladbach fulfills the 'must-have' factors required for a city. This is one of its strengths. This is due to the fact that Moenchengladbach is a convenient place to live and work. The city has good supply structures and an excellent infrastructure connection. However, these aspects can hardly influ-ence human behavior or reactions like suggested in the case of this article's title 'Live here…? No, thank you!' Moenchengladbach shows deficits in every aspect which could make the city a more at-tractive and livable community: leisure activities, cleanliness, an attractive cityscape, and a positive and secure social community. In light of an increasing demographic migration and increasing competi-tion amongst cities, it is doubtful that the city's amenities are enough to reverse the current trend of population exchange or to impede related unfavorable economic trends.

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THE CHAOTIC UNEMPLOYMENT RATE GROWTH MODEL: EURO AREA

Vesna D. JABLANOVIC
Professor of Economics, University of Belgrade, Faculty of Agriculture, Nemanjina 6 , 11081 Belgrade, Republic of Serbia
vesnajab@ptt.rs

Abstract
The unemployment rate in the Euro Area fall to 10.026 per cent in 2016. Among the Member States, the lowest unemployment rates were recorded in Germany and Malta. On the other hand, the highest unemployment rates were observed in Greece and Spain. Unemployment rates have fallen from their postcrisis peaks, but remain high. The basic aims of this paper are: firstly, to provide a relatively simple chaotic unemployment rate growth model that is capable of generating stable equilibria, cycles, or chaos, and secondly, to to analyze the unemployment rate growth stability in the period 1991-2015 in the Euro Area.. This paper confirms stable growth of the unemployment rate in the Euro Area in the observed period.

Keywords: Unemployment rate, Economic Growth, Euro Area
JEL classification: J64, 040, 052

1. Introduction

The Euro Area economy continued its gradual recovery in 2016. GDP Growth Rate in the Euro Area averaged 0.37 percent from 1995 until 2016. GDP Growth Rate in the Euro Area stood at 1.661 percent in 2016 (see Fig. 1).

While private consumption continued to expand, supported by higher real disposable incomes as a result of lower energy prices and rising employment, investment growth faltered.

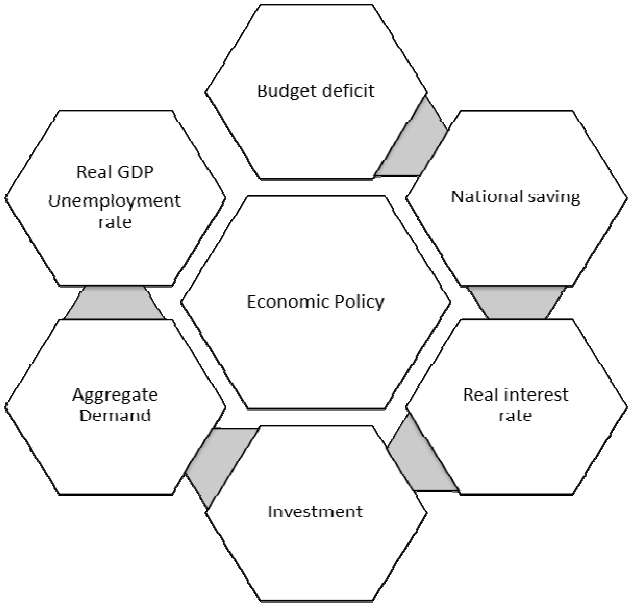
Euro Area inflation has been falling steadily for five years . In 2016, the Euro Area inflation rate was just 0.278 % . Inflation is also picking up in the Euro Area, but more slowly and from from 0.033 percent in 2015, to 0.278 percent in 2016.

In the Euro Area domestic demand is expected to be the main driver with robust private consumption supported by rising real incomes reflecting higher employment. Domestic demand, notably investment, decelerated in some of the larger euro area economies. Domestic demand and investment are still below precrisis levels in some euro area countries. In the Euro Area, GDP and investment have in recent years grown more slowly than projected. On the other hand, employment has grown faster. The productivity slowdown reflects prolonged weak investment.

A modest fiscal expansion and easy monetary policy support economic growth. Persistently low interest rates in the Euro Area are coupled with the expectation of a continuation of the gradual increase of short-term rates in the US. Fiscal policy has been less restrictive in 2016 than in the previous three years. The reduction of the consolidated Euro Area budget deficit has been supported by improved growth. Public consumption is controlled. Countries with high debt burdens should undertake gradual fiscal consolidation.

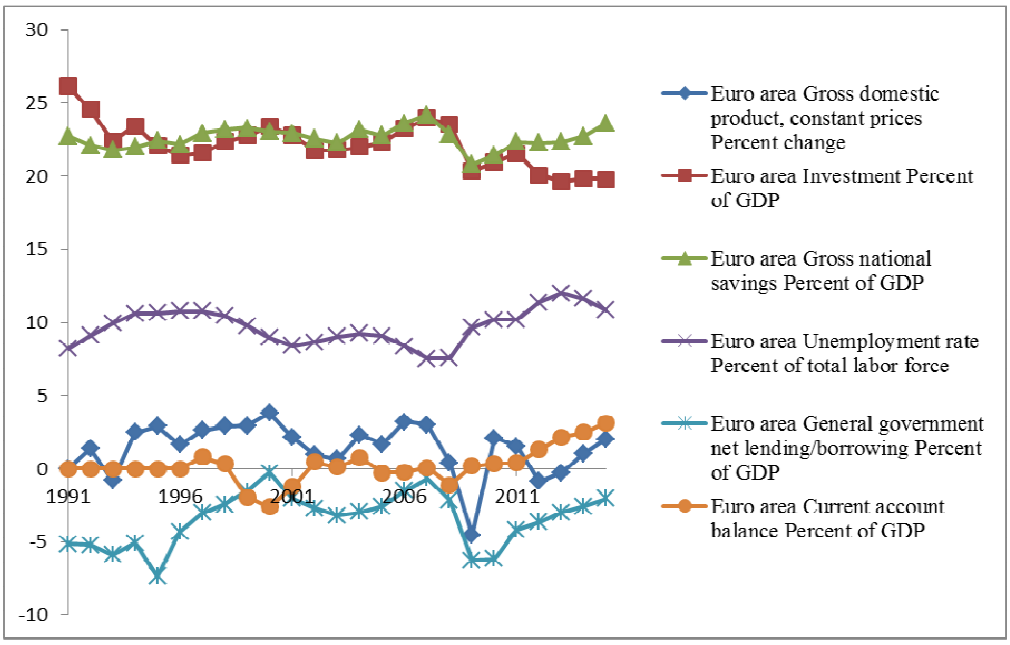
In the short run, the fall in aggregate demand leads to falling output and price level and rising unemployment. What should policymakers do when faced with such a recession? One possibility is to take action to increase aggregate demand. An increase in government spending or an increase in money supply would increase aggregate demand. According to the Phillips curve, when aggregate demand is low , then unemployment is high and inflation is low. On the other hand, Okun's law is a relationship between changes in the unemployment rate and economic growth. In this sense, this relationship predicts that growth slowdowns coincide with rising unemployment. (see Fig 1 and Fig 2.)

Figure 1: Relations between budget deficit, national saving investment and unemployment rate.



Chaos theory states that small changes can result in large differences. Chaotic system is unpredictable. Namely, a slight difference, in the decimal place, resulted in prediction failure. Chaotic systems exhibit a sensitive dependence on initial conditions: seemingly insignificant changes in the initial conditions produce large differences in outcomes. This is very different from stable dynamic systems in which a small change in one variable produces a small and easily quantifiable systematic change. Chaos theory started with Lorenz's (1963) discovery of complex dynamics arising from three nonlinear differential equations leading to turbulence in the weather system. Li and Yorke (1975) discovered that the simple logistic curve can exibit very complex behaviour. Further, May (1976) described chaos in population biology. Chaos theory has been applied in economics by Benhabib and Day (1981,1982), Day (1982, 1983,1992 , 1997.), Grandmont (1985), Goodwin (1990), Medio (1993,1996), Lorenz (1993), Jablanovic (2011, 2013, 2016), among many others.

Figure 2.GDP, investment, gross national saving, unemployment rate, general government net



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The basic aims of this paper are: firstly, to provide a relatively simple chaotic unemployment rate growth model that is capable of generating stable equilibria, cycles, or chaos, and secondly, to to analyze the unemployment rate growth stability in the period 1991-

2015 in the Euro Area. This paper confirms stable growth of the unemployment rate in the Euro Area in the observed period.

2. The model

The chaotic unemployment growth model is presented by the following equations:

$$u_t - u_n = -\alpha (Y_t - Y_n) \qquad \alpha > 0 \qquad (1)$$

$$u_n = \beta u_t \qquad \beta > 0 \qquad (2)$$

$$Y_n = \gamma Y_t \qquad \gamma > 0 \qquad (3)$$

$$Y_t = C_t + I_t + G_t + N_{xt} \qquad (4)$$

$$C_t = \delta Y_{t-1}^2 \qquad 0 < \delta < 1 \qquad (5)$$

$$I_t = \rho (Y_t - Y_{t-1}) \qquad \rho > 1 \qquad (6)$$

$$N_{x,t} = n Y_t \qquad 0 < n < 1 \qquad (7)$$

$$G_t = g Y_t \qquad 0 < g < 1 \qquad (8)$$

with Y – real output , Yn – the potential output, I – investment , C– consumption, Nx – net exports, G – governmnet spending, u – unemployment rate, un - the natural rate of unemployment, α – the "Okun's coefficient" , δ - the private consumption rate, β and γ – the positive coefficients, n – the net export rate, g- the government expenditure rate, ρ - the accelerator.

(1) shows the Okun' law ; the negative correlation between GDP growth and unemployment has been named "Okun's law." The relationship between contemporaneous changes in economic growth and unemployment is often referred to as "Okun's Law". The parameter α is often called "Okun's coefficient." Okun's relationship connected the level of unemployment to the gap between actual output (Y) and potential output (Yn). Potential output explains how much the economy would produce "under conditions of full employment". (2) shows that the natural rate of unemployment which is known as the non acceleration inflation rate of unemployment (NAIRU) is proportional to the current unemployment rate; (3) shows that the potential output is proportional to the actual output; (4) shows GDP (Y) as the sum of consumption (C), investment (I), government spending (G) and net exports; (5) In this model, the consumption function displays the quadratic relationship between consumption (Ct) and real output of the previous period (Yt-1). Real output is multiplied by the coefficient δ, „the marginal propensity to consume" (MPC) . The MPC coefficient can be between zero and one. (6) As regards investment in period t, it is taken to be the function of the change in real output in the previous period, where ρ stands for the capital –output ratio or accelerator; (7) shows the relation between net export (Nx) and real output (Y); and (8) shows the relation between government spending (G) and real output (Y).

Now, putting (1), (2), (3), (4), (5) , (6), (7), and (8) together we immediately get:

$$u_t = \left[\frac{\rho}{(g+n+\rho-1)}\right] u_{t-1} - \left[\frac{\delta(\beta-1)}{\alpha(1-\gamma)(g+n+\rho-1)}\right] u_{t-1}^2 \qquad (9)$$

This model given by equation (9) is called the logistic model. For most choices of α, β, γ , δ , ρ , g , and n there is no explicit solution for (9). Namely, knowing α, β , γ , δ, ρ , g , and n and measuring u 0 would not suffice to predict u t for any point in time, as was previously possible. This is at the heart of the presence of chaos in deterministic feedback processes. Lorenz (1963) discovered this effect - the lack of predictability in deterministic systems.

Sensitive dependence on initial conditions is one of the central ingredients of what is called deterministic chaos.

This kind of difference equation (9) can lead to very interesting dynamic behavior, such as cycles that repeat themselves every two or more periods, and even chaos, in which there is no apparent regularity in the behavior of u t. This difference equation (9) will posses a chaotic region. Two properties of the chaotic solution are important : firstly, given a starting point u0 the solution is highly sensitive to variations of the parameters α, β , γ , δ , ρ , g , and n; secondly, given the parameters α, β , γ , δ , ρ , g , and n, the solution is highly sensitive to variations of the initial point u0 . In both cases the two solutions are for the first few periods rather close to each other, but later on they behave in a chaotic manner.

3. The Logistic Equation

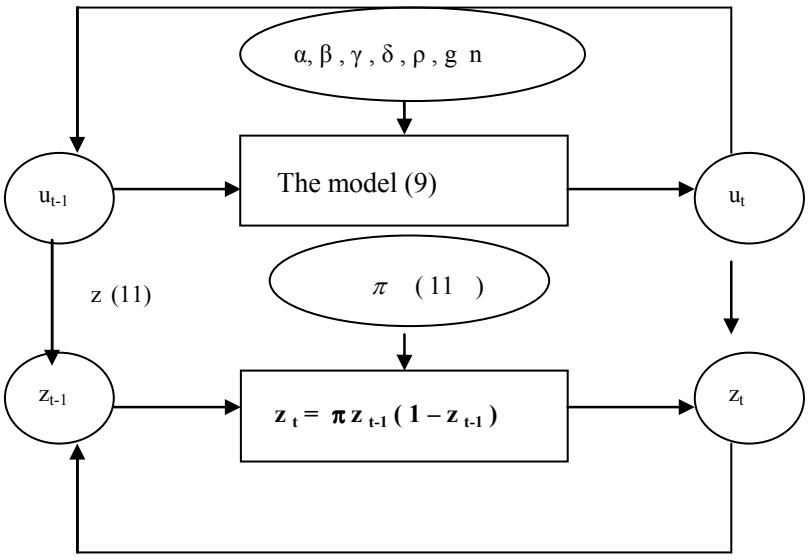
It is possible to show that iteration process for the logistic equation (see Fig. 3.)

$$z_t = \pi z_{t-1} (1 - z_{t-1}) , \quad \pi \in [0 ,4] \quad , \quad z_t \in [0 ,1] \tag{10}$$

is equivalent to the iteration of growth model (9) when we use the identification

$$z_{t-1} = \left[\frac{\delta (\beta - 1)}{\alpha \rho (1-\gamma)} \right] u_{t-1} \quad \text{and} \quad \pi = \left[\frac{\rho}{(g + n + \rho - 1)} \right] \tag{11}$$

Figure 3: Two quadratic iteratiors running in phase are tightly coupled by the transformations indicated



Using (9) and (11) we obtain:

$$z_t = \left[\frac{\delta (\beta - 1)}{\alpha \rho (1-\gamma)} \right] u_t =$$

$$= \left[\frac{\delta (\beta - 1)}{\alpha \rho (1-\gamma)} \right] \left\{ \left[\frac{\rho}{(g + n + \rho - 1)} \right] u_{t-1} - \left[\frac{\delta (\beta - 1)}{\alpha (1-\gamma)(g + n + \rho - 1)} \right] u_{t-1}^2 \right\}$$

$$= \left[\frac{\delta(\beta-1)}{\alpha\ (1-\gamma)(g+n+\rho-1)}\right] u_{t-1} - \left[\frac{\delta^2\ (\beta-1)^2}{\alpha^2\ \rho(1-\gamma)^2\ (g+n+\rho-1)^2}\right] {u_{t-1}}^2$$

On the other hand, using (10) and (11) we obtain:

$z_t = \pi z_{t-1} (1 - z_{t-1}) =$

$$= \left\{\frac{\rho}{(g+n+\rho-1)}\right\}\left[\frac{\delta(\beta-1)}{\alpha\ \rho(1-\gamma)}\right] u_{t-1} \left\{1 - \left[\frac{\delta(\beta-1)}{\alpha\ \rho(1-\gamma)}\right] u_{t-1}\right\}$$

$$= \left[\frac{\delta(\beta-1)}{\alpha\ (1-\gamma)(g+n+\rho-1)}\right] u_{t-1} - \left[\frac{\delta^2\ (\beta-1)^2}{\alpha^2\ \rho(1-\gamma)^2\ (g+n+\rho-1)^2}\right] {u_{t-1}}^2$$

Thus we have that iterating (9) is really the same as iterating (10) using (11). It is important because the dynamic properties of the logistic equation (10) have been widely analyzed (Li and Yorke (1975), May (1976)).

It is obtained that :

(i) For parameter values $0 < \pi < 1$ all solutions will converge to $z = 0$;

(ii) For $1 < \pi < 3{,}57$ there exist fixed points the number of which depends on π;

(iii) For $1 < \pi < 2$ all solutions monotnically increase to $z = (\pi - 1) / \pi$;

(iv) For $2 < \pi < 3$ fluctuations will converge to $z = (\pi - 1) / \pi$;

(v) For $3 < \pi < 4$ all solutions will continously fluctuate;

(vi) For $3{,}57 < \pi < 4$ the solution become "chaotic" wihch means that there exist totally aperiodic solution or periodic solutions with a very large, complicated period. This means that the path of z_t fluctuates in an apparently random fashion over time, not settling down into any regular pattern whatsoever.

Important parameter π values " 0, 1 , 1, 2, 3 " are part of the Fibonacci sequence. The Fibonacci Sequence is the series of numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ... There is an interesting pattern: The Fibonacci Sequence is found by adding the two numbers before it together. The is found by adding the two numbers before it (0+1). The 2 is found by adding the two numbers before it (1+1). The 3 is found by adding the two numbers before it (1+2). Namely, each number is the sum of the two numbers before it. If we make squares with those widths, we get a nice spiral. Also, if we take any two successive, important values of parameter π , (" 2, 3 ") , their ratio is very close to the Golden ratio which is approximately 1.618034... The adjacent numbers divided yield the Golden Ratio (e.g. 55/34=1.618). For example 3/2 is 1.5. The golden ratio that has approximate value of 1.618. The golden ratio and the golden rectangle are connected. This is because the ratio of the longer side of a golden rectangle to the shorter side is equal to the golden ratio ($1^2 + 1^2 + 2^2 + 3^2 + 5^2 + 8^2 + \ldots$) (Jablanovic, 2016., pg. 30)

4. Empirical Evidence

The main aim of this paper is to analyze the unemployment rate stability in the period 1991-2015 in the Euro Area by using the presented logistic model (12):

$$ut = \pi\, u_{t-1} - \upsilon\, {u_{t-1}}^2 \qquad (12)$$

where u – unemployment rate, $\pi = = \left[\frac{\rho}{(g+n+\rho-1)}\right]$, $\upsilon = \left[\frac{\delta(\beta-1)}{\alpha(1-\gamma)(g+n+\rho-1)}\right]$

Now, the model (12) is estimated (see Table 1.)

Table 1. The estimated model (12): Euro area , 1991-2015. (R= 0.825 , Variance explained: 68.063%)

	π	υ
Estimate	1.198807	1.907698
Std.Err.	0.124436	1.238245
t (22)	9.633944	1.540646
p-level	0 .00000	0.137664

Source: www.imf.org

5. Conclusion

This paper creates the chaotic unemployment rate growth model. For most choices of α, β , γ , δ , ρ , g , and n there is no explicit solution for (9). Namely, knowing α, β , γ , δ , ρ , g , and n and measuring u_0 would not suffice to predict u_t for any point in time, as was previously possible. But even slight deviations from the values of parameters: α, β , γ , δ , ρ , g , n, and initial value of unemployment rate, u_0 show the difficulty of predicting a long-term unemployment rate behavior.

A key hypothesis of this work is based on the idea that the coefficient $\pi = \left[\frac{\rho}{(g+n+\rho-1)}\right]$ plays a crucial role in explaining the local unemployment growth stability, where , n – the net export rate, g- the government expenditure rate, ρ - the accelerator. An estimated value of the coefficient π (1.198007) confirms stable growth of the unemploymet rate in the Euro area in the observed period.

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METHODOLOGICAL ASPECTS OF CONSTRUCTION OF THE DYNAMIC MODEL FOR THE DEVELOPMENT OF THE INSTITUTIONAL ENVIRONMENT OF THE INNOVATIVE MULTICLUSTERS

Napolskikh Dmitri LEONIDOVICH
Candidate of Economic Sciences, Associate Professor of the Department of Management and Law
Volga State University of Technology Yoshkar-Ola, pl. Lenin, 3
NapolskihDL@yandex.ru

Abstract
The study of the processes of development of the institutional environment of the innovative multiclusters allows to determine the stage of its life cycle and the direction of the development of the processes of clustering the economic system of the region. The models of interaction among the economic agents of the innovative multicluster at the various stages of development of its institutional environment, proposed by the author, allow to monitor the effectiveness of the regional cluster policy over the long term. The study shows that the structure of the interactions among the economic agents in the framework of this model of formation and development of the innovative multiclusters is due to the institutional aspects of the regional cluster policy. The classification of the economic agents of the innovative multicluster, which are the main subjects of the processes of modernization of the institutional environment of the regional economic system, is provided.
Keywords: economic modeling, cluster policy, institutional environment
JEL classification:

1. Introduction

The process of formation of the innovative multiclusters at the sub-federal level is the consistent implementation of a set of interrelated activities in order to organize the effective economic interaction among the subjects of the regional economic system. The analysis of the Russian practice of clustering of the regional economic systems revealed a number of trends and patterns of formation and development of the innovative multiclusters.

The formation and development of the integrated cluster formations at the sub-federal level is performed "from the top down" with the active use of the administrative resources; moreover, the processes of formation of the innovative multiclusters are implemented most effectively in the regions with traditionally prevailing high scientific and technical potential (Achenbach, 2012). The development of the clustering process is impossible without the formation of the regional mechanisms and institutions of interaction among the scientific and educational institutions and the business community (Feldman, 1994); at the same time, the mandatory condition for the development of the innovative multiclusters is the structural diversification of the regional economic system, based on the formation of an effective institutional environment of the generation and transfer of the innovative technologies (Boush, 2010). Hereat, in the process of development of the innovative multicluster, the increase in the number of the economic agents occurs, forming therein the production chains of the added value creation (Kleiner, 2008).

2. Data And Method

The methodological advantages of the tools for the institutional direction of the economic thought make it possible to simulate the changes in the structure of the interactions among the economic agents of the innovative multicluster, depending on the dynamics of the innovation environment development. Based on the grouping of the economic agents, involved in the formation and development of the scientific and industrial clusters, the systematization of the main participants in the institutional relations within the internal environment of the innovative multicluster was performed. The classification of the economic agents of the innovative multicluster, involved in the formation and development of its institutional environment, is shown in the Table 1.

Table 1. The classification of the economic agents of the innovative multicluster

Type of the economic agents of the innovative multicluster	Characteristics of the main organizational forms of the economic activity
Agents-provocateurs	Enterprises of the "core" of the multicluster, the regional development agencies, the associations of industrialists and entrepreneurs, the regional chambers of commerce
Agents-facilitators	The suppliers of the specialized resources for the enterprises multicluster; logistics, engineering and other service organizations, providing the infrastructure support to the processes of formation and development of the multicluster, venture capital funds
Agents-innovators	The scientific research and educational institutions, as well as the small innovative enterprises and the innovative infrastructure enterprises, based on them
Agents-imitators	The subjects of the innovative business, distributing and implementing new technologies on the basis of the license agreements; the centers for the commercialization of the innovations and transfer of the technology
Agents-integrators	The independent enterprises of the innovation infrastructure, integrating the efforts of the innovative businesses (business-incubators, technology parks, industrial parks, venture), the structural units of the regional executive and local self-governing authorities, regulating the processes of the socio-economic development of the territory

Consequently, the solution to the problem of constructing of the model for the clustering of the economic system in the region should be based on a study of the relationship of competition and cooperation, preconditioned by the processes of distribution of the internal resources of the multicluster of both material and immaterial nature.

4 types of institutionalization of the vector of the interactions of the cluster economic agents were identified based on the theory of mathematical graphs. Based on the dialectical nature of the development of the cluster formations, it can be assumed that in the framework of the intracluster interactions the economic agents implement in relation to each other a strategy, either stimulating or restricting the development. Therefore, each pair of economic agents of the innovative multicluster, when considering it as the directed mathematical graph, can belong to one of three types of interactions, summarized in the Table 2.

Table 2. The types of institutionalization of the interaction among the economic agents of the multicluster

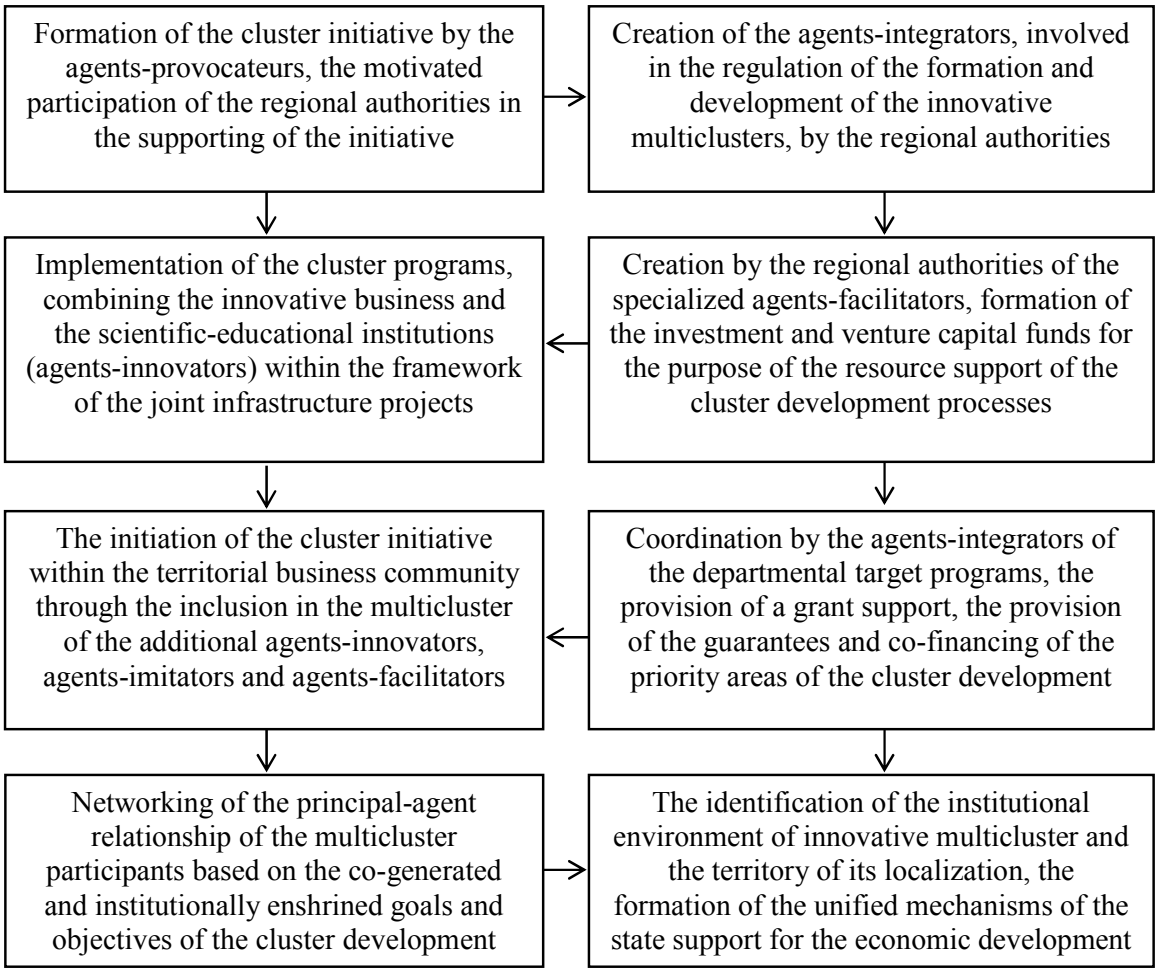
Vector of the interaction among the economic agents	Result of the interaction among the economic agents	Direction of the institutionalization of the type of interaction
+ +	The mutually beneficial cooperation of the economic agents aimed at the development of the competitive advantages of each other and the innovative multicluster as a whole.	Broadcasting of the experience within the multicluster, its incorporation in the form of a tradition. Formation of the mechanisms for the internalization of the positive externalities of this type of interactions.
+ -	The support is provided by one economic	Formation of the compensatory

	agent to the second one through the limitations of the own resources and opportunities for the economic growth.	mechanisms, based on the distribution of the risks and benefits for the long term. Implementation within the cluster of the public-private partnership mechanisms.
- -	The economic agents of the multicluster block each other's development, limiting the competitiveness of the cluster formation as a whole.	Implementation of the system of "checks and balances" in the framework of the internal environment of the multicluster. The establishment of the institutional platforms for the regulation of the economic interests.

3. Analysis And Results

On the basis of this approach, it is possible to analyze the structural changes in the territorial network of the institutional relations with the participation of the innovative businesses, the scientific research and educational institutions and the public authorities, complementary and reinforcing the competitive advantages of each other as a result of the distribution of the positive externalities of the clustering processes within the adaptive model of interaction among the participants of the multicluster. The structural and institutional scheme of interactions among the economic agents within this model of the formation and development of the multiclusters is shown in the Figure 1.

Figure 1. The structural-logical scheme of the formation and development of the innovative multiclusters

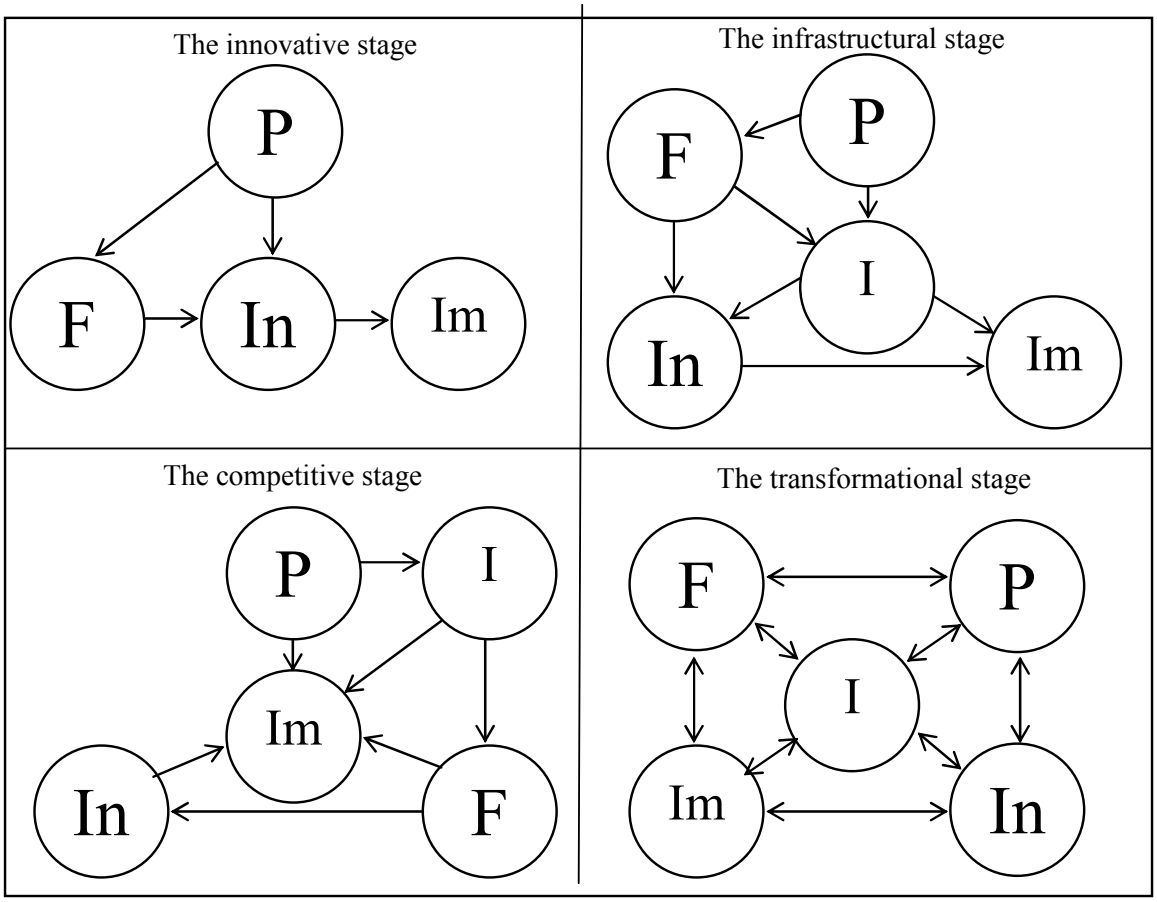


From the point of view of the evolutionary direction of the economic thought, where the subject of the study is the historical background and conditions complicating the organizational forms of the economic systems, the innovative multicluster is the evolving

institutional system, gradually transforming the socio-economic system of the territory of its localization. As part of the institutional dynamics of the interaction among the participants of the multicluster, four stages of the multicluster life cycle were identified: innovative, infrastructural, competitive, and transformational.

Let us consider the models of interaction among the economic agents of the innovative multicluster at the various stages of development of the institutional interaction environment in the form of the directed graph, consisting of a number of peaks – the economic agents of the multicluster). The models of interaction among the economic agents of the innovative multicluster at the various stages of development of its institutional environment are shown in the Figure 2.

Figure 2. The models of interaction among the economic agents of the innovative multicluster at the various stages of development of its institutional environment



P – economic agents-provocateurs; F – economic agents-facilitators; In – economic entities-innovators; Im – economic agents-imitators; I – economic agents-integrators.

In the course of implementation of the cluster initiative, the gradual integration of the economic space takes place, moreover; the coordinating role in formation of the innovative cluster with each successive stage is gradually transferred from the agents-provocateurs to the agents-integrators, the regional development corporations and the managing companies of the clusters play.

4. Discussion

The solution to the problem of construction of the dynamic model of the innovative multicluster assumes its consideration as the network organizational structure with the specific elements of the hierarchy and the institutionalization of the interactions (Enright, 1996). The previously considered essential features of the innovative multiclusters allow the consideration of the network relationship formed within its framework as relatively homogeneous, equal and mutually beneficial (Porter, 2003).

However, the complex economic structure of the multicluster formation presupposes the existence of two overlapping levels of the network interactions. The first (cluster) level

includes the network interconnections, formed within the individual industry segments of the multicluster based on the implementation of the related activities and processes by the economic agents (Dritsaki and Adamopoulos, 2005). The second (multicluster) level of the network interactions is represented by the economic relations arising among the diverse economic subjects, belonging to different segments of the multicluster (Liu and Chen, 2004).

The specific nature of the hierarchization and institutionalization within the network structure of the multicluster lies in the leading role of the cluster-forming components: the core of the multicluster formation (the innovation cluster as it is) and the organizations, being the formal/informal leaders within the industry segments of the multicluster and influencing the e development of the segment as a whole (Solvell, 2008). The unity and the interrelation of the segments of the innovative multicluster are ensured by the flows of the resources of various types, optimally distributed within the multicluster formation among the industry segments (Kim et al., 2014).

5. Conclusion

The key essential feature of the innovative multiclusters is the complex two-level structure of the cluster-forming "core", acting as the central system-forming element of the inter-sectoral cluster formation and the independent cluster of the innovation type at the same time. The two-level structure of the multicluster core determines the nature of the processes of the integration of the economic agents into the multi-cluster formation.

The features of the processes of integration of the economic agents are also determined by the presence of the structural intercomponental contradictions and the contradictions caused by the presence of the competition among the economic agents of the multicluster. The main factors of the formation of the set of contradictions among the multicluster agents are: the distribution of the organizational and institutional functions within the domestic environment of the multicluster; the contradictions among the industry segments, the multi-level nature of the set of sectoral interests and strategic goals of the territorial development.

The construction of the dynamic model of development of the institutional environment for each territorial unit can improve the effectiveness of the interactions among the agents-innovators, generating the ideas, the susceptibility of the agents-imitators, distributing and implementing the new technologies, and to extend the participation of the agents-facilitators in the innovative projects, providing the financial and other resources. The flexible network structure of the principal-agent interactions of the economic agents-integrators with the subjects of the innovative business contributes to the effective transformation of the results of basic scientific research into the industrial and managerial innovations, and the innovation into the competitive socio-economic advantages of the territory.

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DETERMINANTS OF INCLUSIVE GROWTH IN IRANIAN REGIONS (SURE APPROACH IN PANEL DATA)

Majid FESHARI
Assistant Professor of Economics, Kharazmi University
majid.feshari@gmail.com

Mojtaba VALIBEIGI
Assistant Professor of Urban Planning, Buein Zahra Technical University

Abstract
The concept of inclusive growth is one of the important issues in the urban economics literature and has been considered in empirical studies recently. For this purpose, the aim of this paper is to investigate the relationship between income inequality and GDP growth in Iranian provinces over the period of 2000-2014. To conduct this study, the econometric model has been estimated by applying seemingly unrelated regression in panel data for 30 Iran's provinces. The main findings of this paper shows that the Gini coefficient as a proxy for income inequality, unemployment rate have negative impact and initial value of Gini coefficient has positive and significant effect on the growth of GDP respectively. The overall conclusion of this study suggests that inequality of Iranian provinces can be declined by improving employment and growth of GDP in Iranian provinces.
Keywords: Inclusive Growth, GDP Growth, SURE Approach, Panel Data
JEL classification: C23:O15:R11

1. Introduction

Inclusive growth is one of the important issues and has been discussed in recent development economics. According to Ali and Zhuang (2007), inclusive growth is growth that not only creates new economic opportunities, but also the one that ensures equal access to the opportunities created for all segments of society, including the disadvantaged and the marginalized. This definition of inclusive growth is very close to the concept of pro-poor growth presented by the OECD-Development Assistance Committee (DAC).

In other definition, Ali and Son (2007) define that inclusive growth depends on average opportunities available to the population and how opportunities are shared among the population. On the other hand, Ali (2007) emphasizes that the inclusive growth policy relies on three anchors, i.e., expanding opportunity, broadening access to opportunity, and social protection that acts as a safety net and a springboard. Asian Development Bank (2007) defines inclusive growth strategy by giving importance of creation of opportunities and expansion of access to it. Rauniyar and Kanbur (2010) suggested that inclusive growth strategy should accompany with reduction of inequality.

On the empirical ground, several studies have examined the main determinants of inclusive growth such as poverty, access to primary and secondary education and other micro or macroeconomics variables. Agrawal (2007) finds that higher growth rates are likely to accompany with more rapid reduction in poverty. Son (2007) explores the relationship between economic growth, income distribution, and poverty for Asian Development Bank (ADB) Developing Member Countries. The results of this study indicates that greater effectiveness of pro-poor policies in countries with higher incomes than in countries with lower incomes and they suggest that inequality-reducing pro-poor policies would be more effective policy, in countries where high inequality persists. In measuring income inequality in the People‟s Republic of China at the national, regional, and provincial levels, Lin et al. (2008) find that income inequality increased significantly during the last two decades. The major sources of the increases in inequality were found to be within urban inequality and between urban and rural inequality. Suryanarayana (2008) has attempted to define the concept and aims at developing measures

of inclusion. Using the broad-based growth process in terms of mean-based averages of income and absolute-norm based measures of deprivation, the tentative estimates indicate that the growth process between 1993-94 and 2004-05 bypassed the majority and was not inclusive. Thorat and Dubey (2012) examines the changes in poverty incidence and monthly per capita expenditure in India by using of National Sample Survey‟s unit record data for three rounds, 1993-94, 2004-05 and 2009-10. They found that some groups benefited more than the others from poverty reduction strategies. In addition, inequality has also begun to adversely affect poverty reduction, particularly in the urban sector.

The review of empirical studies on the inclusive growth literature shows that there is no study on the relationship between inclusive growth and income inequality in the Iranian provinces. Hence, for fill out this gap, the main contribution of this paper is to investigate the nexus between inclusive growth and income inequality for 30 Iranian provinces over the period of 2000-2009. To conduct this study, the econometric model has been estimated by applying seemingly unrelated regression (SURE) for Iran's provinces.

The remainder of the paper is organized as follows:

Section 2, briefly reviews the current literature on the inclusive growth issue. Section 3 presents the model specification and data sources. In Section 4 econometric results of study has analyzed. The final section is concerned with conclusions and policy implications of paper.

2. Review of Literature

The concept of inclusive growth was put forward with people's deeper understanding of poverty. In the process of poverty alleviation and development, we have experienced three phases in understanding of poverty: income poverty, capability poverty and rights poverty. Meanwhile, people have also a deeper understanding of the relationship between economic growth and poverty alleviation. The concept of growth has gone through the evolution from pure emphasis on growth rate, to "pro-poor growth" and "inclusive growth". The core idea of inclusive growth is economic growth on the basis of equality of opportunity, and inclusive growth needs to ensure that everyone has equitable participation and benefit from the growth process. In next section, the content of inclusive growth has been explained.

2.1. Content of inclusive growth

As a new concept, inclusive growth has aroused international attention and recognition, but there is no unified and accepted definition for it yet. From the literature review we found that the definition of inclusive growth is mainly stated from the following three perspectives: First, from the perspective of domestic economic growth and welfare improvement, the inclusive growth is defined as growth in equality of opportunity (Ali, 2007). In this definition, equality of opportunity is the core of inclusive growth, and the inclusive growth emphasizes to create employment and other development opportunities through rapid and sustained economic growth, and to promote social justice and the equality of sharing of growth results by reducing and eliminating inequality of opportunity. Inclusive growth is the economic growth that all people are able to "participate in" and "share" (Tang, 2010). Inclusive growth aims to achieve the following four results: sustainable and equitable growth, social inclusion, empowerment and social security. Meanwhile, rapid and sustainable growth should be based on a wide range of sectors and regions, covering the majority of workforce, the poor and vulnerable groups (Ali and Son, 2007). Second, inclusive growth is defined based on the philosophy of harmonious development of civil society from the perspective of populism and concept of governance.

"Inclusiveness" is the system demand for people's livelihood development and inclusive growth is the coordination of economic growth, population growth and system equity, with significant trend of development towards populism (Xianzhong, 2010). Jieren (2010), however, define inclusive growth from three levels of understanding based on the core concept of China's ruling party: At the level of value, people's interests first is the core of inclusive growth; as for method, legal and policy regulation is the key to achieving inclusive growth; at the technical level, it takes care of more private enterprises and other grass-roots interest subjects.

Third, define inclusive growth from a global perspective. From the domestic perspective, inclusive growth is "broad-based growth". It continuously creates the material wealth for people to live a richer life steadily in order to achieve equitable distribution and increase the proportion of residents' income in national revenue and the proportion of labor remuneration in the initial distribution of income (Du Zhixiong, 2010). Inclusive growth is the harmonious growth and scientific growth; people can all benefit from the growth, especially low-income groups; this development should be conducive to social development, public services and the development of spiritual civilization (Ma Xiaohe, 2010). From the international perspective, inclusive growth is an "open growth". Countries should take care of each other in the economic cooperation and adhere to the principle of mutual benefit and joint development (Du Zhixiong, 2010; Ma Xiaohe, 2010). At the same time, we should invest in trade liberalization and oppose trade protectionism.

It is clear from the above definitions that the concept of inclusive growth has been recognized in various fields, both from the perspective of domestic economic growth, social development or from the perspective of global cooperation. This study primarily evaluates and analyses Iran's provinces inclusive growth in recent years from the perspective of economic growth and social welfare, therefore, it is more inclined to define inclusive growth as the growth of equality of opportunity that covers not only the speed but also the model of economic growth. To achieve inclusive growth, on the one hand, we need to maintain high economic, effective and sustained growth, thereby creating a large number of employment and development opportunities; on the other hand, inclusive growth requires promoting social justice and inclusiveness by reducing and eliminating inequality of opportunity. These two aspects complement each other: there is no chance (employment, education, social security) without economic growth, and if there is no opportunity, equality of opportunity will become castles in the air. Meanwhile, in case of inequality of opportunity and lack of social inclusion, it is impossible to maintain rapid, effective and sustained economic growth.

After the definition of inclusive growth and explain the content of it, in next section, the relationship between economic growth as a proxy for inclusive growth and income distribution in the framework of Kuznets curve has been investigated.

2.2. Determinants of Inclusive Growth

It was in the late 1950s and early 1970s that the growth theories were dominated by Kuznets (1955) and Solow (1956), growth models which depicted the relationship between economic growth, inequality and poverty. The Kuznets' U shaped relationship between income inequality and economic growth in poor countries suggested that economic growth will lead to greater income inequalities, followed by decrease in this inequality provided economy continued to grow; for this continued economic growth countries had to shift from agriculture to industrial sector as there is a little variation in agricultural income as compared to industrial income. According to the framework of Convergence explained by Solow Growth Model, the developing economies contain a tendency to converge to developed economies by maintaining higher levels of growth, forced through equalization of marginal returns of factors of production between developing and developed economies, as the country progresses. Subsequently, Government and International Financial Institutions under this context of "big push" formulated policies of development for infrastructure and capital building projects in the developing countries. By late 1970s and 1980s, the policy prescription from these models were realized as false hope, as neither these poor countries converged with developed countries, and nor income inequality reduced.

With the displacement of Keynesianism and the rise of monetarism and new classical economics, development theory shifted towards the so called phenomena of trickle down proposition. The proponent of "free market" policies this time offered this paradigm for poverty alleviation and better income distribution with strong argument that government intervention was reason of failure. Washington Consensus (WC) type economic policies were prescribed to "operationalize" the trickle down proposition. Dani Roderick explains WC policies as ""Stabilize, Privatize, and Liberalize" became the mantra of a generation of technocrats who cut their teeth in the developing world and of the political leaders they counselled."5 By early 1990s, the prescribed policies were immensely criticised by all spheres

of life and International financial institutions were once again assigned to provide policies to deal with the problem of inequality and poverty reduction. Millennium Development Goals (MDGs) 6 were the new shift from the Washington

Consensus type economic policies, and emerged as pro-poor alternative. However, as we are reaching close to the timeline to achieve the goals set by MDGs, and there is another apparent failure. "The scale of the task of achieving the Millennium Development Goals (MDGs) is daunting. The region is home to more than 900 million poor comprising more than two-thirds of the world's population in extreme poverty."7 (ADB 2010)

In late 1990s, debates about growth and inequalities tended to focus on the concept of pro-growth and macroeconomic stability was disqualified. Mainstream admitted that "Instead, poverty has to be addressed directly through a dedicated set of economic and social tools. The International Financial Institutions also had to confront claims that inequality is harmful because it induces political and economic instability and, in extreme cases, political violence and civil war."8 The two different definition of pro-poor growth (Kakwani, Khandker and

Son, 2004 and Kakwani and Pernia 2000, Baulch and McCullock, 2000, Ravallion, 2004; Ravallion and Chen, 2003, Besley and Cord, 2007, and McKinley, 2009) were presented by Nanak Kakwani and Martin Ravallion. According to Kakwani ""pro-poor growth" means that poverty falls more than it would have if all incomes had grown at the same rate."9 This definition prioritizes the concept of relative improvement in the poor's condition. It advocates the growth that can promote equity, so the criteria for selection of economic policies will be equity; hence all those policies which promote equity are "pro-poor". According to Ravallion ""pro-poor growth" is growth that reduces poverty."10 His definition is in absolute term, which focuses on absolute improvement of living standard of poor, without considering inequality. In this case equity has instrumental value, and it is a non-perverse type of growth.11 So in this case equity will be applied if it can enhance the impact of economic policies which target poverty alleviation ─ as in case of China where growth lead to decrease in the poverty but not to inequality. Both these definitions over time seems similar as both tended to reach on an agreement to reduce the poverty at the maximum level. "And for this goal, they have tended to agree that both faster growth (implying absolute improvements) and greater equity (implying relative Improvements) should be priorities" (MacKinely, 2009, pg. 6). In specifically everyone gains from faster growth, there may be some loss in case of equity promoting growth policies which may cause some political tension and partly 8 Saad-Filho, A. (2010). "Growth, Poverty and Inequality: From Washington Consensus to Inclusive growth".

With the departure of the equity from these debates and rise of definition of absolute pro-poor growth, World Bank and Commission on Growth and Development (CGD)12- Group, described the growth and social development in the following way: "Growth is not an end in itself. But it makes it possible to achieve other important objectives of individuals and societies. It can spare people en masse from poverty and drudgery. Nothing else ever has. It also creates the resources to support health care, education, and the other Millennium Development Goals to which the world has committed itself. In short, we take the view that growth is a necessary, if not sufficient, condition for broader development, enlarging the scope for individuals to be productive and creative."13

The CGD Report 2008, on one hand explains growth in terms of competitive pressure and on the other hand re-iterates the role of government. It explains to address the pressure of competitiveness; the government should liberate the product markets, and remove entry barriers for more productive firms. Surprisingly, it indicated that government should intervene into the labor market for the quick creation of jobs and for worker mobility within the labor market to fill the job.14 Along with the public sector expenditure on the development of Infrastructure and creation of physical and human capital this would crowd-in private investment. World Bank report "What is Inclusive growth?" (World Bank 2009) and CGD Report 2008 mentioned different strategies that governments should adopt for the sustained and steady growth along with commitment of World Bank itself with "Growth Diagnostic" approach.

2.3. Empirical Studies

In the context of inclusive growth and its main determinants, several studies have examined the determinants of inclusive growth such as income inequality. In this section, the main of these studies have been reviewed.

Fritzen (2002) has analyzed the relationship between income inequality and urban growth in the case of Vietnam during the period of 1980-2000. The results of this study indicate that income inequality has led to decrees of urban growth. In other study, Ali and Son (2007) by applying panel data approach have investigated the determinants of inclusive growth in the 10 Asia countries over the 1985-2008. They found that the income inequality and unemployment rate have negative and significant impact on the inclusive growth. Agrawal (2007) by using of Johansen's co-integrating technique has explored the long-run relationship between income inequality and inclusive growth in Ghazaghestan during the 1975-2005. The empirical results of this study indicate that income inequality has negative and significant effect on the inclusive growth in the cities of this country. Son (2007) has analyzed the relationship between income inequality, poverty and inclusive growth in 43 developing countries over the period of 1980-2004. The econometric model in this study has been estimated by 2SLS approach in panel data. The main results of this paper suggest that in the countries with high per capita income, implementing of inclusive growth policies has led to the alleviation of income inequality and poverty. Lin et al (2008) by using of panel data technique have investigated the nexus between income inequality and inclusive growth in China provinces over the period of 1990-2004. They concluded that an increase of income inequality has led to decrease in growth in theses provinces. Pieters (2010) by SAM method has explored the relationship between income inequality and inclusive growth in Indian provinces during the 2003. The results of this study suggest that the growth of industrial sector has led to increase of income inequality. Kundu and Samanta (2011) investigated the relationship between inclusive growth and income inequality in the case of Indian cities over the 1995-2009. The main results of this study show that there is a negative nexus between these variables. In the recent studies, Dubey (2012) and Sabyasachi (2013) showed that income inequality has negative and significant impact on the inclusive growth.

None of these studies has attempted to look at the nexus between income inequality and inclusive growth in Iranian provinces, so the prime objective of this study is to fill out this gap by investigating the relationship between growth of Gini coefficient and GDP growth rate by applying SURE method.

3. Model Specification and Data Collection

In order to evaluate the relationship between income inequality and inclusive growth in the Iranian provinces, according to the economic literature as well as empirical studies by Son (2007) and Sabyasachi (2013), the following model has been specified:

$$\Delta Y_{it} = \alpha_i + \beta_1 I_0 + \beta_2 \Delta I_{it} + \beta_3 UR_{it} + \beta_4 Y_{0it} + \nu_{it} \quad (1)$$

$$\Delta I_{it} = \gamma_i + \alpha_1 I_0 + \alpha_2 \Delta Y_{it} + \alpha_3 \Delta Y_{it} \times I_{0it} + \varepsilon_{it} \quad (2)$$

In above equations, ΔY ،ΔI ،UR are the growth rate of GDP, growth rate of Gini coefficient and unemployment rate. Moreover, Y_0، I_0 و $\Delta Y \times I_0$ represents the initial value of GDP, Gini coefficient and cross effect of GDP growth and initial value of Gini coefficient respectively.

For estimation of these two equations, the data set for above variables has been collected from the statistical center of Iran during the period of 2000-2014.

As discussed in review of literature, the expected sign of coefficients are: $\beta_4 > 0, \beta_1, \beta_2, \beta_3 < 0$ and $\alpha_1 > 0, \alpha_2, \alpha_3 < 0$.

For investigation of relationship between growth rate of income inequality and GDP growth as a proxy for inclusive growth, the econometric model has been estimated by using of seemingly unrelated regression in panel data (SURE). This method is suitable and credible for

estimation of simultaneous equations and for contemporaneous correlation between error terms of equations. In this case, at first the contemporaneous correlation among the error terms of equations has been tested and with confirmation of contemporaneous correlation, the equations have estimated by SURE method.

For the test of contemporaneous correlation between error terms of equations, LM test has been used as follows:

$$LM = T\sum_{i=2}^{M}\sum_{j=1}^{i-1} r_{ij}^2 \qquad (3)$$

In above formula, T and r_{ij} represents the observations and correlation coefficient between error terms of equation i and j.

4. Empirical Results

In this section, the result of model specification has been presented. Before the estimation of model, we can examine the correlation between error terms of equations.

The results of LM test for investigation of contemporaneous correlation has been tabulated in table1.

Table1: The Results of contemporaneous correlation between error terms

LM Statistics (χ^2)	df	PV
26.3	2	0.000

Source: Authors Computations

The results of Table 1 show that the contemporaneous correlation between error terms of equations has been accepted and these two equations should be estimated by SURE approach.

In next step, the results of model estimation for equation (1) and (2) have been presented in table 2.

Table2: The Results of SURE Method for Model Estimation

t-statistics	coefficient	Equation2 (ΔI)	t-statistics	coefficient	Equation1 (ΔY)
5/39	0/39	C	0/78	2/23	C
*8/4	0/05	I_0	*-48/26	-0/82	I_0
*-7/91	-0/16	ΔY	**-2/39	-0/04	ΔI
**-4/48	-0/019	$\Delta Y \times I_0$	**-7/01	-0/18	UR
		---	***1/94	0/34	Y_0
---	70/65	F Statistics	----	818/38	F Statistics
---	0/096	(RMSE)	----	0/077	(RMSE)

*,** and *** represents significance level at 1, 5 and 10%

Source: Authors Computations

According to table2, we can argue that in equation (1), initial value of Gini coefficient has negative effect on the GDP growth rate in Iranian provinces and with 1 percent increase of Gini coefficient in initial year (2000), the growth of GDP has decreased in about of -0.82. The growth rate of Gini coefficient has also negative impact on the growth of GDP in equation1 and one percent increase of this variable has led to 0.04 decreases in GDP growth rate.

In equation1, the unemployment rate has negative impact on the growth of GDP and initial value of GDP has positive and significant effect on the growth rate of Iranian provinces.

In eqution2, the initial value of Gini coefficient has positive effect on the growth of Gini coefficient and growth rate of GDP has negative and significant impact on the income inequality.

The RMSE for these two estimated equations shows that, the RMSE for these equations are 0.077and 0.0.96. Moreover, the value of F statistics for these two equations indicates that the coefficients of variables overall significant at level of 5%.

In other section of paper for investigation of model robustness, the variable of population density (PD) instead of unemployment rate considered in equation1 and these two equations has been estimated by SURE method. Before the estimation of model by SURE approach, contemporaneous correlation between error terms of equations has been examined by LM test statistics. The result of LM test has been showed in table3:

Table3: The Results of contemporaneous correlation between error terms (Robustness Case)

LM Statistics (χ^2)	df	PV
26.68	2	0.000

Source: Authors Computations

The results of Table 3 show that the contemporaneous correlation between error terms of equations has been accepted and these two equations should be estimated by SURE approach. The result of model estimation in this condition has been reported in table 4.

Table4: The Results of Model Robustness

t-statistics	coefficient	Equation2 (ΔI)	t-statistics	coefficient	Equation1 (ΔY)
19.39	0.42	C	0.78	0.89	C
4.*19	0.13	I_0	26.*−9	-0.54	I_0
91.*−7	-0.16	ΔY	-5.23**	-0.12	ΔI
22.**−8	-0.023	$\Delta Y \times I_0$	25.29**−	-0.32	PD
		−−−	1.83***	0.18	Y_0
−−−	58.39	F Statistics	−−−−	98.56	F Statistics
−−−	0.071	(RMSE)	−−−−	0.056	(RMSE)

Source: Authors Computations

The results of model estimation in this case show that the initial value of Gini coefficient has negative impact on the growth of GDP and one increase in this variable caused to decrease of GDP growth rate in Iranian provinces at about of 0.54. In addition, growth rate of Gini coefficient has also negative and significant effect on the GDP growth. Initial value of GDP has positive effect on the growth of GDP and one percent increase of this variable has led to 0.18 increase of GDP growth. In second equation, initial value of Gini coefficient has positive impact on the growth rate of Gini coefficient in current period. The variable of GDP growth has negative and significant effect on the Gini coefficient growth. The coefficient of this variable is estimated at about of 0.16 and one percent increase in growth rate of GDP has resulted to a 0.16 decline in income inequality and poverty.

The cross effect of GDP growth with initial value of Gini coefficient has negative and significant effect on the growth of Gini variable.

The value of RMSE for these two equations is 0.056 and 0.071 respectively. This criteria shows that the error term for these equations is less than of other estimated models.

According to the results of this study, we can conclude that the growth of GDP has negative impact on the Gini coefficient growth and growth of Gini coefficient has also negative and significant impact on the GDP growth. Moreover, initial values of Gini coefficient and GDP have negative and positive impact on the growth of GDP respectively.

The results of this paper in the context of relationship between income inequality and inclusive growth have been consistent with theoretical framework and empirical studies such as Son (2007), Lin (2008) and Sabyasachi (2013).

5. Conclusion and Policy Implications

This paper analyzes empirically the relationship between growth of GDP as a proxy for inclusive growth and Gini coefficient growth rate in Iranian provinces over the period of 2000-2014.

For this purpose, by using of SURE method, the empirical model has been estimated for 30 Iran's provinces.

The main findings of this study reveal that the growth of Gini coefficient, unemployment rate and initial value of Gini coefficient has negative effect on the GDP growth. In addition, the growth of GDP has negative and significant effect on the Gini coefficient. The interaction effect of GDP growth with Gini coefficient has negative effect on the growth of Gini coefficient.

On the base of empirical results in this paper, it can be argued that the increase of population density and unemployment can be resulted to the increase and intensify of income inequality. So, with an increase of population density and unemployment, it can be expected that, the capacity of production declined and as a result the growth of GDP decrease.

With respect to the results of this paper, the main policy implication is that the policy makers should rely on the inclusive growth policies such as social development policies and provide the equal opportunities to the all groups of society.

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INVESTIGATING THE EFFECTS OF FINANCIAL INNOVATIONS ON THE DEMAND FOR MONEY IN MALAYSIA USING THE ARDL APPOACH TO COINTERGRATION

Payam MOHAMMAD ALIHA
Ph.D candidate, National University of Malaysia (UKM), Malaysia
payammaliha@gmail.com

Tamat SARMIDI
Associate Professor Dr. at Faculty of Economics and Management, Universiti Kebangsaan Malaysia (UKM), Malaysia
tamat@ukm.edu.my

Abu Hassan SHAAR
Professor Dr. at Faculty of Economics and Management, Universiti Kebangsaan Malaysia (UKM), Malaysia
ahassan@ukm.edu.my

Fathin FAIZAH SAID
Dr. at Faculty of Economics and Management, Universiti Kebangsaan Malaysia (UKM), Malaysia
fatin@ukm.edu.my

Abstract

Money demand function plays a vital role in monetary policy formulation. Over the years, several countries have experienced growth in financial innovation which has implications for monetary policy. This paper estimates the relationship between financial innovation and money demand in Malaysia with a focus on payment instruments (PI), payment systems (PS) and payment channels (PC) using the ARDL approach to cointegration between 2008 Q1 to 2015 Q4. This paper adopts the bounds testing procedure developed by Pesaran et al. (2001) to test the stability of the long-run money demand and determine the short-run dynamics for Malaysia. The empirical evidence points to the fact that while innovation in the Malaysian financial system have not ruled out the existence of stable long run money demand relationships as attested to by QUSUM Test, they (except for PS) fail to pass the Bound Test meaning that there is no evidence for a long-run association between variables. Therefore, for PI and PC, we cannot proceed to the next step. For PS, the estimated coefficient for the error correction term is not significant which means that there is no adjustment towards long-run equilibrium. In other words, disequilibrium between money demand and independent variables is not corrected over time and it actually diverges rather than converge.

Keywords: Money demand, Financial innovations, Stability, ARDL, Cointegration
JEL classification: C13, C40, C51, E40, E44

1. Introduction

The demand for money function creates a platform to investigate the effectiveness of monetary policies which is crucial for macroeconomic stability. Money demand is an essential indicator of economic growth. The increasing money demand is an indication of growth of the economy, whereas decreasing money demand indicates that the economy is deteriorating. It is important to assume that money demand function is stable for the purpose of conducting monetary policy. This is a crucial assumption as money demand function is used to get inflation rate under control (Owoye and Onafowora, 2007). As discussed above, stable relationship between money and its determinants is a requirement for implementing monetary policy including monitoring and targeting of monetary aggregates. If this is the case (existing a steady and state relationship between money demand and its determinants), the central bank will be able to use monetary policy to affect important macroeconomic variables successfully (Baharumshah, et al. 2009).

In light of the recent growth in financial innovation spanning over the last few decades, there are mixed results with regards to the stability of money demand. Therefore, it has become increasingly important to study the stability of money demand as financial innovation can have potential impact on the demand for money through over estimation of the money demand. Prior to the mid-1970s (before introducing financial innovations) when most empirical results showed a stable money demand, a few variables such as the interest rate and output were sufficient to achieve a stable money demand (Goldfeld and Sichel,1990). With the introduction of the financial innovation, several studies such as Arrau and De Gregorio (1993), Ireland (1995), Attanasio et al (2002), Alvarez and Lippi (2009), Nagayasu (2012), Arrau et al (1995), Mannah-Blankson and Belyne (2004), Hafer and Kutan (2003) and Hye (2009) have attempted to analyze money demand with inclusion of financial innovation.

It is often difficult to measure financial innovation and there are many definitions that capture this definition in the literature. Financial innovations have emerged over time as individuals moved away from holding cash to assets and the use of ATMS, Debit cards, Internet banking, mobile banking, ect. There is still a limited amount of studies that have analyzed the relationship between financial innovation and money demand. Examples of these few studies are those for M. Azali and Kent Mathhews (2001) who model the effect of financial innovation on demand in Malaysia using error correction model and Eu Chye Tan (1997) who conclude that liberalization and innovation in the Malaysian financial system that have not ruled out the existence of stable long run money demand relationships as attested to by the presence of cointegrating vectors, but they render short run relationships unstable.

While most research has yielded great insight to the money demand literature, a vital question that is worth investigating is if the demand for money is still stable given the recent financial innovation developments in Malaysia. Given the limited number of studies on money demand in Malaysia, this paper contributes to the relevant literature by estimating the Malaysian money demand including financial innovation proxies in three different systems: payment instrument (credit card, charge card, debit card, e-money), payment system (RENTAS, Interbank GIRO, FPX and Debit Card) and payment channel (ATM, Mobile Banking, Internet Banking). This study hopes to shed some light on the relationship between these new innovations and money demand one by one. Also, this study is likely to inform policy makers and guide their decision making particularly in terms of monetary policy. The rest of the paper is structured as follows. A review of the theoretical and empirical literature is given in Section 2 followed by methodology including a brief overview of the conventional demand for money and econometric approach in Section 3. Then, Section 4 describes the situation of financial innovation in Malaysia. Section 5 presents the data, the model specification and the results of the estimation and it ends up with summary in section 6.

2. Literature review

There are numerous studies that have examined the stability of money demand particularly in developing countries. The results depend on the data frequency, stability test methods, and the development stage of a country. Some of the studies that used ARDL cointegrating technique for investigating the long run relationship between money demand and its determinants as follow.

Halicioglu and Ugur (2005) examined the stability of the narrow M1 (money demand function) in Turkey. In doing so, they used annual data from 1950 to 2002. They conducted stability test of M1 for Turkish by applying a cointegration procedure (along with CUSUM and CUSUMSQ stability tests) that was proposed by Pesaran et al. (2001). They proved that money demand function was stable and therefore, it could be used as an intermediate target of monetary policy. Using quarterly data for the period 1973-2000, Bahmani & Oskooee and Rehman (2005) estimate money demand for seven Asian countries including India, Indonesia, Malaysia, Pakistan, Philippines, Singapore and Thailand. They used ARDL approach and CUSUM and CUSUMSQ tests. The results indicated that even though real M1 or M2 are cointegrated with their determinants in some Asian countries, the estimated parameters are unstable.

Akinlo (2006) used quarterly data (1970:1–2002:4). They applied ARDL approach along with CUSUM and CUSUMSQ tests, to investigate if money demand (M2) for Nigeria is

cointegrated and stable. The results indicated that M2 was cointegrated with income, interest rate and exchange rate and it was somewhat stable using CUSUM test. Using monthly data over the period 1994:12-2006:12, Samreth (2008) estimated the money demand function for Cambodia. They applied ARDL approach to analyse cointegration property. They showed that there was a cointegrating relationship between M1, Industrial Production Index, Consumer Price Index, and Nominal Exchange Rate in money demand function. A stable money demand function was confirmed using CUSUM and CUSUMSQ tests. Using ARDL approach, Long and Samreth (2008) examined if short and long run monetary models of exchange rate is valid for monetary exchange rate model of the Philippines. The results confirmed that there was both short and long run relationships between variables in the monetary exchange rate model of the Philippines. They also showed that the estimated parameters were stable.

Baharumshah, et al. (2009) studied M2 (the demand for broad money) in China. They applied ARDL approach to cointegration and used quarterly data over the period 1990:4 &2007:2. Bounds test indicated that there was a stable, long-run relationship between M2 and real income, inflation, foreign interest rates and stock prices. Using quarterly data during1990:1-2008:3, Achsani (2010) applied the vector error correction model (VECM) and autoregressive distributed lag (ARDL) approach to examine the M2 money demand for Indonesia. He showed that for the purpose of predicting stable money demand function of Indonesia, the ARDL model is more appropriate compared to VECM. Finally, using monthly data from 1991 to 1998, Claudia Bush (2001) investigated the determinants and the stability of money demand functions in Hungary and Poland by applying an error correction model. The findings indicated that long-run parameters were in line with economic theory. However, on the basis of these findings alone would be premature. She concluded that money demand functions could serve as a useful appropriateness of different strategies for mapping the monetary policy of the surveyed countries.

However, most of these studies failed to account for financial innovation in the money demand specification except for Ndirangu and Nyamongo (2015) who employed the ARDL approach to cointegration for Kenya and used the currency outside banks/time deposit ratio as a proxy for financial development. The current study overcomes this limitation by incorporating financial innovation in the money demand specification using separate measures of payment instruments (credit card, charge card, debit card, e-money), payment channels (RENTAS, Interbank GIRO, FPX and direct debit) and payment channels (ATM, mobile banking, Internet banking) to capture the effect of financial innovations. Prior to the empirical analysis, it is useful to know the main features of the conventional demand for money function that is done in the next section.

The purpose of this paper can be summarized as follow. 1) To examine the empirical relationship between M2 nominal monetary aggregates, nominal income, nominal interest rate and financial innovation using ARDL cointegration model. 2) To determine the stability of M2 money demand function. 3) To examine the long-run stability of the nominal money demand function.

3. Methodology

3.1. Theoretical approach: conventional demand for money function

We start the empirical estimation of money demand functions with introducing the long-run, log linear function that is of the form

$$\text{Log}\left(\frac{M_t^*}{P_t}\right) = \alpha + \beta_1 \log Y_t + \beta_2 R_t + \varepsilon_t$$

Desired stock of nominal money is denoted by M^*, P is the price index that we use to convert nominal balances to real balances, Y is the scale variable, and R is the opportunity cost variable.

The conventional money demand $M^d = (Y_t, R_t)$ is misspecified and leads to the bias that gets into the estimated coefficients. Therefore, it has to be enriched with financial innovation (r*) so that it can be represented implicitly as $M^d = (Y_t, R_t, r^*)$.

3.2. Econometric approach: autoregressive distributed lag (ARDL) models

3.2.1. Definitions

ARDL model was introduced by Pesaran et al. (2001) in order to incorporate I(0) and I(1) variables in same estimation. If the variables are all stationary I(0) then OLS is suitable and if they are all non-stationary I(1) then VECM (Johanson Approach) is recommended. Conventional OLS is not appropriate if at least one variable is I(1). As non-stationary variables change in time so OLS estimates show high t values by mistake as they become inflated due to common time component. In econometric it is called spurious results where R square of the model becomes higher than the Durban Watson Statistic. ARDL is considered a solution to this problem that can handle I(1) variables. Using ARDL model, this section addresses the key question of whether long-run money demand of Malaysia can be influenced by the impact of financial innovation and what are the possible explanations for such strong impacts of financial innovation on the demand for money in this country from 2008 Q1-2015 Q2. Eviews offers powerful time-saving tools for estimating and examining the properties of Autoregressive Distributed Lag (ARDL) models. ARDLs are standard least squares regressions that contain lags of both the dependent variable and independent variables as regressors (Greene, 2008).

ARDL models have become popular method in econometrics as it is able to examine long-run and cointegrating relationships among variables (Pesaran and Shin, 1999). In this section we chose the Autoregressive Distributed Lag (ARDL) modelling approach developed by Pesaran and Pesaran (1997), Pesaran and Smith (1998), and Pesaran et al. (2001). The ARDL has become popular due to a number of advantages compared to other single equation cointegration procedures. It is able to estimate the long and short-run parameters of the model simultaneously yet avoid the problems posed by non-stationary data. Also, there is no need to determine the order of the integration amongst the variables in advance. Other approaches, however, do require that the variables have the same order of integration. In addition, it is statistically much more significant approach for the determination of the cointegration relationship in small samples, while allowing different optimal lags of variables. We show that some proxies for financial innovation do have a positive long run impact on money demand in this sample while others don't. There has been no general consensus over the last several decades about the link between financial innovation and money demand. There is no way to say for sure if this relationship is positive or negative. Recent empirical studies offer contradictory evidence. As a result, the current verdict on the financial innovation-money demand relationship has remained inconclusive.

3.2.2. Background

Specification: An ARDL is a least squares regression containing lags of the dependent and explanatory variables. ARDLs are usually denoted with the notation ARDL $(p, q_1, \dots, q_k)$, where p is the number of lags of the dependent variable, q_1 is the number of lags of the first explanatory variable, and q_k is the number of lags of the kth explanatory variable. An ARDL model may be written as:

$$y_t = \alpha + \sum_{i=1}^{p} \gamma_i y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} X'_{j,t-i} \beta_{j,i} + \epsilon_i$$

Some of the explanatory variables, x_j , may have no lagged terms in the model (q_j=0). These variables are called static or fixed regressors. Explanatory variables with at least one lagged term are called dynamic regressors.

To specify an ARDL model, you must determine how many lags of each variable should be included (i.e. specify p and $q_1, \dots, q_k$). Fortunately simple model selection procedures are available for determining these lag lengths. Since an ARDL model can be estimated via least squares regression, standard Akaike, Schwarz and Hannan-Quinn information criteria may be used for model selection. Alternatively, one could employ the adjusted R^2 from the various least squares regressions.

4. Financial innovations in Malaysia

4.1. Innovations in payment systems in Malaysia

4.1.1. Migration from paper to electronic payments

Migrating from paper-based payments to electronic payments would improve the overall efficiency of the payment system, and provide meaningful cost savings and efficiency to the entire economy. By driving the displacement of cash and cheques through more intensive use of electronic payments, resources involved in manual processing can be redeployed and cost related to cash and cheque handling can be considerably reduced. Electronic payment, which is a more expedient and efficient means of payment, provide the opportunity to improve productivity levels and lower the cost of doing business. Studies have shown that shifting from paper based to a more electronic based payment system can generate an annual savings up to 1% of GDP. Moreover, electronic payments can also enhance financial inclusion by extending financial services to the unbanked communities. In so doing, such communities would be brought into the formal financial system and into the economic mainstream. This would enable them to enjoy lower cost of financial services and better means of savings. The shift to electronic payments is an area in which the quantum leap forward can be made and is essential to the quest to achieve higher economic growth and improve the competitiveness of the economy.

4.1.2. Driving towards electronic payments

Accelerating the country's migration to electronic payments (e-payments) to quicken the pace for the country to realise the resulting cost savings and benefits has become a part of the Bank's agenda to increase the efficiency of the nation's payment systems. To underscore the importance of e-payments and to drive this agenda forward, the Bank has released its Financial Sector Blueprint 2011-2020, which charts the future direction of the financial system over the next ten years. Electronic payment for greater economic efficiency is one of the nine focus areas under the Blueprint to drive Malaysia's transition to a high value-added, high-income economy with adequate safeguards to preserve financial stability. The Bank will work towards accelerating the migration to electronic payments. In the next ten years, the Bank targets to increase the number of e-payment transactions per capita from 44 transactions to 200 transactions, and reduce cheques by more than half from 207 million to 100 million per year. Measures to achieve this aim will include providing the right price signals to encourage the switch from paper-based payments to e-payments, and facilitating wider outreach of e-payments infrastructure, such as point-of-sale terminals and mobile phone banking.

Table 1: Key Performance Indicators

Target by 2020	
E-payment transactions per capita	200
Debit card transactions per capita	30
No. of EFTPOS terminals per 1,000 inhabitant	25
Number of cheques cleared	100 million

Source: Bank Negara Malaysia

4.1.3. Electronic payments on the rise (initiatives and achievements)

Through the collaboration between the Bank and the payments industry, efforts were made to improve and widen the access to the payments infrastructure, identify and remove barriers to greater adoption of electronic payments, and provide the necessary support to ensure the smooth transition to electronic payments. Whilst steps were taken to increase the offering and acceptance of all electronic payment services, particular focus was given in recent years to improving the infrastructure to promote greater use of Internet banking services, positioning the debit card as a convenient substitute for cash and as a more cost efficient payment instrument, as well as facilitating the Government to play a lead role in the migration to electronic payments. These efforts have resulted in many payments which were traditionally made by cash and cheques, being made electronically with plastic cards or through electronic

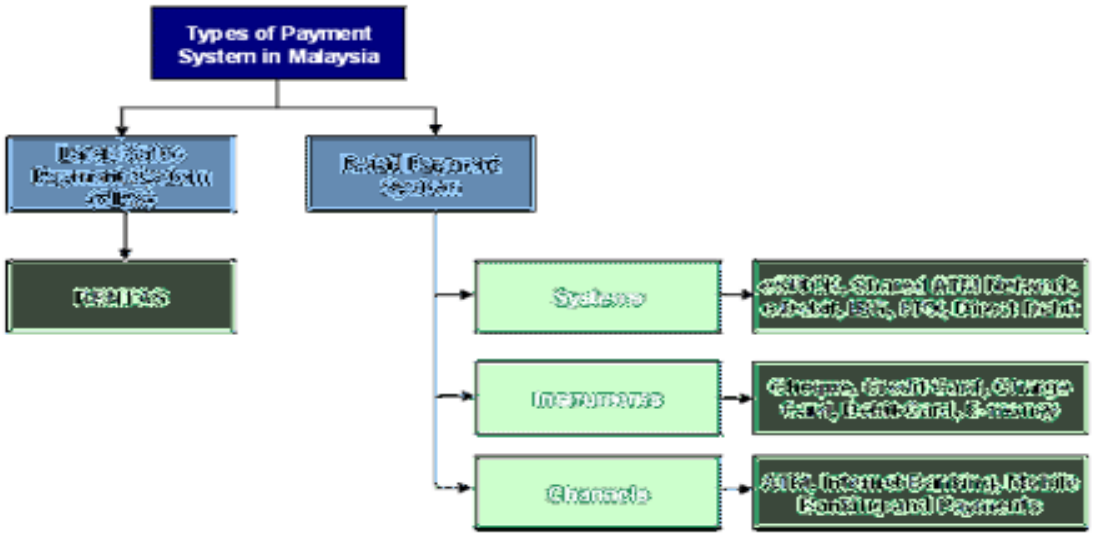
channels. This is demonstrated by the increase in the number of electronic payment transactions made per capita to 56 transactions in 2012 as compared to 14.3 in 2003, and that more than 80% of retail payment transactions are conducted electronically. While the transition to electronic payments will be gradual and may span several years, efforts would be intensified to encourage the public to use electronic payment methods, with more initiatives to be undertaken in the years to come in tandem with advancements in technology.

4.2. Malaysian payment systems

4.2.1. Large value payment system

Payment systems are a vital part of the financial infrastructure of a country. In Malaysia, the large value payment system, RENTAS (Real Time Electronics Transfer of Funds and Securities), which is operated by the Malaysian Electronic Clearing Corporation Sdn. Bhd. (MyClear), a payment subsidiary owned by Bank Negara Malaysia, enables the transfer and settlement of high-value interbank payments and securities. Its failure could contribute to systemic crisis and transmit financial shocks to the financial system. The efficient functioning of RENTAS allows transactions to be completed safely and in a timely manner contributing to overall economic performance. Safe and efficient payment systems are fundamental to promote financial stability, facilitating Bank Negara Malaysia in the conduct of its monetary policy by allowing greater use of market-based instruments to achieve its objectives, while enhancing the efficiency of the financial system and the economy as a whole. Given its importance, the promotion of a secure, safe and efficient payment system is one the main pillars of the Bank.

Figure 1: Payment Systems in Malaysia



Source: Bank Negara Malaysia

4.2.2. Types of retail payment system

In general, the retail payments in Malaysia can be divided into three - Retail Payment Systems, Retail Payment Instruments and Retail Payment Channels. Types of retail payment systems includes: 1) National Electronic Cheque Information Clearing System (eSPICK), 2) Shared ATM Network, Interbank GIRO, 3) Financial Process Exchange, and 4). Types of retail payment instruments includes: 1) Cheques, 2) Credit cards, 3)Charge cards, 4) Debit cards, and 5) E-money. Types of retail payment channels includes: 1) Internet banking, 2) Mobile banking, 3) Mobile payment. InterBank GIRO: The Interbank GIRO (IBG) refers to a payment system that provides funds transfer services amongst its participating financial institutions. Direct Debit: Direct debit, which is operated by MyClear Sdn Bhd, is an interbank collection service for regular and recurring payments enabling automated collection directly from a customer's bank account at multiple banks with a single authorization. Financial Process Exchange: Financial Process Exchange (FPX) is an Internet-based multi-bank payment platform that leverages on the Internet banking services of banking institutions to offer online payment for electronic commerce (e-commerce) transactions.

4.2.3. Types of retail payment instruments

Cheques: A cheque is a paper based payment instrument. It is a form of written order directing a bank to pay money to the beneficiary. Credit Cards: A credit card enables its holder to buy goods and services with a credit line given by credit card issuer and the amount will be settled at a later date. Charge Cards: The functionality of a charge card is similar to a credit card. However, charge card holders must settle their outstanding amount in full by the due date every month. Debit Cards: A debit card is a payment card where the transaction amount is deducted directly from the cardholder's bank account upon authorisation. E-money: E-money is a payment instrument that contains monetary value that has been paid in advance by the user. E-money users can use their e-money to purchase goods and services from merchants. When users pay using e-money, the amount will be automatically deducted from their e-money balance. E-money comes in different forms and can be broadly categorised as card-based and network-based, which are currently accessible via the internet and mobile phones.

4.2.4. Types of retail payment channels

Internet Banking: Internet banking provides a fast and convenient way of performing common banking transactions, such as transferring funds from the customers' saving account to their current account, or even to a third party's account. If you have a computer with Internet access, a web browser and a registered account for Internet banking service from your banking institution, you'll be able to do your banking and payments from the comforts of your home, office, or virtually anywhere else in the world.

Mobile Banking: Mobile banking is similar to Internet banking in that it provides a fast and convenient way of performing common banking transactions. To enjoy the benefits of mobile banking, all you need is a mobile phone that is equipped with the features required by your bank that provides this service. Once you obtained a registered account for mobile banking from your banking institution, you'll be able to do your banking transactions from anywhere that has your mobile telecommunication network coverage.

Mobile Payment: Mobile payment allows you to make payments to selected merchants by using your mobile phones. Bill payments and purchase of goods and services are among the cashless transactions that can be made. To enjoy the benefits of mobile payments, you have to register and open an account with mobile payment service providers. Non-bank mobile payment services are provided using an e-money account (Bank Negara Malaysia).

5. Estimating nominal money demand for FPX and direct debit using ARDL

"ARDL" stands for "Autoregressive-Distributed Lag". Regression models of this type have been in use for decades, but in more recent times they have been shown to provide a very valuable vehicle for testing the presence of long-run relationships between economic time-series. ARDL models can be used to test for cointegration, and estimate long-run and short-run dynamics, even when the variables in question may include a mixture of stationary and non-stationary time-series. In its basic form, an ARDL regression model looks like this:

$$y_t = \beta_0 + \beta_1 y_{t-1} + ... + \beta_p y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + ... + \alpha_q x_{t-q} + \varepsilon_t$$

where ε_t is a random "disturbance" term. The model is "autoregressive", in the sense that y_t is "explained (in part) by lagged values of itself. It also has a "distributed lag" component, in the form of successive lags of the "x" explanatory variable. Sometimes, the current value of x_t itself is excluded from the distributed lag part of the model's structure. Let's describe the model above as being one that is ARDL(p,q), for obvious reasons. Given the presence of lagged values of the dependent variable as regressors, OLS estimation of an ARDL model will yield biased coefficient estimates. If the disturbance term, ε_t, is autocorrelated, the OLS will also be an inconsistent estimator, and in this case Instrumental Variables estimation was generally used in applications of this model. First, recall that the basic form of an ARDL regression model is:

$$y_t = \beta_0 + \beta_1 y_{t-1} + ... + \beta_p y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + ... + \alpha_q x_{t-q} + \varepsilon_t \quad (1)$$

where ε_t is a random "disturbance" term, which we'll assume is "well-behaved" in the usual sense. In particular, it will be serially independent.

We're going to modify this model somewhat for our purposes here. Specifically, we'll work with a mixture of differences and levels of the data. The reasons for this will become apparent as we go along. Let's suppose that we have a set of time-series variables, and we want to model the relationship between them, taking into account any unit roots and/or cointegration associated with the data. First, note that there are three straightforward situations that we're going to put to one side, because they can be dealt with in standard ways: 1) We know that all of the series are I(0), and hence stationary. In this case, we can simply model the data in their levels, using OLS estimation, for example. 2) We know that all of the series are integrated of the same order (e.g., I(1)), but they are not cointegrated. In this case, we can just (appropriately) difference each series, and estimate a standard regression model using OLS. 3) We know that all of the series are integrated of the same order, and they are cointegrated. In this case, we can estimate two types of models: (i) An OLS regression model using the levels of the data. This will provide the long-run equilibrating relationship between the variables. (ii) An error-correction model (ECM), estimated by OLS. This model will represent the short-run dynamics of the relationship between the variables. 4) Now, let's return to the more complicated situation mentioned above. Some of the variables in question may be stationary, some may be I(1) or even fractionally integrated, and there is also the possibility of cointegration among some of the I(1) variables. In other words, things just aren't as "clear cut" as in the three situations noted above.

Therefore, if we want to model the data appropriately and extract both long-run and short-run relationships, we have to use the ARDL model. The ARDL / Bounds Testing methodology of Pesaran and Shin (1999) and Pesaran et al. (2001) has a number of features that many researchers feel give it some advantages over conventional cointegration testing. For instance: 1) It can be used with a mixture of I(0) and I(1) data. 2) It involves just a single-equation set-up, making it simple to implement and interpret. 3) Different variables can be assigned different lag-lengths as they enter the model.

Here are the basic steps that we're going to follow: doing unit root test to make sure none of the variables are I(2), formulating a model with lagged difference and one lagged level of the variables, finding the optimum lag using AIC/SC critarion and estimating the model using this optimum lag, making sure that the errors of this model are serially uncorrelated, making sure that the model is dynamically stable, performing Bound Test to see if there is evidence of a long-run relationship between variables, estimating the long-run model and obtaining the error correction term if the outcome of the previous step is positive, estimating lagged model using this error correction term. In other words, estimate the long-run equilibrium relationship between the variables, making sure that the errors of this model are serially uncorrelated and that the model is dynamically stable, using the results of the model estimated in previous step to measure short-run dynamics effects (testing the causality running from independent variable to dependent variable one by one) and estimating the long-run equilibrating relationship between the variables (or simply long-run coefficients).

We can see from the form of the generic ARDL model given in equation (1) above, that such models are characterised by having lags of the dependent variable, as well as lags (and perhaps the current value) of other variables, as the regressors. Let's suppose that there are three variables that we're interested in modelling: a dependent variable, y, and two other explanatory variables, x_1 and x_2. More generally, there will be (k + 1) variables - a dependent variable, and k other variables. Before we start, let's recall what a conventional ECM for cointegrated data looks like. It would be of the form:

$$\Delta y_t = \beta_0 + \Sigma\beta_i \Delta y_{t-i} + \Sigma\gamma_1 \Delta x_{1t-j} + \Sigma\delta_k \Delta x_{2t-k} + \varphi z_{t-1} + e_t \qquad (2)$$

Here, z, the "error-correction term", is the OLS residuals series from the long-run "cointegrating regression",

$$y_t = \alpha_0 + \alpha_1 x_{1t} + \alpha_2 x_{2t} + v_t \qquad (3)$$

The ranges of summation in (2) are from 1 to p, 0 to q_1, and 0 to q_2 respectively. Now, back to our own analysis:

Step 1: We can use the ADF test to check that none of the series we're working with are I(2).
Step 2: Formulate the following model:

$$\Delta y_t = \beta_0 + \Sigma\beta_i \Delta y_{t-i} + \Sigma\gamma_1 \Delta x_{1t-j} + \Sigma\delta_k \Delta x_{2t-k} + \theta_0 y_{t-1} + \theta_1 x_{1t-1} + \theta_2 x_{2t-1} + e_t \quad (4)$$

Notice that this is almost like a traditional ECM. The difference is that we've now replaced the error-correction term, z_{t-1} with the terms y_{t-1}, x_{1t-1}, and x_{2t-1}. From (3), we can see that the lagged residuals series would be $z_{t-1} = (y_{t-1} - \alpha_0 - \alpha_1 x_{1t-1} - \alpha_2 x_{2t-1})$, where the α's are the OLS estimates of the α's. So, what we're doing in equation (4) is including the same lagged levels as we do in a regular ECM, but we're not restricting their coefficients. This is why we might call equation (4) an "unrestricted ECM", or an "unconstrained ECM". Pesaran et al. (2001) call this a "conditional ECM". Step 3: The ranges of summation in the various terms in (4) are from 1 to p, 0 to q1, and 0 to q2 respectively. We need to select the appropriate values for the maximum lags, p, q1, and q2. Also, note that the "zero lags" on Δx_1 and Δx_2 may not necessarily be needed. Usually, these maximum lags are determined by using one or more of the "information criteria" - AIC, SC (BIC), HQ, etc. These criteria are based on a high log-likelihood value, with a "penalty" for including more lags to achieve this. The form of the penalty varies from one criterion to another. Each criterion starts with 2 lags, and then penalizes, so the smaller the value of an information criterion the better the result. the Schwarz (Bayes) criterion (SC) is generally used, as it's a consistent model-selector. Some care has to be taken not to "over-select" the maximum lags, and one should usually pay some attention to the (apparent) significance of the coefficients in the model as well. Step 4: A key assumption in the ARDL / Bounds Testing methodology of Pesaran et al. (2001) is that the errors of equation (4) must be serially independent. As those authors note (p.308), this requirement may also be influential in our final choice of the maximum lags for the variables in the model. Once an apparently suitable version of (4) has been estimated, we should use the LM test to test the null hypothesis that the errors are serially independent, against the alternative hypothesis that the errors are (either) AR(m) or MA(m), for m = 1, 2, 3,...., etc. Step 5: We have a model with an autoregressive structure, so we have to be sure that the model is "dynamically stable". What we need to do is to check that cumulative sum appearing graphically as the Center line lie strictly between two dotted lines (Lower control limit and Upper control limit). The value of cumulative sum should not exceed these two threshold values to be considered stable. Step 6: Now we're ready to perform the "Bounds Testing" Here's equation (4), again:

$$\Delta y_t = \beta_0 + \Sigma\beta_i \Delta y_{t-i} + \Sigma\gamma_1 \Delta x_{1t-j} + \Sigma\delta_k \Delta x_{2t-k} + \theta_0 y_{t-1} + \theta_1 x_{1t-1} + \theta_2 x_{2t-1} + e_t \quad (4)$$

All that we're going to do is preform an "F-test" of the hypothesis, H_0: $\theta_0 = \theta_1 = \theta_2 = 0$; against the alternative that H_0 is not true. As in conventional cointegration testing, we're testing for the absence of a long-run equilibrium relationship between the variables. This absence coincides with zero coefficients for y_{t-i}, x_{1t-1} and x_{2t-1} in equation (4). A rejection of H_0 implies that we have a long-run relationship. There is a practical difficulty that has to be addressed when we conduct the F-test. The distribution of the test statistic is totally non-standard (and also depends on a "nuisance parameter", the cointegrating rank of the system) even in the asymptotic case where we have an infinitely large sample size. (This is somewhat akin to the situation with the Wald test when we test for Granger non-causality in the presence of non-stationary data. In that case, the problem is resolved by using the Toda-Yamamoto (1995) procedure, to ensure that the Wald test statistic is asymptotically chi-square). Exact critical values for the F-test aren't available for an arbitrary mix of I(0) and I(1) variables. However, Pesaran et al. (2001) supply bounds on the critical values for the asymptotic distribution of the F-statistic. For various situations (e.g., different numbers of variables, (k + 1)), they give lower and upper bounds on the critical values. In each case, the lower bound is based on the assumption that all of the variables are I(0), and the upper bound is based on the assumption that all of the variables are I(1). In fact, the truth may be somewhere in between these two polar extremes. If the computed F-statistic falls below the lower bound we would conclude that the variables are I(0), so no cointegration is possible, by definition. If the F-

statistic exceeds the upper bound, we conclude that we have cointegration. Finally, if the F-statistic falls between the bounds, the test is inconclusive.

This reminds us of the old Durbin-Watson test for serial independence. As a cross-check, we should also perform a "Bounds t-test" of H_0 : θ = 0, against H_1: θ < 0. If the t-statistic for y_{t-1} in equation (10) is greater than the "I(1) bound" tabulated by Pesaran et al. (2001; pp.303-304), this would support the conclusion that there is a long-run relationship between the variables. If the t-statistic is less than the "I(0) bound", we'd conclude that the data are all stationary. Step 7: Assuming that the bounds test leads to the conclusion of cointegration, we can meaningfully estimate the long-run equilibrium relationship between the variables:

$$y_t = \alpha_0 + \alpha_1 x_{1t} + \alpha_2 x_{2t} + v_t \quad (5)$$

as well as the usual ECM:

$$\Delta y_t = \beta_0 + \Sigma\beta_i \Delta y_{t-i} + \Sigma\gamma_1 \Delta x_{1t-j} + \Sigma\delta_k \Delta x_{2t-k} + \varphi z_{t-1} + e_t \quad (6)$$

where $z_{t-1} = (y_{t-1} - \alpha_0 - \alpha_1 x_{1t-1} - \alpha_2 x_{2t-1})$, and the a's are the OLS estimates of the α's in (5).

Step 8: We can "extract" long-run effects from the unrestricted ECM. Looking back at equation (4), and noting that at a long-run equilibrium, $\Delta y_t = 0$, $\Delta x_{1t} = \Delta x_{2t} = 0$, we see that the long-run coefficients for x_1 and x_2 are $-(\theta_1/\theta_0)$ and $-(\theta_2/\theta_0)$ respectively. Step 9 involve obtaining long-run coefficients and step 10 involves testing short-run causality.

The empirical model

In estimating the effect of financial innovation (technology payments) proxied by the value of transactions of payment instruments on the demand for money, we estimate a semi log-linear specification of the form:

$$\text{Log LMOD} = \beta_0 + \beta_1 \text{Log LGDP} + \beta_2 \text{ INR} + \beta_3 \text{Log (LCRC)} + \beta_4 \text{Log (LCHC)} + \beta_5 \text{Log (LDEC)} + \beta_6 \text{Log (LEMO)} + e_t$$

We use a traditional specification of the conventional demand for money using ARDL, where MOD denotes currency in circulation, GDP denotes nominal gross domestic product, INR is the interest rate, CRC is the nominal value of credit cards transactions, CHC is the nominal value of charge cards transactions, DEC is the nominal value of debit cards transactions, EMO is the nominal value of E-money transactions (all in million Ringgits, and in logarithm form) and e_t is the error term. The data are quarterly, from 2008(Q1) to 2015(Q4). In terms of the notation that was introduced earlier, we have (k + 1) = 7 variables, so k = 6 when it comes to the bounds testing.

Table 2: Probability of the estimated coefficients of the level and the difference of the variables for payment instrument model

Level	LMOD	LGDP	INR	LCRC	LCHC	LDEC	LEMO
Prob	0.3867	0.4495	0.0293	0.4384	0.2949	0.3506	0.8635
FirstD	D(LMOD)	D(LGDP)	D(INR)	D(LCRC)	D(LCHC)	D(LDEC)	D(LEMO)
Prob	0.0081	0.0017	0.0002	0.0489	0.0001	0.0006	0.0000

To complete step 1, we need to check that neither of our time-series are I(2). Applying the ADF test to the levels and the first-differences of the series, the p-values are shown in table above. Clearly, neither series is I(2). All of the series except INR are I(1). INR is I(0). This is a great illustration of how the ARDL / Bounds Testing methodology can help. In order for standard cointegration testing (such as that of Engle and Granger, or Johansen) to make any sense, we must be really sure that all of the series are integrated of the same order. In this instance, we might not be feeling totally sure that this is the case. Step 2 is straightforward. We need to formulate an unrestricted ECM with different lags. Step 3 is to check AIC and SIC criterion and choose the one with lowest value of AIC and SIC. However, regarding the limited number of our observations which is only 32, estimating the model with more than 2 lags is not possible so we estimate using 2 lags as below: D(LMOD) C D(LMOD(-2)) D(LGDP(-1)) D(LGDP(-2)) D(INR(-1)) D(INR(-2)) D(LCRC(-1)) D(LCRC(-2)) D(LCHC(-1)) D(LCHC(-2)) D(LDEC(-1)) D(LDEC(-2)) D(LEMO(-1)) D(LEMO(-2)) LMOD(-1) LGDP(-1) INR(-1) LCRC(-1) LCHC(-1) LDEC(-1) LEMO(-1)

Table 3: Estimation output of step 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.502256	2.421808	-0.207389	0.8409
D(LMOD(-2))	0.063157	0.350249	0.180320	0.8614
D(LGDP(-1))	0.117270	0.136149	0.861332	0.4141
D(LGDP(-2))	-0.106425	0.143639	-0.740920	0.4799
D(INR(-1))	0.039280	0.020009	1.963081	0.0853
D(INR(-2))	-0.022100	0.017368	-1.272471	0.2389
D(LCRC(-1))	-0.158747	0.192825	-0.823268	0.4342
D(LCRC(-2))	0.097044	0.147745	0.656836	0.5297
D(LCHC(-1))	-0.060534	0.055468	-1.091345	0.3069
D(LCHC(-2))	-0.039376	0.042223	-0.932582	0.3783
D(LDEC(-1))	0.041053	0.091191	0.450190	0.6645
D(LDEC(-2))	-0.055927	0.071079	-0.786830	0.4541
D(LEMO(-1))	-0.024363	0.055608	-0.438114	0.6729
D(LEMO(-2))	0.009939	0.049861	0.199339	0.8470
LMOD(-1)	-0.156976	0.175879	-0.892519	0.3982
LGDP(-1)	0.006182	0.154409	0.040036	0.9690
INR(-1)	0.006189	0.019755	0.313262	0.7621
LCRC(-1)	0.236932	0.179591	1.319284	0.2236
LCHC(-1)	0.078937	0.071483	1.104275	0.3016
LDEC(-1)	-0.089274	0.044499	-2.006226	0.0797
LEMO(-1)	0.052048	0.066015	0.788433	0.4532

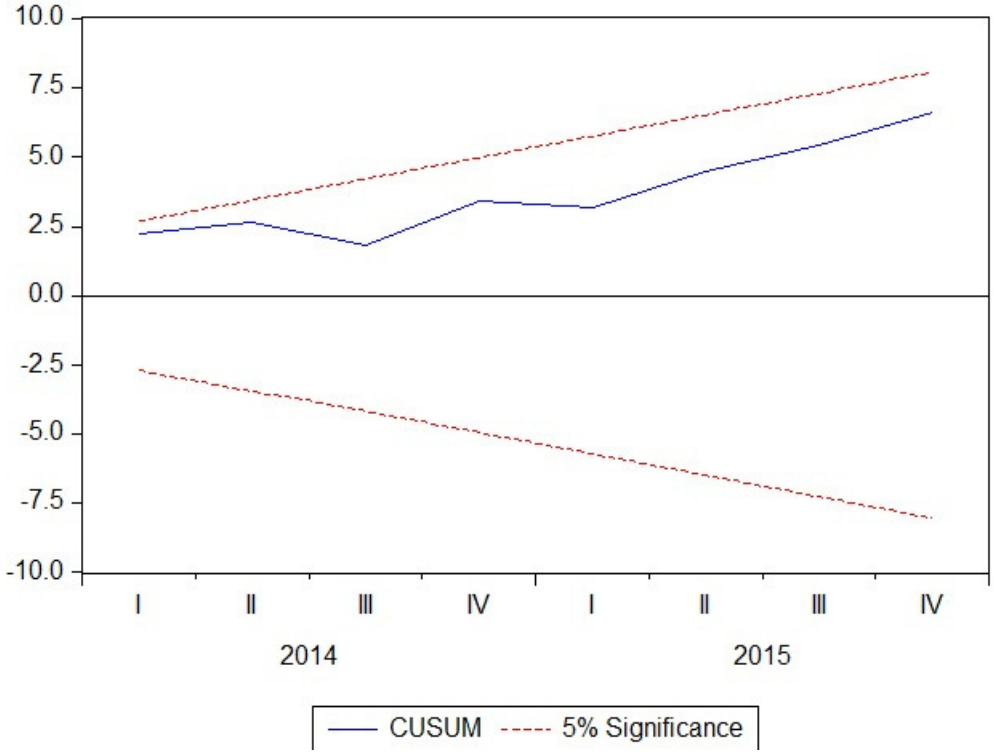
Step 4 involves checking that the errors of this model are serially independent.

Table 4: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.602625	Prob. F(2,6)	0.5774
Obs*R-squared	4.850939	Prob. Chi-Square(2)	0.0884

According to the result, we do not have a problem with serial correlation. Next, Step 5 involves checking the dynamic stability of this ARDL model. We use QUSUM Test for this purpose.

Figure 2: COSUM Test



It seems to be well as the plotted line is entirely between the two dotted lines meaning that money demand is stable. Step 6 is the Bounds Test itself. We want to test if the coefficients of laged dependent and independent variables are zero in our estimated model so we use Wald Test:

Table 5: Wald Test [Null Hypothesis: C(15)=C(16)=C(17)=C(18)=C(19)=C(20) =C(21)=0]

Test Statistic	Value	df	Probability
F-statistic	1.488594	(7, 8)	0.2936
Chi-square	10.42016	7	0.1660

Table CI (iii) on p.300 of Pesaran et al. (2001) is the relevant table for us to use here. We haven't constrained the intercept of our model, and there is no linear trend term included in the ECM. F-statistics should be compared with Pesaran critical value at 5 percent level with unrestricted intercept and no trend. According to Pesaran table, lower bound is 2.45 and upper bound is 3.61

Regarding the fact that F-statistics is less than the upper bound, we cannot reject the null hypothesis so the variables including dependent variables and independent variables do not have long-run relationship. In other words, they do not move together in the long-run. Therefore, it not recommended proceeding further. In spite of this, we move to the next step to obtain the coefficient of the error correction term to determine the speed of adjustment. In step 7, we estimate the long-run model to obtain the residuals:

Table 6: Estimation output of step 7

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.04408	2.018956	6.956107	0.0000
LGDP	-0.049057	0.181057	-0.270946	0.7887
INR	0.018856	0.021698	0.869043	0.3931
LCRC	-0.258364	0.184695	-1.398869	0.1741
LCHC	0.017069	0.082962	0.205745	0.8387
LDEC	0.245973	0.055295	4.448356	0.0002
LEMO	0.166434	0.084686	1.965308	0.0606

In step 8, after we estimate the levels model above by OLS, and construct the residuals series, (ect), we can fit a regular (restricted) ECM. However, the estimated model shows the evidence of serial correlation so we fit a model by omitting D(LMOD(-1)) and obtain:

Table 7: Estimation output of step 7

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.018654	0.004587	4.067030	0.0012
D(LMOD(-2))	0.522730	0.206935	2.526065	0.0242
D(LGDP(-1))	-0.017299	0.067030	-0.258086	0.8001
D(LGDP(-2))	-0.259048	0.100837	-2.568981	0.0223
D(INR(-1))	0.055257	0.017685	3.124493	0.0075
D(INR(-2))	-0.037984	0.012618	-3.010374	0.0094
D(LCRC(-1))	0.213378	0.069288	3.079597	0.0082
D(LCRC(-2))	0.396914	0.090306	4.395198	0.0006
D(LCHC(-1))	0.053683	0.033409	1.606846	0.1304
D(LCHC(-2))	-0.007567	0.031089	-0.243412	0.8112
D(LDEC(-1))	-0.098027	0.044063	-2.224716	0.0431
D(LDEC(-2))	-0.169954	0.042650	-3.984875	0.0014
D(LEMO(-1))	0.023012	0.034738	0.662433	0.5185
D(LEMO(-2))	0.065101	0.033026	1.971197	0.0688
ECT(-1)	-0.022732	0.104548	-0.217429	0.8310

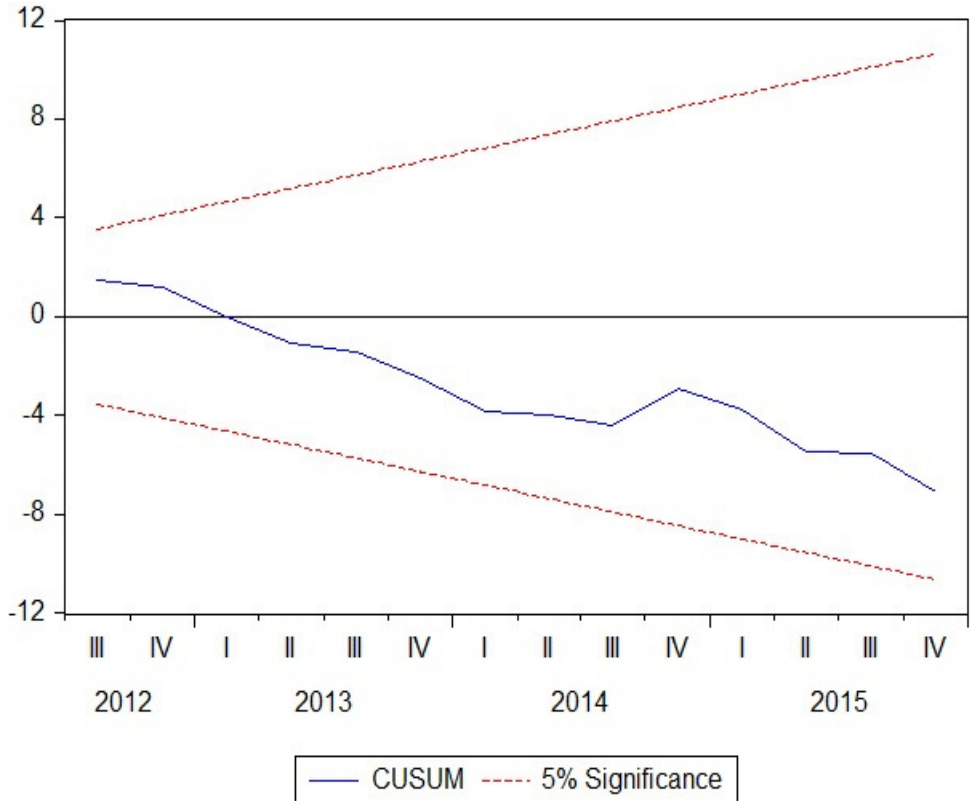
Now, we check again for the serial correlation and stability as below:

Table 8: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.033407	Prob. F(2,12)	0.9672
Obs*R-squared	0.160574	Prob. Chi-Square(2)	0.9229

According to LM Test, there is no evidence of serial correlation. Then we check for the stability:

Figure 3: COSUM Test



Fortunately, this final ECM is dynamically stable. Notice that the coefficient of the error-correction term, ECT(-1) which is one lagged ECT, is negative but not significant. If there was cointegration between MOD (money demand) and independent variables, we would expect a negative and significant one. The magnitude of this coefficient implies that nearly 2% of any disequilibrium between MOD and independent variables is corrected within one period (one quarter). Finally, the within-sample fit (in terms of the levels of MOD) is exceptionally good. In step7, long-run coefficients can be obtained from the estimated coefficients above by dividing the coefficients of the lagged independent variables by the coefficient of the lagged dependent variable, for example, an increase of 1 percent in EMO (E-money) will lead to an increase of 0.33 percent [-(0.052048/-0.156976)= -0.33157] in money demand:

Table 9: Long-run coefficients

Financial innovations variables	Long-run coefficients
CRC	1.5
CHC	0.5
DEC	-0.5
EMO	0.3

The last step involves testing short-run causality running from each of the independent variables to dependent variable. In doing so, we conduct Wald test:

Table 10: Short-run causality

Variables	F-statistic	Chi-square	Short-run causality
GDP	0.0669	0.0369	Yes
INR	0.0104	0.0016	Yes
CRC	0.0017	0.0000	Yes
CHC	0.2889	0.2570	No
DEC	0.0027	0.0001	Yes
EMO	0.1800	0.1432	No

After estimating money demand with the inclusion of payment instruments as a proxy for financial innovation, we did repeat the same process for estimating money demand with payment systems and payment channels. The model for payment systems is:

$$\text{Log LMD} = \beta_0 + \beta_1 \text{Log LGDP} + \beta_2 \text{ IR} + \beta_4 \text{Log (LRE)} + \beta_5 \text{Log (LIG)} + \beta_6 \text{Log (LFD)} + e_t$$

We use a traditional specification of the conventional demand for money using ARDL, where MD denotes currency in circulation, GDP denotes nominal gross domestic product, IR is the interest rate, RE is the nominal value of RENTAS transactions, IG is the nominal value of Interbank GIRO transactions, FD is the nominal value of FPX and Direct Debit transactions (all in million Ringgits, and in logarithm form) and e_t is the error term. The data are quarterly, from 2008(Q1) to 2015(Q4). The model for payment channels is:

$$\text{Log LMD} = \beta_0 + \beta_1 \text{Log LGDP} + \beta_2 \text{ IR} + \beta_4 \text{Log (LATM)} + \beta_5 \text{Log (LMB)} + \beta_6 \text{Log (LIB)} + e_t$$

Where We use a traditional specification of the conventional demand for money using ARDL, where MD denotes currency in circulation, GDP denotes nominal gross domestic product, IR is the interest rate, ATM is the nominal value of ATM transactions, MB is the nominal value of Mobile Banking transactions, IB is the nominal value of Internet Banking transactions (all in million Ringgits, and in logarithm form) and e_t is the error term. The data are quarterly, from 2008(Q1) to 2015(Q4). In table below, we sum up the results of the ARDL estimation of all of these three cases for comparison.

Table 11: Summary of the results

Tests	Breusch-Godfrey Serial Correlation LM Test (prob)	Normality Test (prob)	Heteroskedasticity Test: Breusch-Pagan-Godfrey (prob)	Stability Test (CUSUM Test)	Bound Test: Test of the Existence of long-run association	Adjustment toward long-run equilibrium (ECT and its prob)
PI	0.0884	0.6045	0.7604	stable	no	-0.0227 (0.8310)
PS	0.1964	0.8756	0.3912	stable	yes	-0.1841 (0.0954)
PC	0.0577	0.0350	0.9253	stable	no	-0.1454 (0.5298)

To test for short run causality, we use Wald Test to find out if the coefficients of the lagged variables are jointly equal to zero or not. For PI: There is short run causality running from GDP, interest rate, debit cards and E-money to money demand, however, there is no short run causality running from credit cards and charge cards to money demand. For PS: There is short run causality running from interest rate, RENTAS and FPX and Direct Debit to money demand, however, there is no short run causality running from GDP and Interbank GIRO to money demand. For PC: There is short run causality running from interest rate,

ATM, Mobile Banking and Internet Banking to money demand, however, there is no short run causality running from GDP to money demand.

Table 12: Long-run coefficients

PI Variables	PI Long-run coefficients	PS Variables	PS Long-run coefficients	PC Variables	PC Long-run coefficients
GDP	0.03	GDP	0.21	GDP	1.02
INR	0.03	IR	0.06	IR	-0.03
CRC	1.50	RE	0.21	ATM	0.47
CHC	0.50	IG	-0.24	MB	-0.003
DEC	-0.56	FD	0.21	IB	-0.005
EMO	0.33				

According to the table that is obtained by dividing the coefficients of the lagged independent variables by the coefficient of the lagged dependent variable, for example, an increase of 1 percent in GDP will lead to an increase of 0.03 percent in money demand for PI.

Table 13: Existence of short-run causality

PI Variables	PI Short-run causality	PS Variables	PS Short-run causality	PC Variables	PC Short-run causality
GDP	Yes	GDP	No	GDP	No
INR	Yes	IR	Yes	IR	Yes
CRC	No	RE	Yes	ATM	Yes
CHC	No	IG	No	MB	Yes
DEC	Yes	FD	Yes	IB	Yes
EMO	Yes				

6. Summary

Both long and short run nominal money demand functions of Malaysia with money defined as M2 have been estimated using ARDL approach to cointegration technique. The period under review is 2008Q1–2015Q4. While innovation in the Malaysian financial system have not ruled out the existence of stable long run money demand relationships as attested to by QUSUM Test, they (except for PS) fail to pass the Bound Test meaning that there is no evidence for a long-run association between variables. Asymptotic critical value bounds for the F-statistic are used as criteria to test the existence of a levels relationship. I(0) and I(1), that is, lower bound and upper bound for unrestricted intercept and no trend at the significance level of 0.050 are compared to F-statistic from Wald Test. F-statistic is less than the upper bound in two of the three cases (PI and PC) so we cannot reject the null hypothesis meaning that the variables (dependent variable and independent variables) do not have long-run association. In other words, these variables not move together in the long-run rather they diverge instead of converge. For PS, the estimated coefficient for the error correction term is not significant which means that there is no adjustment towards long-run equilibrium. In other words, disequilibrium between money demand and independent variables is not corrected over time and it actually diverges rather than converge.

Table 14: Data used in the regression analysis (RM million)

					PI				PS			PC		
Year	Quarters	M2	GDP	IR	credit card	charge card	debit card	e-money	RENTAS	Interbank GIRO	FPX and Direct Debit	ATM	Mobile Banking	Internet Banking
2008	1Q	843244.38	182202.00	3.37	15312.89	593.78	401.68	424.45	8397753.07	19746.29	179.17	55424.70	11.81	124766.17
	2Q	868007.30	195021.00	3.44	15798.05	678.57	459.11	504.95	9755270.44	21110.91	233.27	56269.89	15.66	187027.76
	3Q	883547.20	205404.00	3.43	17035.72	865.82	547.62	550.55	11075347.05	24254.73	290.45	63509.23	23.09	165952.46
	4Q	903429.71	187321.00	3.31	17142.51	921.81	549.99	587.13	9515799.34	24507.56	329.17	60177.32	20.99	146615.70
2009	1Q	921831.48	165315.00	2.38	16217.48	914.56	548.07	477.02	8489873.98	23449.34	370.08	61228.13	29.78	144879.71
	2Q	922616.86	169790.00	1.90	16709.52	885.41	606.93	535.08	9373649.41	26092.80	413.94	62065.58	29.97	162901.21
	3Q	950412.62	182766.00	1.96	17566.51	952.50	729.86	556.33	9541217.11	28260.27	541.20	66428.56	38.30	180987.85
	4Q	989342.89	194986.00	1.98	18827.11	1063.40	889.07	632.96	9854160.74	31045.17	680.99	66263.15	42.83	213275.78
2010	1Q	1002708.23	196650.00	2.11	19002.98	1029.92	1094.99	550.54	10178561.90	28689.20	788.07	68393.41	36.35	297068.72
	2Q	1007317.93	199372.00	2.59	19341.08	1200.16	1099.73	700.62	9659840.98	30247.86	985.25	69040.29	32.37	323274.16
	3Q	1028850.56	207460.00	2.83	19919.74	1199.17	1207.84	737.47	9739698.40	32314.77	1062.54	72322.42	25.78	
	4Q	1060153.58	217953.00	2.85	21546.32	1259.28	1301.23	719.73	9856452.68	35617.76	1248.02	76838.14	43.37	407242.62
2011	1Q	1088617.28	218298.00	2.83	21034.71	1265.33	1395.23	807.81	10192778.33	35806.28	1306.87	76570.35	69.91	419676.86
	2Q	1132071.24	224055.00	2.91	21765.71	1307.24	1481.07	872.25	12833859.95	38651.70	1187.08	79801.15	112.81	474165.17
	3Q	1162582.03	231335.00	2.98	22299.00	1366.95	1625.95	912.16	12338998.82	42875.08	1331.02	80172.01	220.62	494361.65
	4Q	1214390.28	238045.00	2.98	23697.30	1448.05	1753.58	885.05	11809959.73	48808.20	1625.97	80224.52	448.79	546004.30
2012	1Q	1254562.76	234956.00	3.00	22632.55	1553.75	1902.03	909.26	12131484.14	47602.93	1913.81	81538.45	770.77	704859.03
	2Q	1285864.19	239607.00	3.05	23055.52	1633.21	2058.97	1017.52	11322846.88	51149.86	2151.85	84411.98	971.38	681230.35
	3Q	1313763.72	245203.00	3.04	23419.33	1625.28	2247.50	1114.08	11676469.92	53173.69	2314.09	88885.29	1134.32	732025.18
	4Q	1330788.24	251485.00	3.05	24977.48	1646.27	2410.22	1203.06	11038616.65	59733.29	2690.03	80263.76	1360.17	860320.02
2013	1Q	1373101.64	241870.00	3.04	23638.75	1700.19	2561.20	1168.49	10912807.19	60742.76	2776.63	80508.77	1752.58	1168.49
	2Q	1400408.00	245107.00	2.99	24170.79	1778.08	2768.83	1214.19	12089176.05	66723.52	3040.15	81057.17	2098.81	881246.39
	3Q	1416222.29	258334.00	2.98	25163.99	1853.21	2953.03	1232.19	11695463.53	73598.32	3237.47	83647.53	2462.48	864208.93
	4Q	1436451.85	273510.00	2.98	26759.39	1891.58	3170.60	1303.93	11740296.74	84202.59	3569.92	85485.67	2928.85	883850.23
2014	1Q	1459864.10	266114.00	2.97	25138.84	1984.58	3344.62	1240.00	11645276.83	91777.52	3985.97	86009.55	3206.63	1032294.93
	2Q	1479547.48	272267.00	2.99	25911.22	2354.95	3539.42	1309.76	12710784.44	103982.45	4606.66	85762.55	3457.96	996441.76
	3Q	1492807.26	278828.00	3.19	26296.29	2106.33	3690.63	1352.09	12739841.26	112160.75	4991.51	98685.25	3963.34	1023451.51
	4Q	1544657.38	289371.00	3.35	28151.82	2115.71	4212.03	1382.41	12031491.62	124616.11	5403.54	99358.77	4049.55	1056082.59
2015	1Q	1583570.81	277207.00	3.21	28829.41	2075.14	5015.81	1384.23	11969318.05	142340.32	5479.19	102638.63	4545.26	1146949.01
	2Q	1575139.00	283244.00	2.95	26405.41	2158.52	4718.63	1391.43	13460472.23	153609.21	6806.44	100090.94	4595.18	1180157.02
	3Q	1574467.45	292580.00	3.17	27438.84	2218.48	4908.03	1509.74	13771048.99	164105.52	7279.95	101923.74	5301.21	1151928.81
	4Q	1589204.16	303849.00	3.11	30001.03	2448.47	5314.54	1709.60	14369655.05	176509.98	8347.63	108245.69	6123.27	

Source: Bank Negara Malaysia

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ECONOMIC CONTAGION UNDER UNCERTAINTY: CGE WITH A MONTE CARLO EXPERIMENT

Hiroshi SAKAMOTO[♦]
Dr. Research Associate Professor Asian Growth Research Institute (AGI) 11-4 Otemachi, Kokurakita, Kitakyushu, 803-0814 JAPAN Tel: +81 93 583 6202; Fax: +81 93 583 4602
sakamoto@agi.or.jp

Abstract

Economic contagion is increasingly felt as economic interdependence deepens in today's economy. This study quantitatively investigates how economic shocks of a certain country influence a different country. Usually, a positive shock has a positive influence, and a negative shock has a negative influence. For instance, the monetary crisis of Europe affected the Asian economy as well as the economy of Europe itself. The Chinese economy, which recently accomplished the most remarkable economic growth in the Asian region, has also declined in rates of growth, and has become a risk factor for the global economy. The downturn of the economy in regions with economic power may have a negative influence on the economy of other countries. Under such circumstances, this study quantitatively analyzes the economic shock influence of a certain country to other countries, at the same time there is a possibility of influence to the opposite direction supposing the economic shock occurs under uncertainty. The model employed in the study uses the general algebraic modeling system (GAMS), it uses the global trade analysis project (GTAP) database, which is compiled as a computable general equilibrium (CGE) model using multiple countries' data. Moreover, this database is constantly updated to a recent year to feature more realistic knowledge. Furthermore, this study uses the Monte Carlo experiment to model uncertainty. This is realizable by adding the random number of a normal distribution to the exogenous variables of the model.

Keywords: Economic Contagion, Multi-country Computable General Equilibrium Model, Monte Carlo Experiment

JEL classification: C15, C68, D58, O53, R13

1. Introduction

The global economy has thrived remarkably because of globalization. However, the development of the global economy has recently met a crossroads. The holdup is the considerable influence of economic growth from one economy to other countries. If one representative country's economic growth is high, it will not be a problem. However, if its economic growth stops, growth of the other countries may start to decrease. The global economy has experienced big crises in the past, but all crises after 1990 met the global economy without causing havoc to the global economy. For example, the 1997 Asian financial crisis, the subprime mortgage crisis, the Greek bond crisis, and the European sovereign debt crisis, and so on. The word "contagion" started to be used to refer to these phenomena around the 1990s.

Contagion is defined as "the spread of market changes or disturbances from one regional market to others. Contagion can refer to the diffusion of either economic booms or economic crises throughout a geographic region" (*Investopedia*, 2016). Economic contagion is increasingly watched as economic interdependence deepens. In its definition, a positive shock has a positive influence, and a negative shock has a negative influence. For instance, the

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monetary crisis of Europe affected the Asian economy as well as the economy of Europe itself. The Chinese economy, which accomplished the most remarkable economic growth in the Asian region, has also recently waned in rates of growth. Interdependence is also one of the reasons of the downturn of the economy in Europe. Likewise, the downturn of China's domestic economy may also be considered. Moreover, the downturn of the economy of a region with economic power may have a negative influence on the economy of other countries. Lately, the United Kingdom decided to leave the EU in a plebiscite. The flounder of the Chinese economy is thought to be more severe than the official statistical publications, and while the world is confused, the politicians' introverted-oriented remarks are valued by some countries. The current state of affairs may be a trial for keeping up globalization. It can also be said, that the global economy's uncertainty of the future is rising by these phenomena.

Obviously, it may not become a contagion. Even if a country suffers a negative shock, others may not be affected. Such situations are known as a decoupling.[1] This study quantitatively investigates to what magnitude the economic shock of a certain country should affect a different country, and mentions the possibility of whether it will be a contagion or a decoupling. Concerning the methodology, this study adopts a multi-country computable general equilibrium (CGE) model instead of using an econometric model. The empirical literature on testing for contagion (especially financial contagion) has focused on increases in the correlation of returns between markets during periods of crisis. In this case, the vector autoregression (VAR) model is predominantly used to measure contagion. However, to estimate a VAR model, a sufficient time series sample is required. Moreover, the estimated result cannot necessarily judge whether it is a contagion or not.[2] Then, it is the purpose of this research to propose another method.

Several studies of contagion focus mainly on the financial market (therefore it will be called "financial contagion"). On the other hand, the CGE model estimates economic contagion through international trade by adding the number of handled goods (this model does not deal with the financial market). It is almost entirely different from former studies on this subject. The global trade analysis project (GTAP) model is widely used all over the world as a multi-country CGE model.[3] The CGE model is built on the data of a specific year, and the GTAP model is not an exception. However, the base year is updated every so often. Additionally, the GTAP model can also compute various countries (regions) and custom industries. Therefore, if this model is used, the influence of contagion can be investigated in many countries at the same time.

As another feature of this study, the uncertain situation of an economy is assumed. When seeing the world's situation nowadays, you can find out that uncertainty to the future is high. Hence, if an economic forecast is also considered uncertain, it is desirable. This study adopts the Monte Carlo experiment to consider the uncertainty about an economic fluctuation.[4] Because distribution of changes occur with other variables subject to uncertainty, the possibility of a wider economic fluctuation can be considered. Furthermore, when judging whether it shows economic propagation, the direction of change of other variables (here positive or negative rates) is important. Therefore, it is possible to explore the robustness of the direction of change by simulating uncertainty of the variables.

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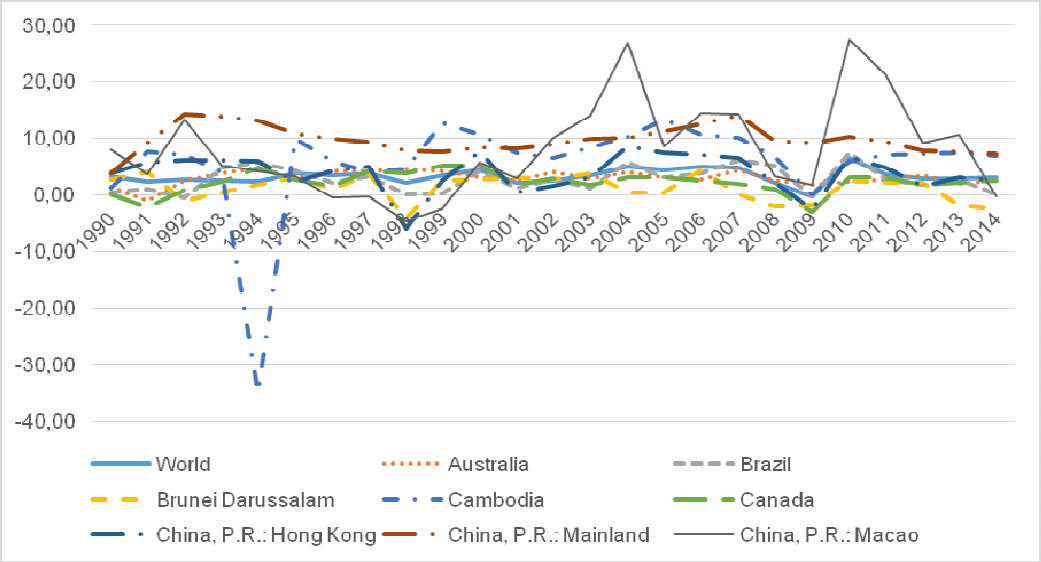
[1] Decoupling is defined as "the occurrence of returns on asset classes diverging from their expected or normal pattern of correlation. Decoupling takes place when two different asset classes that typically rise and fall together move in opposing directions, such as one increasing and the other decreasing (*Investopedia*, 2016)". Rise of the developing countries called BRICs (Brazil, Russia, India and China) have increased the public attention to the meaning of decoupling. Nevertheless, economic growth is also recently decreasing in these countries.

[2] These arguments are introduced by *Wikipedia* ("Financial contagion", sited on 16th Aug, 2016). Therefore, we do not site related literatures in this study.

[3] In detail, see Hertel, eds. (1997).

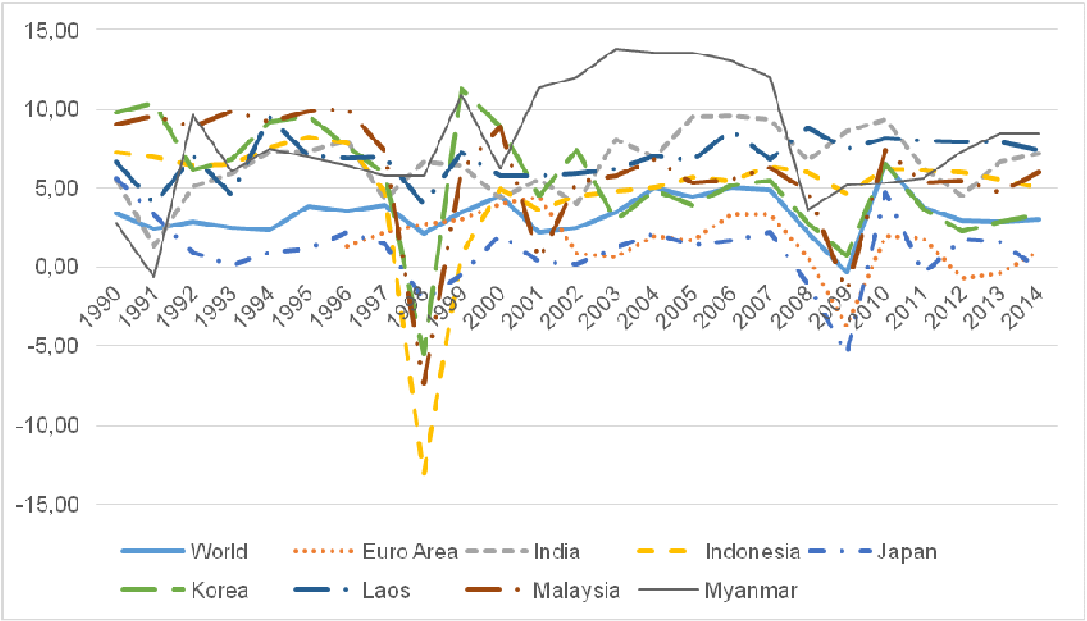
[4] Now, literature on the CGE model is also diverse and it is very difficult to introduce them in detail. The combination of the CGE model and the Monte Carlo experiment has never been used in the field, for example, the research of Abler et al. (1999) and Harris and Robinson (2001) are relatively old.

Figure 1 Economic Growth Rates of the Selected Regions (1) (1990–2014)



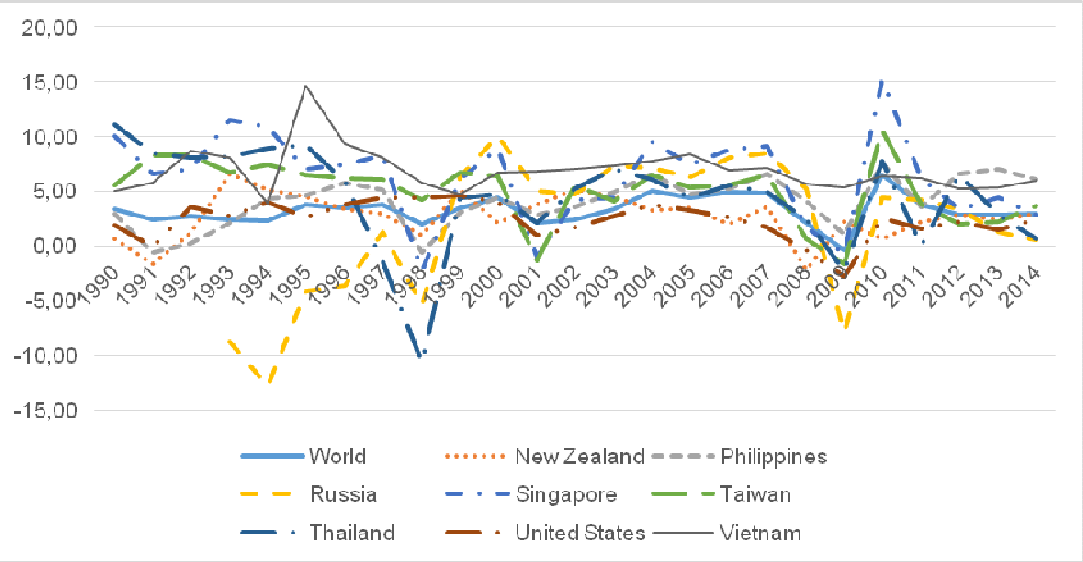
(Source) IMF: *International Financial Statistics* (January, 2016) and http://ecodb.net/

Figure 2 Economic Growth Rates of the Selected Regions (2) (1990–2014)



(Source) IMF: *International Financial Statistics* (January, 2016) and http://ecodb.net/

Figure 3 Economic Growth Rates of the Selected Regions (3) (1990–2014)



(Source) IMF: *International Financial Statistics* (January, 2016) and http://ecodb.net/

2. Evidence

Figure 1 to Figure 3 show graphs of the economic growth rate of the selected economies, which include several Asian countries.[5] Furthermore, in 1990 and afterwards, there have been two spells of economic crises. The first time was the Asian financial crisis in 1997, and the second time was the subprime mortgage crisis in 2009. Moreover, the European Union with the Greece crisis, continued a downturn until 2011, their hope of economic convergence is not possible at the present time. It can be said that Greece and the European Union, is one example of economic contagion in a negative direction. Obviously, all countries in the contagions above did suffer from a reduction of growth, which can be regarded as a decoupling.

Table 1 and Table 2 show the percentage in two standards of growth, one showing growth rate 0% or more ("Positive growth rate" is indicated in the table), and the other a global average of these countries ("Higher than world growth" is indicated in the table). First on Table 1, for each year you can appreciate the countries' results, and the contraction of the economy in 1998 and on 2009, portraying an economic crisis. Additionally in 1998, in comparison with the global average, because the economic crisis was mainly in Asia, their growth rates were below average, the Asian continent contracted more than half its economy. Second, there was a positive growth rate in many countries, as you can see in Table 1, in the first years of the 2000s, the majority of the countries exceeded the global average, and their performance was also stable. Third, Table 2 shows the economic growth rate of each region in 1990 and afterwards, China, India, Laos, and Vietnam had positive growth rates during these periods. On the other hand, in Brunei, Japan, and Russia, about 1/4 of the period had negative growth. It turns out that the economic growth of Japan was very low.

Second, in comparison with the global average, China and Laos are the only ones that have fulfilled economic growth every year. On the other hand, Brunei, Canada, the European Union, Japan, and the United States recorded less than the global average in many years. This analysis is simple; however, a possibility of both a contagion and a decoupling could be discerned.

[5] Selection of the countries is integrated with the candidate country of the simulation which introduces next.

Table 1 Percentage of the Economic Growth Rate of Selected Regions (year base, %)

Year	Positive growth rate	Higher than world growth	Year	Positive growth rate	Higher than world growth
1990	100.00	59.09			
1991	78.26	63.64	2003	100.00	66.67
1992	91.30	68.18	2004	100.00	62.50
1993	95.83	78.26	2005	100.00	58.33
1994	91.67	82.61	2006	100.00	66.67
1995	95.83	65.22	2007	100.00	70.83
1996	92.00	66.67	2008	84.00	62.50
1997	92.00	66.67	2009	48.00	54.17
1998	56.00	45.83	2010	100.00	50.00
1999	92.00	66.67	2011	96.00	54.17
2000	100.00	62.50	2012	96.00	62.50
2001	92.00	62.50	2013	92.00	54.17
2002	100.00	83.33	2014	88.00	45.83

(Note) Selected regions defined as Table 2. It shows percentages of the region beyond the two standards calculated from the selected regions (24 regions) in each year.

(Source) Author's calculation

Table 2 Percentage of the Economic Growth Rate of Selected Regions (region base, %)

Region	Positive growth rate	Higher than world growth	Region	Positive growth rate	Higher than world growth
World	96.00				
Australia	96.00	44.00	Korea	96.00	76.00
Brazil	92.00	36.00	Laos	100.00	100.00
Brunei	76.00	16.00	Malaysia	92.00	88.00
Cambodia	96.00	88.00	Myanmar	96.00	88.00
Canada	92.00	24.00	New Zealand	92.00	36.00
Hong Kong	92.00	60.00	Philippines	92.00	68.00
China	100.00	100.00	Russia	72.73	54.55
Macao	80.00	76.00	Singapore	88.00	80.00
Euro Area	84.21	10.53	Taiwan	92.00	80.00
India	100.00	92.00	Thailand	88.00	68.00
Indonesia	96.00	84.00	United States	92.00	28.00
Japan	76.00	8.00	Vietnam	100.00	96.00

(Note) It shows percentages of the year beyond the two standards calculated from the selected years (1990-2014, 1996-2014 in Euro Area, 1993-2014 in Russia) in each region.

(Source) Author's calculation

Table 3 Simple Description of GTAP Data

		intermediate		expenditure		export		transportation	output
		Region 1	Region 2	Region 1	Region 2	Region 1	Region 2		
intermediate	R1	vdfm	vifm	vdfm	vifm	vxmd	vxmd	vst (vtwr)	vom
	R2	vifm	vdfm	vifm	vdfm	vxmd	vxmd	vst (vtwr)	vom
tax	R1	rtfd	rtfi	rtfd	rtfi				
	R2	rtfi	rtfd	rtfi	rtfd				
factor tax subsidy		vfm rtf rto	vfm rtf rto						
output		vom	vom	vom	vom				

(Source) The GTAP 8 Database and author

(Note) All variables are defined by Rutherford (2010).
vom: Aggregate output.
vfm: Endowments, firms' purchases at market prices.
vdfm: Intermediates, firms' domestic purchases at market prices.
vifm: Intermediates, firms' imports at market prices.
vxmd: Trade, bilateral exports at market prices.
vst: Trade, exports for international transportation. Aggregate of "vtwr".
vtwr: Trade, margins for international transportation at world prices.
rtxs: Export subsidy (rate).
rtms: Import taxes (rate).
rto: Output subsidy (rate).
rtf: Primary factor and commodity taxes (rate).
rtfd: Firms' domestic tax (rate).
rtfi: Firms' import tax (rate).
vifm = vxmd + vtwr + rtxs + rtms (zero profit condition for import).

3. Model and Simulation

Under such a context, this study quantitatively analyzes the economic shock influence from some countries to other countries, at the same time the possibility of a reduction in the rate of growth is presumed when an economic shock occurs under uncertainty. The model employed is the general algebraic modeling system (GAMS) code which Rutherford (2010) advocates, this study also uses the trade data from the GTAP.[6]

Table 4 Mapping Information

Production Factor		Production Sector		Country (Region)	
lab	Unskilled labor	agri	Agriculture	aus	Australia and New Zealand
skl	Skilled labor	mine	Mining	chn	China
cap	Capital	food	Food	hkg	Hong Kong
res	Resources	text	Textiles	jpn	Japan
lnd	Land	wood	Wood	kor	Korea
		peto	Petroleum Chemical	idn	Indonesia

[6] GTAP model has also calculation software (General Equilibrium Modelling PACKage, GEMPACK). However, the way GTAP is rewritten in the GAMS code tends to make an extension and a correction of the model. Although various improvements were considered for the Rutherford model in this study, the original model was used as it was, and the present study only added the Monte Carlo experiment code.

Production Factor		Production Sector		Country (Region)	
		meta	Metals	mys	Malaysia
		moto	Motor vehicles	twn	Taiwan
		elec	Electronic equipment	phl	Philippines
		mech	Machinery and others	sgp	Singapore
		egwp	Electricity, Gas, Water	tha	Thailand
		cons	Construction	vnm	Vietnam
		trad	Trade	asa	Other ASEAN countries
		ntra	Transport	ind	India
		wtra	Water transport	can	Canada
		atra	Air transport	usa	United States
		comm	Communication	bra	Brazil
		serv	Other services	eeu	European Union
				rus	Russian Federation
				xwd	Rest of the World

(Source) The GTAP 8 Database and author

Table 5 Growth Rate for Estimation

	2007-14	average		2007-14	average
aus	1.243	1.028	tha	1.251	1.028
chn	2.054	1.094	vnm	1.586	1.059
hkg	1.275	1.031	ind	1.758	1.073
jpn	1.028	1.003	can	1.134	1.016
kor	1.311	1.034	usa	1.092	1.011
twn	1.313	1.035	bra	1.286	1.032
idn	1.564	1.057	rus	1.210	1.024
mys	1.453	1.048	asa	1.836	1.079
phl	1.519	1.054	eeu	1.038	1.005
sgp	1.502	1.052	xwd	1.288	1.032

(Source) IMF: *International Financial Statistics* (January, 2016) and http://ecodb.net/

Table 6 Simulation Design

Simulation	Sector	Country	Frequency
Simulation 1	Consumption	China (chn)	0.05
Simulation 2	Consumption	EU (eeu)	0.01
Simulation 3	(Unskilled) Labor	China (chn)	0.10
Simulation 4	Simulation 1 + Simulation 2		
Simulation 5	Simulation 1 + Simulation 3		
Simulation 6	Consumption	India (ind)	0.05

(Note) We use a random number of a normal distribution whose average is 1 in the Monte Carlo experience.

(Source) Author

Data from the GTAP can be taken out independently, when these variables indicate a structure of the input-output table, shown in Table 3. To use the GTAP database, it is necessary to first aggregate the production factor, the production sector, and the regions.[7] In this study, the production factor was not aggregated. However, Table 4 aggregates 18 commodities (production sectors) and 20 regions (countries). These are specific to the typical

[7] The GTAP 8 database, boasts dual reference years, 2004 and 2007, as well as 129 regions for all 57 GTAP commodities. We use 2007 for the reference year and estimate to the statistics of the year 2014.

Asian country's economic sectors, these industries are added to the GTAP calculation, the selection of industries has been made independently by the author

However, when making 2007 the base year, a problem surges of not using the most recent data. That is because the Chinese gross domestic product (GDP) was smaller than the Japanese GDP in that year. The Chinese GDP passed Japan's in 2010. Therefore, it is more desirable to use a recent database. The GTAP has already published the GTAP 9 database, which includes the reference year of 2011, but it is not efficient to wait for new data to be published. Therefore, to renew the GTAP data, this study considered updating the report to 2014.

We worked the estimation of 2014 data based on the 2007 data.

- 1. Multiply the items using the growth rate of Table 5 for "vom", "vfm", "vdfm", "vifm", "vxmd" and "vtwr" of Table 3.
- 2. Estimating the adjustment parameter from the condition of vom = vdfm + rtfd + vifm + rtfi + vfm + rtf + rto of Table 3.
- 3. Recalculate the "vfm", "vdfm", "vifm".
- 4. Estimating the adjustment parameters from conditions of vifm = vxmd + vtwr + rtxs + rtms of Table 3.
- 5. Recalculate the "vxmd", "vtwr", "vst" (aggregate of "vtwr").
- 6. Estimating the adjustment parameters from condition of vom = vdfm + vxmd + vst.
- 7. Recalculate the "vom".
- 8. Repeat (2 to 7).

This study reports six simulations by using estimated data. The Monte Carlo experiment is applied because it can model uncertainty. It is realizable by adding the random number of a normal distribution to the exogenous variables of the model. The normal random number which has an average of 1, and the calculated standard deviation is multiplied to one or two variables. Table 6 shows the variable, target country, and the standard deviation that performs the simulation.[8] Simulation 1 is a case where Chinese consumption demand has uncertainty. Simulation 2 is a case where the European Union's consumption demand has uncertainty. Simulation 3 is a case where Chinese labor supply has uncertainty. Simulation 4 is a case where consumption demand in China and the European Union have uncertainty. Simulation 5 is a case where Chinese consumption demand and labor supply have uncertainty. Simulation 6 is a case where India's consumption demand has uncertainty. The uncertainty characteristics are taken up as a reference for the selection of a country in this study. Regarding the uncertainty of consumption demand and labor supply, the intention of people's behavior is likely to change dramatically due to changes in the economic situation. The standard deviation differs in each simulation, in order that it may assemble the influence of a simulation result to some extent. For example, consumption in United States and the European Union is much larger than China's (Table 7), so we set the degree of uncertainty at 5% in China, and 1% in the European Union, respectively. On the other hand, although the share of labor in China is high, the influence of uncertainty of Chinese labor has on a foreign country is not great, we set the degree of uncertainty to 10%.[9]

[8] In GAMS code, vom ("c", r) is consumption demand and evom ("lab", r) is (unskilled) labor supply ("evom" is disaggregated of "vfm"). These variables show the monetary value and they are exogenous in the model. For the endogenous variables, the model sets up change of quantity (*Y*, *FT* and so on) and change of a price (*P*, *PF* and so on) which sets the initial value to 1, respectively.

[9] This setting was decided after doing simulation experiments many times.

4. Result

The result of each simulation is introduced below. First, Table 7 shows the estimation result for use by all simulations. The GDP of China exceeds Japan's, but it does not reach that of the United States and the European Union. In addition, value added (unskilled) labor in China is relatively high. Table 8 to Table 13 show the change of the GDP of each country by using 200 experiments for every simulation. The table reports the maximum, the minimum, the average, and the standard deviation. For example, in the Simulation 1 (Table 8), when consumption demand of China has 5% of uncertainty, the GDP of China receives more than a 5% change in the standard deviation, and there is more than 30% difference between the maximum and the minimum. Moreover, the change of about 4% is set to other countries, and the influence to the global economy by the fluctuation of the Chinese economy can be seen.[10] However, it can be said that this is about the same rate of change of the European Union's economy. Simulation 2 (Table 9) has grown the GDP to 1% of uncertainty from the consumption demand of the European Union. The European Union has also more than 3% change in the standard deviation, and about a 3% change in foreign countries. This is because the level of consumption of the 27 countries of the European Union is very large as shown in Table 7. Therefore, it can be said that the influence of 1% of uncertainty to the global economy is considerable.

Next, when the (unskilled) labor supply of China has 10% of uncertainty (Simulation 3), and about a 4% change in the standard deviation, there is hardly any effect to other countries. Because the uncertainty of supply of labor is affected by domestic production, is not affected directly by foreign trade, it is considered not to cause change to other countries (Table 10).

Since Simulation 4 (Table 11) and Simulation 5 (Table 12) are a combination of the above-mentioned simulations, the result depends on two uncertainties that reshape the positive or negative change of the GDP.

Finally, we will introduce the case of India where future growth can be expected (Table 13). When the consumption demand of India has 5% of uncertainty, the GDP of India takes more than a 6% change in the standard deviation. However, influence to the global economy stops at about 2% of change in the standard deviation. It turns out that influence from a country to another country by uncertainty of consumption demand is largest in the European Union, second in China, and last in India. The uncertainty of consumption demand is related to the initial value of the consumption demand.[11]

However, the direction of change is not known, taking from the above result, and it is not yet validated whether it is a contagion or a decoupling. Below we will discuss positive or negative outcomes from the results. We totaled the entries and the positive or negative values of the 200 experiments. Table 14 shows how many of the 200 experiments differed in the sign in each region (country). Here, for each simulation, when signs differ even once, 1 time is counted as causing uncertainty. In other words, 200 times means that in each simulation, some region always shows a different sign. Furthermore, 0 times means that the same sign is shown in all regions.

As far as Table 14 is concerned, it shows the change of quantity of production of many industries, and the amount of consumption, so we can see that the signs may differ in each region. Yet, the GDP shows some differences on all simulations. For example, in Simulation 1 and in Simulation 2, the influence uncertainty brings remains only in the change of quantity, and all regions can be referred to as having the same sign. This can be interpreted as a highly

[10] In the Rutherford model, the region which is the largest initial value of the representative agent is set as the numeraire region. Because the value of the representative agent is fixed in the numeraire region, there is no fluctuation in the representative agent after a simulation, and the fluctuation of the GDP is also small. When the data of this study was used, the initial value of the representative agent of the United States is the largest in the model. Because of the fluctuation of the GDP of the United States becoming small, when it is simulated, the rest of the world (xwd) is set as the numeraire region in this study.

[11] In this model, we assume the economy of 27 Euro countries are aggregated as one region. Obviously, a different result will be expected when the European Union is taken apart in several areas or countries.

probable likeliness that the economy will be affected by contagion in each region. On the other hand, in the case of Simulation 3, it is the contrary, and it serves as a decoupling event. Nevertheless, from Table 10, we can see the likeliness of a decoupling, since the changes that affect other countries are very small. When the uncertainty of consumption demand exists in China and the European Union randomly, the result of Simulation 4 shows that there is a possibility of decoupling. Additionally, the possibility of decoupling exists when consumption demand and labor supply are uncertain.

Table 7 Initial (Monetary) Value and Share of Consumption, (Unskilled) Labor, and GDP (billion USD, %)

	Consumption		Labor		GDP	
aus	693.365	1.77	381.082	2.08	1256.390	1.89
chn	2686.705	6.85	2548.499	13.92	6950.825	10.44
hkg	158.163	0.40	56.404	0.31	274.841	0.41
jpn	2567.578	6.54	1229.793	6.72	4550.522	6.84
kor	739.889	1.89	403.625	2.20	1395.598	2.10
twn	280.257	0.71	154.086	0.84	548.376	0.82
idn	421.354	1.07	210.399	1.15	680.296	1.02
mys	113.274	0.29	79.419	0.43	274.678	0.41
phl	153.696	0.39	54.398	0.30	224.260	0.34
sgp	101.098	0.26	63.449	0.35	249.754	0.38
tha	157.861	0.40	73.767	0.40	313.505	0.47
vnm	72.942	0.19	28.370	0.15	106.648	0.16
ind	1287.651	3.28	713.328	3.90	2168.014	3.26
can	915.957	2.33	459.387	2.51	1596.433	2.40
usa	10866.294	27.69	5051.520	27.59	15427.127	23.18
bra	1047.983	2.67	489.378	2.67	1765.119	2.65
rus	808.839	2.06	294.348	1.61	1560.909	2.34
asa	46.255	0.12	18.614	0.10	75.523	0.11
eeu	10313.136	26.28	3624.866	19.79	17368.993	26.09
xwd	5812.897	14.81	2377.513	12.98	9779.709	14.69
	39245.194		18312.245		66567.520	

(Source) Calibrated by author based on the GTAP 8 Database (reference years of 2007)

Table 8 Change of GDP (Simulation 1)

	aus	chn	hkg	jpn	kor
max	1.135015	1.190151	1.145222	1.141910	1.139505
min	0.907114	0.875085	0.899191	0.901436	0.902436
average	1.006497	1.009378	1.006954	1.006792	1.006650
std dev	0.040292	0.055557	0.043522	0.042533	0.041945
	twn	idn	mys	phl	sgp
max	1.151083	1.137238	1.144489	1.142552	1.153363
min	0.894690	0.905374	0.899253	0.900394	0.891993
average	1.007216	1.006597	1.006902	1.006799	1.007282
std dev	0.045357	0.041002	0.043395	0.042845	0.046266
	tha	vnm	ind	can	usa
max	1.142400	1.124727	1.137756	1.136622	1.138509
min	0.900429	0.910397	0.904242	0.905193	0.903808
average	1.006789	1.005855	1.006590	1.006542	1.006629
std dev	0.042814	0.037990	0.041304	0.040932	0.041512
	bra	rus	asa	eeu	xwd
max	1.133085	1.128793	1.127625	1.138382	1.051904
min	0.908408	0.911797	0.911580	0.903685	0.964808
average	1.006402	1.006214	1.006120	1.006614	1.002520
std dev	0.039719	0.038357	0.038221	0.041514	0.015393

(Source) Author's calculation

Table 9 Change of GDP (Simulation 2)

	aus	chn	hkg	jpn	kor
max	1.080046	1.084368	1.085306	1.083755	1.084305
min	0.918316	0.913583	0.912702	0.914188	0.913464
average	1.002709	1.002839	1.002875	1.002818	1.002829
std dev	0.028855	0.030464	0.030790	0.030246	0.030470
	twn	idn	mys	phl	sgp
max	1.085199	1.080592	1.081309	1.083899	1.084909
min	0.912315	0.917808	0.916499	0.913831	0.912274
average	1.002848	1.002729	1.002726	1.002813	1.002822
std dev	0.030830	0.029045	0.029394	0.030331	0.030778
	tha	vnm	ind	can	usa
max	1.083051	1.084075	1.082115	1.081485	1.082550
min	0.914700	0.914132	0.915976	0.916615	0.915524
average	1.002784	1.002841	1.002768	1.002746	1.002782
std dev	0.030025	0.030320	0.029637	0.029410	0.029795
	bra	rus	asa	eeu	xwd
max	1.079825	1.079034	1.078630	1.094796	1.031152
min	0.918581	0.919581	0.920109	0.903725	0.968640
average	1.002703	1.002685	1.002677	1.003230	1.001075
std dev	0.028769	0.028454	0.028291	0.034100	0.011162

(Source) Author's calculation

Table 10 Change of GDP (Simulation 3)

	aus	chn	hkg	jpn	kor
max	1.003048	1.110497	1.003724	1.011001	1.012501
min	0.996242	0.893268	0.992010	0.983830	0.981810
average	1.000072	0.996474	0.999927	1.000137	1.000165
std dev	0.001192	0.038692	0.002017	0.004754	0.005369
	twn	idn	mys	phl	sgp
max	1.011560	1.006062	1.012862	1.006634	1.023321
min	0.982401	0.992925	0.982590	0.988739	0.968666
average	1.000116	1.000162	1.000232	1.000011	1.000431
std dev	0.005096	0.002313	0.005319	0.003102	0.009605
	tha	vnm	ind	can	usa
max	1.012203	1.022218	1.010335	1.008319	1.010152
min	0.983757	0.978818	0.986746	0.988972	0.986028
average	1.000232	1.000820	1.000221	1.000160	1.000172
std dev	0.004986	0.007724	0.004144	0.003394	0.004229
	bra	rus	asa	eeu	xwd
max	1.004139	1.000828	1.003860	1.010728	1.003771
min	0.995148	0.999511	0.999297	0.985334	0.995555
average	1.000110	1.000045	1.000295	1.000186	1.000099
std dev	0.001585	0.000245	0.000867	0.004453	0.001450

(Source) Author's calculation

Table 11 Change of GDP (Simulation 4)

	aus	chn	hkg	jpn	kor
max	1.136315	1.172474	1.145965	1.142993	1.142365
min	0.887405	0.862698	0.878611	0.881052	0.881256
average	1.011143	1.014949	1.011914	1.011645	1.011476
std dev	0.053866	0.068402	0.057920	0.056709	0.056354
	twn	idn	mys	phl	sgp
max	1.148648	1.137936	1.142081	1.143426	1.149625
min	0.875359	0.885962	0.881033	0.880104	0.873569
average	1.012234	1.011300	1.011708	1.011655	1.012312
std dev	0.059520	0.054598	0.056877	0.057026	0.060265
	tha	vnm	ind	can	usa
max	1.142635	1.135517	1.139538	1.138422	1.140295
min	0.880688	0.887126	0.884024	0.885058	0.883467
average	1.011618	1.010488	1.011333	1.011247	1.011398
std dev	0.056795	0.052926	0.055249	0.054779	0.055534
	bra	rus	asa	eeu	xwd
max	1.135184	1.132448	1.131683	1.151190	1.052981
min	0.888425	0.891342	0.891560	0.876005	0.957266
average	1.011013	1.010745	1.010632	1.011813	1.004351
std dev	0.053319	0.051955	0.051720	0.058547	0.020685

(Source) Author's calculation

Table 12 Change of GDP (Simulation 5)

	aus	chn	hkg	jpn	kor
max	1.141646	1.239613	1.151858	1.146892	1.144021
min	0.918769	0.887801	0.910665	0.909216	0.909280
average	1.007980	1.007970	1.008378	1.008372	1.008226
std dev	0.041669	0.067151	0.045102	0.044586	0.044117
	twn	idn	mys	phl	sgp
max	1.156415	1.143316	1.149187	1.148528	1.156127
min	0.902856	0.915996	0.906909	0.910291	0.894735
average	1.008862	1.008188	1.008613	1.008269	1.009247
std dev	0.047558	0.042548	0.045571	0.044588	0.049626
	tha	vnm	ind	can	usa
max	1.147354	1.127044	1.142984	1.142090	1.143667
min	0.908124	0.914370	0.912450	0.914329	0.911948
average	1.008470	1.007962	1.008217	1.008110	1.008214
std dev	0.044922	0.040648	0.043205	0.042668	0.043433
	bra	rus	asa	eeu	xwd
max	1.139522	1.135521	1.134020	1.143366	1.053812
min	0.919246	0.924168	0.923654	0.911619	0.968137
average	1.007892	1.007621	1.007775	1.008213	1.003160
std dev	0.041148	0.039553	0.039453	0.043476	0.016070

(Source) Author's calculation

Table 13 Change of GDP (Simulation 6)

	aus	chn	hkg	jpn	kor
max	1.067289	1.068417	1.068454	1.066936	1.066162
min	0.955574	0.953899	0.953634	0.955226	0.955418
average	1.003221	1.003246	1.003241	1.003187	1.003141
std dev	0.019424	0.019954	0.020022	0.019455	0.019303
	twn	idn	mys	phl	sgp
max	1.066873	1.069518	1.063551	1.066090	1.063462
min	0.954546	0.954474	0.956594	0.955204	0.956267
average	1.003160	1.003336	1.002998	1.003128	1.002981
std dev	0.019592	0.019977	0.018668	0.019337	0.018727
	tha	vnm	ind	can	usa
max	1.065346	1.058091	1.257004	1.066217	1.066528
min	0.955456	0.956585	0.869950	0.955787	0.955402
average	1.003083	1.002616	1.013656	1.003154	1.003164
std dev	0.019170	0.017880	0.065877	0.019224	0.019356
	bra	rus	asa	eeu	xwd
max	1.064026	1.066022	1.081176	1.065993	1.023553
min	0.957014	0.956740	0.949280	0.955475	0.983699
average	1.003040	1.003171	1.003975	1.003130	1.001105
std dev	0.018633	0.018986	0.022795	0.019265	0.006970

(Source) Author's calculation

Table 14 Number of Different Signs in 200 Experiences

	Simulation 1	Simulation 2	Simulation 3	Simulation 4	Simulation 5	Simulation 6
consumption	200	200	200	200	200	200
agri	200	0	0	179	113	200
mine	200	200	200	200	176	200
food	200	200	200	200	200	200
text	200	200	200	200	195	200
wood	200	200	200	200	200	200
peto	200	200	200	200	200	200
meta	200	200	200	200	200	200
moto	200	200	200	200	200	200
elec	200	200	200	200	200	200
mech	200	200	200	200	200	200
egwp	200	200	200	200	200	200
cons	200	200	200	200	200	200
trad	200	200	200	200	200	200
ntra	200	200	200	200	200	200
wtra	200	200	200	200	200	200
atra	200	200	200	200	200	200
comm	200	200	200	200	200	200
serv	200	200	200	200	173	200
gdp	0	0	200	11	55	0

(Note) After a simulation, if the sign for all regions is the same, it will not be counted; it will be counted only if at least one region marks a different sign. This table illustrates a case where a different sign is counted at the time of conducting the Monte Carlo experiment 200 times.

(Source) Author's calculation

5. Concluding Remarks

This study explains the possibility of economic contagion or a decoupling between many countries by the framework of the CGE model. The methodology gave uncertainty to the (fixed) variable in a CGE model, analyzed the width and the direction of change by conducting a Monte Carlo experiment. As a result, the uncertainty of consumption demand provides change in the same direction as other countries. Therefore, if positive, the influence affects the global economy, but if it is negative, it will influence the global economy with negative outcomes. However, if uncertainty happened randomly in two or more countries, it will not necessarily become a contagion. On the other hand, the uncertainty of labor supply brings about the possibility of decoupling, although the influence to other countries is small.

The economic conditions of the present era seem to just spread negatively. Obviously, the problem will be solved if the consumption demand of China or the European Union (big economies with magnitude) is improved. Nonetheless, if not damaged, a country may become an example to follow.

All situations possible were not considered, and it will be necessary to pursue a more realistic situation of this experiment in future studies.

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Announcements, Conferences, News

9th International Conference The Economies of Balkan and Eastern European Countries in the changing world

April 28-30, 2017, Piraeus-Athens, Greece

Conference Overview[1]

The 9th International Conference entitled "The Economies of Balkan and Eastern European Countries in the changing world", the program of the EBEEC, took place in Piraeus-Athens, Greece, in April 28-30, 2017. The conference organized in association with Eastern Macedonia and Thrace Institute of Technology, Department of Accounting and Finance, University of Piraeus, School of Economics, Business and International Studies Piraeus University of Applied Sciences (TEI of Piraeus), School of Business and Economics, Department of Accounting and Finance.

The economies of Balkans and Eastern Europe countries have almost completed a course of two decades with significant changes in their characteristics and their adaptation in the new economic environment. This course has fore grounded significant difficulties, has highlighted the particular problems that the countries of the particular region should face, and it has led to different patterns of growth and enhancement of the economies.

Generally, the objectives of the conference were to discuss and evaluate the results of the economic policy that have been applied during the last two decades, to suspended the prospect challenges and to investigated the policies in the sector of economy which are considered necessary, so that the countries to be integrated getting as much benefit as possible.

The issues examined were: Economic and Public Policy, Public Sector Economic, Public Finance, Monetary Economics and Banking, International Economics, International Business, International Relations, International Political Economy, European Political Economy, Globalisation, Regional Integration with special reference to the EU, Comparative Economics, Economic Growth, Development and Sustainability, Labour Markets and Immigration, Knowledge Economics, management and innovation, Poverty, Income Distribution, and Social Inequalities and European Crisis and the Balkans.

[1] **Conference overview by Christos Genitsaropoulos, RSI Journal**

International Conference Economic development in Southern European Regions: Policies and higher education

25th and 26th May 2017, Porto, Portugal

Conference Overview[2]

The regions of the four southern countries of Europe (Greece, Italy, Portugal, Spain) share a significant number of socio-economic characteristics. In particular, these are regions which have been heavily assisted by European cohesion policies and yet were unable to catch up to the income and productivity levels of the rest of the EU, despite the relatively good performance of the most advanced areas of their respective countries. Many reasons exist for this lack of convergence, which can be found in poor human capital, institutions, accessibility, lack of private investments, bad policy implementation, etc.

The conference adopted a normative perspective, and started from the problems of the lagging regions of Southern European countries in order to develop the policy prescriptions that should be implemented in order to achieve sustainable development. In addition, the problems of these regions are not short-run, and will need to be tackled with effective policies in the medium-long run.

The papers analyzed a wide range of themes such us: The success or lack of success of policies implemented in the lagging regions of the four countries, Theory-based evaluations or quantitative counterfactual evaluations, Theories behind the success or failure of policy efforts in this type of regions, New policy perspectives or objectives, which should be implemented, The interrelation between national and European regional policies and how they can be coordinated and made more complementary, Prospective and policy components on the link between human capital, higher education (innovation) and regional development will be particularly welcome and Reports from on-going projects on Smart Specialisation Strategies.

Finally, it is necessary to mention that the conference supported by Belmiro de Azevedo Foundation, University of Porto, RSAI, CCDRN and Portuguese Association of Geographers.

[2] **Conference overview by Christos Genitsaropoulos, RSI Journal**

57th ERSA CONGRESS Social Progress for Resilient Regions
29 August - 1 September 2017 Groningen, The Netherlands

Conference Overview[3]

The 57th ERSA Congress will take place in Groningen (Netherlands) in 29 August - 1 September 2017. In a world of rapid economic and technological change, resilient regions with sustainable socio-economic structures and institutions are more important than ever for social progress and development. The ERSA congress "Social Progress for Resilient Regions" will host a large variety of themes in spatial, regional and urban economics, economic geography and regional policy topics like local governance and institutions.

The core theme of the congress is 'Social progress for resilient regions', but the congress covers all fields in Regional Science. In addition to the general themes, a limited set of Special Sessions will be organized. The Special Sessions address specific and topical themes in Regional Science.

Some of the main themes are: Social Progress for Resilient Regions (Resilience, Well-being, Inequality, Segregation, Poverty), Regional Economic Development, Regional o-r Urban Labour Markets, Migration, Commuting or Mobility, Infrastructure, Transportation or Accessibility, Innovation and Entrepreneurship, Benefits of Agglomeration, Education, Tourism, Regional or Urban Policy, Real Estate and Housing, Regional Finance, Investment or Capital Markets, Methods in Regional Science or Urban Economics, Location of Economic Activity and Environmental Issues or Sustainable Development.

Finally, some of the Special Sessions are: Regional Resilience in the face of Natural Disasters and Climate Change (in association with the Waddenacademie), Urban Disasters and Resilience Policies of Cities, The Impact of Earthquakes on Regional Housing Markets and Regional Economic Development, Smart Rural Development and Beyond, Regional and Urban Perspectives on Individual Well-Being and Are Cities more Productive but less Inclusive? (in association with European Commission).

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[3] **Conference overview by Christos Genitsaropoulos, RSI Journal**

Conference of the ASRDLF & ERSA-GR "Cities and regions in a changing Europe: challenges and prospects"
5-7 July 2017, Athens, Greece

Conference Overview[4]

The 54th Colloquium of the Association de Science Régionale de Langue Française (ASRDLF), and the 15th conference of the Greek Section of the European Regional Science Association will be held jointly in Athens, Greece, 5-7 July 2017.

The core theme of the conference is devoted to the new challenges that cities and regions are facing in the changing European landscape.

In addition, the general theme of the conference will focus on challenges and prospects for urban and regional development within a changing European context.

Also, it is essential to mention that this conference will focus on issues regarding inequalities, inclusive and sustainable development of cities and regions within a changing European context. Current challenges for urban and regional development will be covered through a variety of interdisciplinary thematic topics which are relevant to Regional Science theory and policy.

This conference is very important and this because the aftermath of the economic crisis has created a completely new environment which affects the functioning of cities and regions. Unbalanced development on different geographical scales from global to local, and inequalities in wealth and prospects within cities raise important issues for the theory and policy of urban and regional development.

Furthermore, the migration crisis and BREXIT are among the challenges which call for a reshaping of European and national policies which also affect the functioning of cities and regions.

Finally, special sessions will be held in both in French and English.

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[4] **Conference overview by Christos Genitsaropoulos, RSI Journal**

Academic Profiles

Professor Athanasios Padadaskalopoulos

Athanasios Padadaskalopoulos is a Professor of Regional Analysis and Policy at the Department of Economic and Regional Development at Panteion University of Social and Political Sciences and Director of the University Research Institute for Regional Development (ΙΠΑ). He has served as Deputy Chief Financial Officer of Panteion University, President of the Department of Economics and Regional Development, member of the Board of Directors of the Institute of Urban Environment and Human Resources of Panteion University and member of the Board of Directors of VIVETVA SA.

His teaching at undergraduate and postgraduate levels focus on the subject areas of: Regional Science, Regional Analysis Methods, Land and Regional Development Policies and Regional Planning Policies and Regional Planning.

He is the author of several scientific books and articles. His work has been published in reputable international scientific journals and collective volumes on Quantitative Regional Analysis, Regional Policy and Planning, Development Strategy, Impact Assessment of Development Programs, Innovation Policy, etc. .

He has delivered several announcements at scientific conferences in Greece and overseas.

He has extensive hands on practical experience in addition to being scientifically responsible for many national and European programs and studies.

Indicative sole authorship book contributions:

- 2009 Models and regional development policies, Dionikos Publications – (in Greek "Πρότυπα και πολιτικές περιφερειακής ανάπτυξης'', Εκδόσεις Διόνικος)
- 2000 Methods of regional analysis, Papazisis Publications – (in Greek "Μέθοδοι περιφερειακής ανάλυσης, Εκδόσεις Παπαζήση)

Indicative Co-Authorship Participation in collective works:

- 2012 Work as a growth factor, Papazisis Publications (in Greek ''Η εργασία ως παράγοντας ανάπτυξης'', Εκδόσεις Παπαζήση).
- 2011 Regional planning and spatial analysis issues, Benou G. Publications (in Greek "Θέματα περιφερειακού σχεδιασμού και χωρικής ανάλυσης, Εκδόσεις Μπένου Γ.")
- 2010 Regional Science and Politics: Greece and the Balkans, Govosti Publishing (in Greek " Περιφερειακή επιστήμη και πολιτική: Ελλάδα και Βαλκάνια'', Εκδόσεις Γκοβόστη)
- 2002 Regional programming, Papazisis Publications (in Greek "Περιφερειακός προγραμματισμός'', Papazisis Publications)

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Professor Ismini Kriari

Rector of the Panteion University of Social and Political Sciences

Current position:

Professor of Constitutional Law, Department of Public Administration, Panteion University of Social and Political Sciences

Education :

PhD in Public Law at the Panteion University of Athens (1985). Graduate in Law at the University of Athens (1977).

Experience:

Visiting Professor at the University of Lueneburg 2003.

2004 - 2007 Special Secretary in the Ministry of Education, responsible for Greek Schools Abroad, Intercultural Education and the introduction of bioethics in Secondary education.

Member of the Board of the National Committee on Human Rights (2004-2007).

Member of the Board of the Hellenic National Commission of UNESCO since 2004.

Expert in the field of Bioethics: Member of the Bioethics Committee of the Medicine School of the University of Athens, of the National School of Public Health , President of the Bioethics Committee of the Panteion University.

Member of the Bioethics Committee of the Holy Synod of the Greek Orthodox Church (since 2001).Chairperson of the Scientific Committee on Bioethics of the Interparliamentary Assembly on Orthodoxy (2002-2005).

Member of the Steering Committee for Bioethics (CDBI) of the Council of Europe (2009 – 2011).

Member of the Intergovernmental Bioethics Committee of UNESCO (since 2010).

Expertise for the Greek Parliament, the Council of Europe, the Greek Ministry of Health, The German Office of Technology Assessment, the EGE (2003).

Participation in many research projects at research centers in Greece and Europe as participant, partner and Senior Expert.

Fields of research: Human assisted procreation in national law and comparative perspective, legal, ethical and social aspects of cloning, genetic banks and biobanks, therapies in somatic cells and germcells, legal and ethical issues about xenotransplantation, animal rights, embryo and stem cell research, nanomedicine, technology assessment and consensus conferences, the role of parliaments in the technological era, etc.

Speaker in many national and international conferences and round tables.

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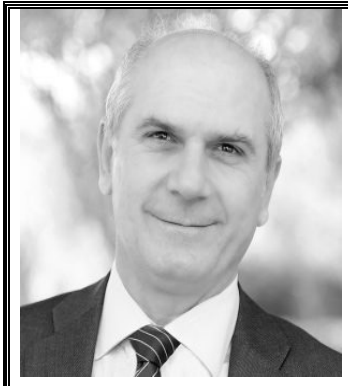

Professor Yannis_Psycharis

Dean at the Department of Economic and Regional Development, Panteion University of Social and Political Sciences

Yannis Psycharis is a Professor of Regional Economic Analysis at the Department Economic and Regional Development, Panteion University of Social and Political Sciences.

He is a graduate of the Department of Economics of the University of Piraeus, with a postgraduate degree from the Institute of Regional Development and a Ph.D. from the Department of Public Administration of Panteion University of Social and Political Sciences.

He has been a faculty member of the Engineering Department of Town Planning and Regional Development of the University of Thessaly and a Senior Research Fellow at the London School of Economics (LSE) in the UK. In addition to his expertise in Economic Geography, his research and educational interests concern the study of regional inequalities at national and European levels and the analysis and evaluation of regional development policies and programs.

He has authored a significant number of articles in reputable Greek and international scientific journals and has participated in numerous international scientific conferences. He is the President of the Greek Department of the European Society of Regional Science (ERSA) and has previously served as a Director of the National School of Public Administration and Local Government.

He is a reviewer of articles in international scientific journals that include:

- URBAN STUDIES,
- EUROPEAN PLANNING STUDIES,
- ENVIRONMENT AND PLANNING,
- REGIONAL STUDIES,
- SPATIAL ECONOMIC ANALYSIS, etc

Indicative Publications include:

- Petrakos G. and Psycharis Y. (2004), Regional Analysis in Greece, Kritiki Publications (in Greek).
- Psycharis Y. and Skayannis P., (2008), (eds) The Context, Dynamics and Planning of Urban Development: a selection of papers, University of Thessaly Press
- Coccossis H., Psycharis Y. (2008), (eds) Regional Analysis and Policy: the Greek experience, Springer, Contributions to Economics Series
- Coccossis H., Psycharis Y. (2007), (eds) ERSA 2006 Conference Proceedings: A Selection of Papers, European Regional Science Association, Greek Section
- Deffner A., Konstadakopulos D and Psycharis Y. (2003) (eds) Culture and Regional Economic Development in Europe: Cultural, Political and Social Perspectives, Volos, University of Thessaly Press.

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Professor Marie Noelle Duquenne

Marie Noelle Duquenne is a Professor of Statistical and Econometric Methods for Spatial Analysis at the Department of Planning and Regional Development School of Engineering, University of Thessaly.

Studies:

1984 Doctorat (Ph.d) Mathematical Economy and Econometry. Department of Economics, University of Paris-X- Nanterre, France

1981 DEA in Mathematical Economy and Econometry, Department of Economics, University of Paris-X-Nanterre, France

1980 Maitrise in Economic Science and Quantitative Methods, Department of Economics, University of Paris-X-Nanterre, France

Employment :

2000 – 2004 Teaching appointment at the Dept. PRD, University of Thessaly (Visiting Assistant Professor)

1998 - 1999Scientific advisor of General Secretary, Greek Ministry of Environment, Planning and Public Works

1997 – 1998 Scientific advisor of General Secretary of Forests and Natural Environment, Greek Ministry of Agriculture

1995 - 1997Scientific researcher, Centre of Social Morphology & Social Policy of the Panteion University

1993 – 1995 Scientific collaborator of the research team at the Direction of Studies and Planning, Agricultural Bank of Greece, for the project: "Agricultural Peri-urban areas: functions – transformations – perspectives

1993 Scientific collaborator of the Greek Institute of Labour, (INE)

1992 - 1997Associate consultant, Vakakis International S.A. Agricultural Development Consultants

1986 – 1992 Scientific researcher, Institution of Mediterranean Studies

1986 – 1988 Scientific researcher at the Kapodistriako University of Athens

1981 - 1983Researcher at the Research Centre CEDRA, University of Paris-X-Nanterre

Indicative Publications include:

Books, Edited volumes:

Duquenne M.N.(1984), 'Spécialisation Internationale et Prix de production', Paris.

Book Chapters:

- Kotzamanis B. and Duquenne M.N. (2012) 'Les recensements de la population dans l'Europe élargie, un essai réussi de comparabilité des données?' In G. Masuy - Stroobant (ed.)Élargissement de l'Union européenne, Enjeux et implications socio-démographiques, Centre de recherche en démographie et sociétés, IACCHOS/ Université catholique de Louvain, Louvain-la-Neuve: 79-98.
- Vlontzos G. and Duquenne M.N. (2009) 'Interrelationship between ethnicity and international trade of Greek virgin olive oil' In Lindgreen and Hingley (eds) Market Orientated? The Metamorphosis of Food and Agricultural Production and Marketing, Gower, U.K.

RSI Journal
By Dr. Eleni Stamatiou-Lacroix

Book Reviews

Book Title: Handbook of Research on Policies and Practices for Sustainable Economic Growth and Regional Development

Author: George M. Korres, Elias Kourliouros and Maria P. Michailidis

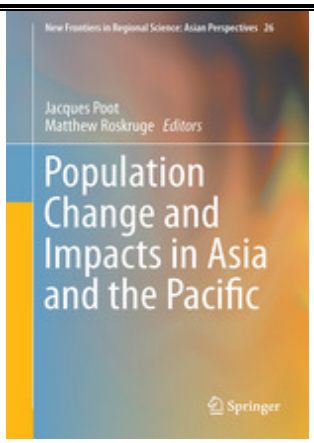
Publisher: IGI Global Editions, 2017

The Handbook of Research on Policies and Practices for Sustainable Economic Growth and Regional Development is an essential reference publication for the latest scholarly information on the role of socio-economics in sustainable development initiatives.

Featuring coverage on a variety of topics and perspectives including social economy innovation, cultural management, and social networking, this publication is ideally designed for researchers, policy makers, and academicians seeking current research on different determining factors of social consequences resulting from economic crisis.

The many academic areas covered in this publication include, but are not limited to: Cultural Management, Economic geography, Functional Urban Regions, Local Democracy, Non-Governmental Organizations, Social Economy Innovation, Social Networking, Sociology, and Spatial Planning.

Book review by Associate Professor Dr. Aikaterini Kokkinou, RSI Journal



Book Title: Population Change and Impacts in Asia and the Pacific

Authors: Poot Jacques and Roskruge Matthew

Publisher:Springer, ISBN: 978-981-10-0230-4

- This book provides an understanding of population change and dynamics across the Asia–Pacific region, with a specific focus on regional dynamics. More specific, this book offers new insights into the demographic challenges facing the Asia-Pacific region in terms of migration, ageing and uneven population distribution and growth.
- Furthermore, this book provides a contemporary regional science perspective on population change, and its socio-economic consequences, in the Asia–Pacific region.
- This book is "must have book" especially for those working on issues of population change and provide unique viewpoints from the perspective of regional science, drawing together many different disciplines with the common focus on understanding how regional dynamics impacts on today's globalized world.
- Specially, the issues being thoroughly developed are the following: broad demographic trends across the Asia-Pacific region, assessment of population decline and spatial distribution using cases from Japan, Australia, Colombia and Chile; migration and development in Oceania, the Pacific and Asia; and the impacts of population ageing in China, India, Thailand and across Asia.

Book Review by Christos Genitsaropoulos, RSI Journal

Book Title: Regional Research Frontiers - Vol. 1 Innovations, Regional Growth and Migration

Authors: Jackson Randall and Schaeffer Peter

Publisher:Springer, ISBN: 978-3-319-50547-3

This book provides an extensive analysis and identifies trends and future developments in the areas of innovation, regional growth and migration. Building on recent methodological and modelling advances, as well as on extensive policy-analysis experience.

- In more details, this book covers research areas such as mobility, regional forecasting, and regional policy, and includes expert contributions on disasters, resilience, and sustainability. Furthermore, this volume builds on recent methodological and modelling advances, as well as on extensive policy-analysis experience

Specially, the issues being thoroughly developed are the regional forecasting and regional policy and includes expert contributions on disasters, resilience and sustainability.

This book is well written and provides valuable a significant addition to the literature. It will appeal to a wide readership, from regional scientists and economists to geographers, quantitatively oriented regional planners and other related disciplines.

Finally, it offers a source of relevant information and can be used by academic researchers and policy analysts in government, and is also suitable for advanced teaching courses on regional and spatial science, economics and political science.

Book Review by Christos Genitsaropoulos, RSI Journal

Book Title: Regional Research Frontiers - Vol. 2 Methodological Advances, Regional Systems Modeling and Open Sciences

Author: Jackson Randall and Schaeffer Peter

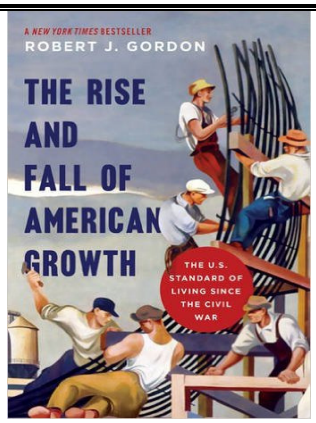
Publisher:Springer, ISBN: 978-3-319-50590-9

- This book provides an extensive methodological advances as well as trends and future developments in regional systems and science.
- In more detail, the book covers research areas such as interindustry modelling, computable general equilibrium models, exploratory spatial data analysis, geographic information science and spatial econometrics.

The central arguments of this book are topics such as dynamic interindustry modelling, computable general equilibrium models, exploratory spatial data analysis, geographic information science and spatial econometrics. It is essential to mention that this is the second volume in a two-part series on frontiers in regional research. Building on recent methodological and modelling advances, as well as on extensive policy-analysis experience, top international regional scientists identify and evaluate emerging new conceptual and methodological trends and directions in regional research.

Finally, it offers a source of relevant information and can be used by academic researchers and policy analysts in government and it is also suitable for advanced teaching courses on regional and spatial science, economics and political science.

Book Review by Christos Genitsaropoulos, RSI Journal



Book Title: The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War

Author: Robert J. Gordon

Publisher:Princeton University Press
ISBN: 978-0-691-14772-7 &0-691-14772-8

This book highlights the century after the Civil War on the United States and focus on an economic revolution which improved the American standard of living in ways previously unimaginable.

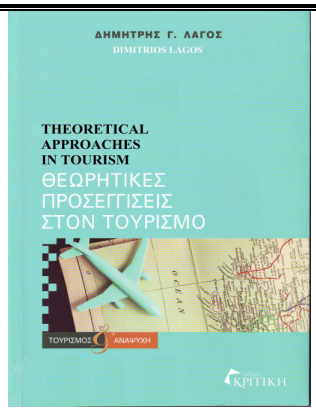
In addition, this book based on an important idea having innumerable implications. Economic growth is not a steady process that creates economic advances at a regular pace, century after century.

Instead progress occurs much more rapidly in some times than in others. To support this idea, the book examines the role of the electric lighting, indoor plumbing, motor vehicles, air travel, and television transformed households and workplaces.

Finally, we could say that Robert J. Gordon try to answer in the central question: «But has that era of unprecedented growth come to an end? »

The book, "The Rise and Fall of American Growth" challenges the view that economic growth will continue unabated and support that the life-altering scale of innovations between 1870 and 1970 cannot be repeated.

Book Review by Christos Genitsaropoulos, RSI Journal



Book Title:Theoretical approaches in Tourism

Author: Dimitrios Lagos

Publisher: Kritiki, 2016 / ISBN:978-960-586-115-5

This book contains extremely interesting content, has an attractive format, and is comprehensive and well documented, not only for the tourism professionals but also for everyone who is interested in the subject. It is the newest work of Professor of the University of the Aegean, Mr Dimitrios Lagos.

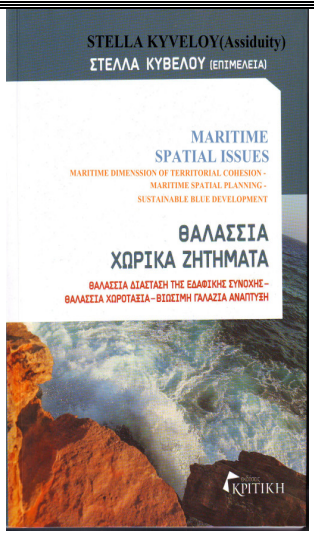
Given the poor theoretical exploration of tourism to date, the author, as intended, addresses the need for a multidisciplinary approach, demonstrating that tourism is not only an area of scientific study but a whole scientific field of interdisciplinary nature.

Several aspects of the theory of Tourism are presented in six chapters including the Introduction; Historical review, Economic Development, Psychological, Sociological and Environmental theories of Tourism.

Given that Greece is a tourist and tourism destination and also the role of tourism as the main pillar of economic, regional and other forms of development, Dimitrios Lagos with his book covers not only a timeless gap in the existing bibliography of Tourism but also offers an invaluable service to the field of Tourism and Greece as a Tourism destination, explaining that the need for tourism must be linked to the awareness of respect for the preservation and sustainability of resources and places of attraction, as well as the quality of life of the local population and visitors.

With the visible challenges of our times, readers are offered basic theoretical knowledge of the field of tourism studies so they can make a substantial contribution to scientific dialogue for further research and study. The author achieves his goal in the most appropriate way. The book is also expected to be released in the English language.

Book Review by Dr. Eleni N. Stamatiou, RSI Journal



Book Title Maritime Spatial Issues
Author(s): Stella Kyvelou (assiduity) - collective work
Publisher: Kritiki, 2016 / ISBN: 9789605861124

Edited and prefaced by the Associate Professor of Economic and Regional Development Department of Panteion University, Dr Stella Kyvelou with the contribution of a significant number of subject matter experts (including the author), this rich publication constitutes a multidisciplinary approach to the interesting and contemporary subject of Maritime Spatial Issues. Representatives of the scientific, business, political, Central government and local government, national, European and international stakeholders, as well as active citizens and from the private sector encompassing scientific / professional subject matter experts have contributed by submitting their knowledge, and experience.

The main sections of the book are:

-Basic approaches and concerns for the land-based operation at sea
-Blue growth and territorial cohesion,
-A vision for Europe
-The smart, sustainable and "inclusive" example of the blue economy
-Small land-use planning: From idea to practice
- Blue growth and sea tourism
-Energy and environmental challenges in ports
-Maritime transport, trans-European networks, challenges for blue growth
-Geopolitical and geostrategic dimensions of blue growth
-The blue growth on the field
-Programs, projects and innovations to promote the blue economy and Maritime spatial planning.

Finally, the book closes with the epilogue of Professor and former Dean of the Panteion University, the Minister of the Environment, Energy and Climate Change, Mr. Gregory Tsalta.

This book's aim and achievement is to contribute to the upgrading of the scientific dialogue being conducted in the EU and in Greece on "blue growth" as well as maritime spatial planning.

The book is expected to be released in English as well.

Book Review by Dr. Eleni N. Stamatiou, RSI Journal

GUIDELINES

for the Writers & a format model for the articles submitted to be reviewed & published in the journal

Regional Science Inquiry Journal

(EconLit, Scopus, RSA I) – www.rsijournal.eu

Guidelines for the Writers & a format model for the articles submitted to be reviewed & published in the journal

The Title of the paper must be centered, and the font must be Times New Roman, size 12, in Uppercase, in Bold

For the writers' personal information use the Times New Roman font, size 11, in bold, and centered. Use lowercase for the first name and uppercase for the last name. The line below the name includes the professional title and workplace; use the Times New Roman font, size 10, centered. In the third line write only the contact e-mail address in Times New Roman 10, centered.

Name LAST NAME
Professional Title, Workplace
E-mail Address

Name LAST NAME
Professional Title, Workplace
E-mail Address

Abstract

The abstract consists of a single paragraph, no longer than 250 words. The font must be Times New Roman, size 11. The text must be justified. The title "Abstract" must be aligned left, in Times New Roman, size 11, in bold. A space of one line must be left between the title and the text of the abstract. The abstract must contain sufficient information, be factual, and include the basic data of the paper.

Keywords: Use 3 to 5 keywords, separated by commas

JEL classification: We kindly request that you classify your paper according to the JEL system, which is used to classify articles, dissertations, books, book reviews, and a variety of other applications. The use of the JEL classification is necessary so that your paper be properly indexed in databases such as EconLit. Select the codes that represent your article and separate them by commas. You can find information on the JEL system here: https://www.aeaweb.org/jel/guide/jel.php

1. Introduction

All articles must begin with an introduction, a section which demarcates the theoretical background and the goals of the paper.

The present document provides the necessary information and formatting guidelines for you to write your article. We recommend that you copy this file to your computer and insert your own text in it, keeping the format that has already been set. All the different parts of the article (title, main text, headers, titles, etc.) have already been set, as in the present document-model. The main text must be written in regular Times New Roman font, size 11, justified, with a 0.5 cm indent for the first line of each paragraph.

We recommend that you save this document to your computer as a Word document model. Therefore, it will be easy for you to have your article in the correct format and ready to be submitted. **The only form in which the file will be accepted is MS Word 2003**. If you have a later version of Microsoft Office / Word, you can edit it as follows:

- Once you have finished formatting your text, create a pdf file, and then save your file as a Word "97-2003" (.doc) file.

- Compare the two files – the pdf one and the Word "97-2003" (.doc) one.
- If you do not note any significant differences between the two, then – and only then – you can submit your article to us, **sending both the pdf and the Word "97-2003" (.doc) files** to our e-mail address.

If you use a word processor other than Microsoft Word, we recommend that you follow the same procedure as above, creating a pdf file and using the appropriate add-on in order to save your document in MS Word "97-2003" (.doc) form. Once you compare the two files (and find no significant differences), send us both.

2. General Guidelines on Paper Formatting

2.1. Body

The body of the text consists of different sections which describe the content of the article (for example: Method, Findings, Analysis, Discussion, etc.). You can use up to three levels of sections – sub-sections. For the Body of the text, use the default format style in Word, selecting the Times New Roman font, size 11, justified, with a 0.5 cm indent for the first line of each paragraph (this is further detailed in the section "Paragraphs").

2.2. References

The references included in the paper must be cited at the end of the text. All references used in the body of the paper must be listed alphabetically (this is further detailed in the section "References").

2.3. Appendices

The section "Appendices" follows the section "References".

3. Page formatting

3.1. Page size

The page size must be A4 (21 x 29,7 cm), and its orientation must be "portrait". This stands for all the pages of the paper. "Landscape" orientation is inadmissible.

3.2. Margins

Top margin: 2,54cm
Bottom margin: 1,5cm
Left and right margins: 3,17cm
Gutter margin: 0cm

3.3. Headers and Footers

Go to "Format" → "Page", and select a 1,25cm margin for the header and a 1,25cm margin for the footer. Do not write inside the headers and footers, and do not insert page numbers.

3.4. Footnotes

The use of footnotes or endnotes is expressly prohibited. In case further explanation is deemed necessary, you must integrate it in the body of the paper.

3.5. Abbreviations and Acronyms

Abbreviations and acronyms must be defined in the abstract, as well as the first time each one is used in the body of the text.

3.6. Section headers

We recommend that you use up to three sections – sub-sections. Select a simple numbering for the sections – sub-sections according to the present model.

3.7. First level header format

For the headers of the main sections use the Times New Roman font, size 11, in bold and underlined, and leave a size 12 spacing before the paragraph and a size 6 spacing after the paragraph. The header must be aligned left. Use a capital letter only for the first letter of the header.

3.8. Second level header format

For second level headers, follow this model. Use the Times New Roman font, size 11, in bold, and leave a size 12 spacing before the paragraph and a size 3 spacing after the paragraph. Select a 0.5 cm indent. The header must be aligned left. Use a capital letter only for the first letter of the header.

3.8.1. Third level header

For third level headers, follow this model. Use the Times New Roman font, size 11, in bold and italics, and leave a size 6 spacing before the paragraph and a size 0 spacing after the paragraph. The header must be aligned left, with a left indent of 1 cm. Use a capital letter only for the first letter of the header.

4. Paragraphs

In every paragraph, use the Times New Roman font, size 11, with single line spacing. We recommend you modify the default (normal) format style in Word and use that in your text. For all paragraphs, the spacings before and after the paragraph must be size 0, and the line spacing single. Use a 0,5cm indent only for the first line of each paragraph. Leave no spacings nor lines between paragraphs.

4.1. Lists

In case you need to present data in the form of a list, use the following format:

- Bullet indent: 1,14cm
- Text:
    - Following tab at: 1,5 cm
    - Indent at: 1,5cm

Use the same format (the above values) if you use numbering for your list.

1. Example of numbered list 1
2. Example of numbered list 1

5. Figures, images, and tables

5.1. Figures and images

Insert your figures and images directly after the part where they are mentioned in the body of text. They must be centered, numbered, and have a short descriptive title.

Figures put together “as they are”, using Office tools, are absolutely inadmissible. The figures used must have been exclusively inserted as images in Word, in gif, jpg, or png form (with an analysis of at least 200dpi), and in line with the text. The width of an image must not exceed 14,5cm so that it does not exceed the margins set above.

The images, figures, and tables must be inserted “as they are” in the text, in line with it. **Figures and images which have been inserted in a text box are absolutely inadmissible.**

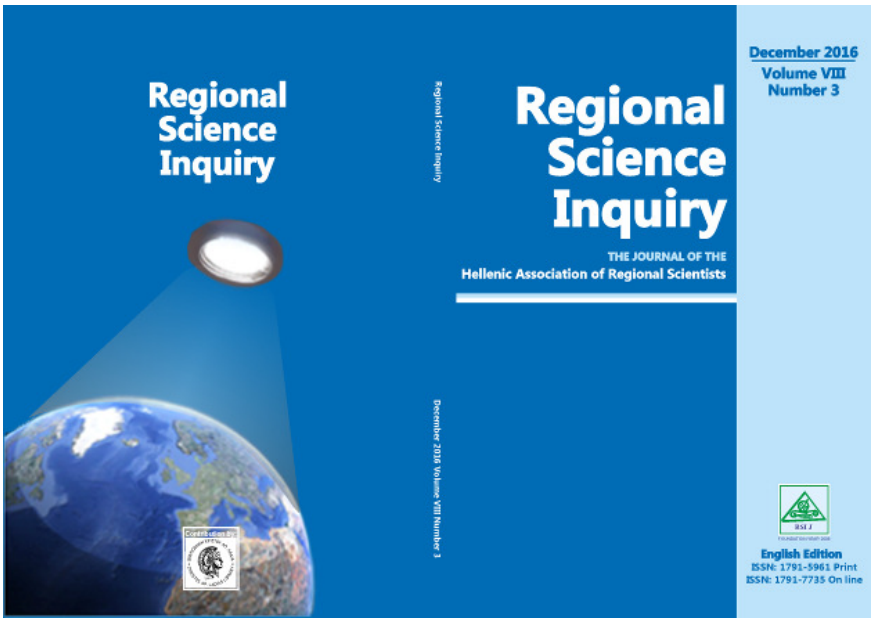
5.1.1. Reference inside the text

Avoid phrases such as "the table above" or the "figure below" when citing figures and images. Use instead "in Table 1", "in Figure 2", etc.

5.1.2. Examples

A model of how to format figures/images follows. For the title, use the Times New Roman font, size 10, in bold. Write the title above the figure, and set a size 6 spacing before the title and a size 0 spacing after it. The line spacing of the title must be 1.5 line. Both the image and its title must be centered.

Image 1: Title



Source: cite the source

Directly below the figure you must cite the source from which you took the image, or any note regarding the figure, written in Times New Roman, size 10. Write it below the figure, leaving a size 0 spacing before and after it, use a line spacing of 1.5 line, and make it centered.

5.2. Tables

For the title, use the Times New Roman font, size 10, in bold. Write the title above the table, and set a size 6 spacing before the title and a size 0 spacing after it. The line spacing of the title must be 1.5 line. Both the table and its title must be centered. The width of the table must not exceed 14,5cm so that it does not exceed the page margins set.

Table 1. Example of how a table must be formatted

Age	Frequency	Percentage %
Under 40	44	32.1
40 - 49	68	49.6
Over 50	25	18.2
Total	**137**	**100.0**

Source: cite the source

If the table needs to continue on the next page, select in the "Table properties" that the first line be repeated as a header in every page, as in the above example of Table 1. **Tables (or figures or images) which are included in pages with a "Landscape" orientation are absolutely inadmissible.**

Every table must have horizontal lines 1 pt. wide at the top and bottom, as shown in the example. The use of vertical lines and color fill at the background of the cells is strictly prohibited.

Directly below the table you must cite the source or any note regarding the table, written in Times New Roman, size 10. Write it below the table, leaving a size 0 spacing before and a size 6 spacing after it, and make it centered.

6. Mathematical formulas

There is a variety of tools in order to insert and process mathematical formulas, such as the "Mathematics", found in the most recent editions of Word, "Math Type", "Fast Math Formula Editor", "MathCast Equation Editor", "Math Editor". Since it is impossible for us to provide you with compatibility with all these tools in all their editions, **we can only admit your paper if it contains mathematical formulas solely in the form of images.**

Keep a continuous numbering for the mathematical formulas and center them in the page, as shown in the following example:

$$y = ax^2 + bx + c \tag{1}$$

The same stands for formulas or particular mathematical symbols you may have integrated in your text. For instance, if you want to use the term ax^2 in your text, you must insert it as an imaged, in line with the text. The images containing the mathematical formulas must be legible (at least 300dpi).

In the exceptional case of a text which may contain a great number of mathematical formulas, the writer may send it to us in TeX form if they so wish.

7. References

We recommend that you use the Chicago Manual of Style Author-Date system, as it is recommended by the AEA (American Economic Association) for the journals included in the EconLit database, and it is the dominant style of bibliography in the field of Economics. For more information you can go to the following links:

- https://www.aeaweb.org/journals/policies/sample-references
- http://www.chicagomanualofstyle.org/tools_citationguide.html
- http://libguides.williams.edu/citing/chicago-author-date#s-lg-box-12037253

7.1. Online references (internet citations)

Check your links again before sending your file, to confirm that they are active.

Avoid long internet links. Where possible, also cite the title of the website operator-owner. Return the font color to black, and remove the hyperlink. Links such as the following are impractical and distasteful, therefore should be avoided.

Example of an inadmissible hyperlink

https://el.wikipedia.org/wiki/%CE%9F%CE%B9%CE%BA%CE%BF%CE%BD%CE%BF%CE%BC%CE%B9%CE%BA%CE%AC

7.2. References Formatting

For your list of references, use the Times New Roman font, size 10, with single line spacing. The paragraph format must include a size 0 spacing before the paragraph and a size 0 spacing after it, aligned left. Use a 0,5 cm indent only for the first line of each paragraph. Leave no spacings or lines between paragraphs.

7.3. Example of how References must be formatted

Bureau of Labor Statistics. 2000–2010. "Current Employment Statistics: Colorado, Total Nonfarm, Seasonally adjusted - SMS08000000000000001." United States Department of Labor. http://data.bls.gov/cgi- bin/surveymost?sm+08 (accessed February 9, 2011).

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Romer, Christina D., and David H. Romer. 2010. “The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks: Dataset.” American Economic Review. http://www.aeaweb.org/articles.php?doi=10.1257/aer.100.3.763 (accessed August 22, 2012).
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Zitzewitz, Eric. 2006. “How Widespread Was Late Trading in Mutual Funds?” http://facultygsb.stanford.edu/zitzewitz.