University of Oradea
Faculty of Economic Sciences
Doctoral School of Economics

with the support of the Research Centre for Competitiveness and Sustainable Development &
Department of Economics and Business

Oradea Journal of Business and Economics

Volume 5/2020, Special Issue

ISSN 2501-1596, ISSN-L 2501-1596

This page intentionally left blank.

Oradea Journal of Business and Economics is an open access, peer-reviewed journal, publishing researches in all fields of business and economics.
The Journal is published exclusively in English. It publishes two regular issues per year, in March and September, and occasionally one special issue, on a special theme (if case). Articles published are double-blind peer-reviewed and included into one of the following categories: theoretical and methodological studies; original research papers; case studies; research notes; book reviews.

Volume 5, Special Issue, June 2020

ISSN 2501-1596 (in printed format). ISSN-L 2501-1596 (electronic format)
Journal site: http://ojbe.steconomiceuoradea.ro/.

Acknowledgement

Oradea Journal of Business and Economics wishes to acknowledge all individuals for their assistance with the peer reviewing of manuscripts for this issue, IT support, on-line and print publishing, as well as international databases indexing: dr. Abrudan Leonard, dr. Laura Diaconu, dr. Cătălina Radu, dr. Ana Iolanda Voda, dr. Ionela Gavrilă-Paven, Cosmin Ştir, Darie Gavriluţ. Their help and contributions in maintaining the quality of the journal are greatly appreciated.

This page intentionally left blank.

Contents

Miscelaneous

GLOBAL DEVELOPMENT, TRADE, HUMAN CAPITAL, AND BUSINESS CYCLES

Wei-Bin Zhang
Ritsumeikan Asia Pacific University, Japan
wbzl@apu.ac.jp

Abstract: *This paper generalizes the multi-country growth model with capital accumulation, human capital accumulation, economic structure and international trade by Zhang (2014) by making all the time-independent parameters in Zhang's model as time-dependent parameters. Each national economy consists of one tradable, one non-tradable and one education sector. National economies are different in propensities to save, to obtain education and to consume, and in learning abilities. The model integrates the Solow growth model, the Uzawa two-sector growth model, the Uzawa-Lucas two-sector growth model, and the Oniki–Uzawa trade model within a comprehensive framework. Human capital accumulation is through education in the Uzawa-Lucas model, Arrow's learning by producing, and Zhang's learning by consuming (creative learning). The behavior of the household is described with an alternative approach to household behavior. We simulated the model to demonstrate existence of equilibrium points, motion of the dynamic system, and oscillations due to different exogenous shocks*.

Keywords: trade pattern, education, non-tradable, economic oscillations, wealth accumulation

JEL classification: F1, F43, F44, J24, J11.

1. Introduction

This paper is concerned with identifying economic fluctuation in a synthesized Solow-Uzawa's growth, Oniki-Uzawa trade, and Lucas-Uzawa's two-sector model with exogenous shocks. The model is based on Zhang's model (Zhang, 2014). The main generalization of this study is to treat all the time-independent parameters in Zhang's model as time-dependent. This will make Zhang's original model far more robust as there are many factors, such as technological change, institutional shifts, fashions, seasonal factors, are time-dependent and are considered exogenous. Economics oscillations, often referred as business cycles, are commonly observed in empirical studies. Some researches consider economic oscillations as exogenous. A typical example is agricultural production which is influenced by seasonal changes as well as long-term global climates. Oscillations may also occur in a self-organized economic system without any exogenous influences. There are a lot of theoretical and empirical research about mechanisms and phenomena of economic fluctuations (e.g., Zhang, 1991, 2005, 2006; Lorenz, 1993; Flaschel *et al* 1997; Chiarella and Flaschel, 2000; Shone, 2002; Gandolfo, 2005; Puu, 2011; Nolte, 2015). These studies show how modern dynamic analysis can be applied to different economic systems, identifying existence of cycles, regular as well as irregular oscillations, and chaos in economic systems. There are also other studies which try to explain economic business cycles from different perspectives. Lucas (1977) demonstrates possible existence of some shocks that affect all sectors in an economy. Chatterjee and Ravikumar (1992) build a neoclassical growth model with seasonal perturbations to taste and technology. They demonstrate how the economic system reacts to seasonal demand and supply perturbations. Gabaix (2011) holds that uncorrelated sectoral shocks are determinants of aggregate fluctuations (see also, Giovanni,

et al. 2014; Stella, 2015). This study attempts to make a contribution to the literature by identifying economic fluctuations in a trade model with endogenous physical and human capital.

This paper is based on a model recently proposed by Zhang (2014). Zhang's model deals with dynamic interdependence between wealth and physical capital accumulation, human capital accumulation, and trade patterns in a multi-country neoclassical growth theory framework. The basic economic mechanism of wealth accumulation based on the Solow growth model with an alternative approach. International trade follows the trade models with accumulating capital developed by Oniki and Uzawa and others (for instance, Oniki and Uzawa, 1965; Frenkel and Razin, 1987; Sorger, 2002; and Nishimura and Shimomura, 2002). The analytical framework of the Oniki-Uzawa model is important for analyzing interdependence between trade patterns and economic growth. The Oniki-Uzawa model should be extended as it is constructed for the two-country with two goods. In fact, most of trade models with endogenous capital are still either limited to two-country or small open economies without taking account of endogenous human capital. Rather than classifying capital goods and consumer goods as in the Oniki-Uzawa model, we use tradable good and non-tradable. Distinction between tradable good and non-tradable good is significant for explaining many economic issues. There are analytical frameworks with tradable and non-tradable goods for explaining the terms of trade (Mendoza, 1995), for examining exchange rates (Stulz, 1987; Stockman and Dellas, 1989; Backus and Smith, 1993; Rogoff, 2002; Raleva, 2013); for dealing with current account dynamics (Edwards, 1989; Hohberger, *et al.* 2014), for examining investment structure (Cachanosky, 2014); or for solving the home premium puzzle (Baxter et al., 1998; Pesenti and van Wincoop, 2002). Backus and Smith (1993:1) explains this distinction as follows: "The mechanism is fairly simple. Although the law of one price holds, in the sense that each good sells for a single price in all countries, PPP may not: price indexes combine prices of both traded and nontraded goods, and because the latter are sold in only one country their prices, and hence price indexes, may differ across countries." Stockman and Tesar (1995) observe that the tradable sector is generally more volatile. Zhao et al. (2014) explains the difference between the tradable and non-tradable sectors by introducing labor adjustments in response to impulses. According to Zhao et al. (2014: 230) "Tradable sector variables like capital, investment, consumption and output are more volatile than their nontradable counterparts. This is especially true for output, where the tradable sector is more than two times as volatile. The nontradable sector accounts for almost half of both GDP and total consumption. Understanding the sources of volatility by sector may help in understanding the sources of aggregate fluctuations, the effects of shocks on the aggregate economy, and the likely impact of alternative public policies."

The study treats differences in human capital between countries as endogenous variables. Dynamic interdependence between economic growth and human capital is important for explaining national differences in growth and income (e.g., Easterlin, 1981; Hanushek and Kimko, 2000; Barro, 2001; Krueger and Lindahl, 2001; Galor and Zeira, 1993; Castelló-Climent and Hidalgo-Cabrillana, 2012; Barro and Lee, 2013; and Hanushek *et al*. 2014). This study considers three sources of learning – education in the Uzawa-Lucas model, Arrow's learning by doing, and Zhang's learning by consuming (which include leisure, family conditions, travels and readings at leisure, and so on). The first formal dynamic growth model with education was proposed by Uzawa (1965). There is an extensive literature on education and economic growth (Mincer, 1974; Tilak, 1989; Could *et al*., 2001; Tselios, 2008; Fleisher *et al.* 2011; Zhu, 2011). There is also a large number of the theoretical literature on endogenous knowledge and economic growth (Romer, 1986; Lucas, 1988; Grossman and Helpman, 1991; and Aghion and Howitt, 1998). There are other studies within similar frameworks for addressing different issues related to growth and human capital (e.g., Maoz and Moav, 1999; Galor and Moav, 2004; Fender and Wang, 2003; Erosa *et al*. 2010). A main

deviation of our approach from the previous models is that we derive demand of education in an alternative approach to the typical Ramsey approach. It is obviously not only school quality but also family and social environment as well as consumption that should be used to explain the differences in human capital between developed and developing economies. In order to more properly modelling human capital accumulation, this study takes account of Arrow's learning by doing (Arrow, 1962) and Zhang's creative leisure (Zhang, 2013, 2014) in modeling human capital accumulation. This paper is built on Zhang's model (Zhang, 2014). The main generalization of this study is to treat all the time-independent parameters in Zhang's model as time-dependent parameters. The rest of the paper is organized as follows. Section 2 defines the basic model. Section 3 shows how we solve the dynamics and simulates the motion of the global economy. Section 4 carries out comparative dynamic analysis to examine the impact of changes in some parameters on the motion of the global economy. Section 5 concludes the study. The appendix proves the main results in Section 3.

2. The Model

The model is a generalization of the trade model proposed by Zhang (2014). The model in this study is developed within the framework of the neoclassical growth theory with international trade. Most neoclassical growth models are based on the pioneering works of Solow (1956). There are many extensions and generalizations of the Solow model (e.g., Burmeister and Dobell, 1970; Azariadis, 1993; Barro and Sala-i-Martin, 1995). This study considers a world economy which consists of multiple countries, indexed by $j = 1, \dots, J$. Country j has population, $\bar{N}_j(t), j = 1, \dots, J$. Each country has three sectors: one tradable good sector, one non-tradable goods sector and one education sector. We use an alternative approach to consumer behavior proposed by Zhang (1993). All the national economies can produce a homogenous tradable commodity (Ikeda and Ono, 1992). The commodity is like the commodity in the Solow model which can be consumed and invested. Households own assets of the economy and distribute their incomes to consume, to receive education, and to save. Production sectors or firms use capital and labor. Exchanges take place in perfectly competitive markets. Production sectors sell their product to households or to other sectors and households sell their labor and assets to production sectors. Factor markets work well; factors are inelastically supplied and the available factors are fully utilized at every moment. Saving is undertaken only by households, which implies that all earnings of firms are distributed in the form of payments to factors of production. We omit the possibility of hoarding of output in the form of non-productive inventories held by households. Let price be measured in terms of the tradable good and the price of the good be unit. We denote wage and interest rates by $w_j(t)$ and $r_j(t)$ respectively, in the jth country. Capital depreciates at an exponential rate $\delta_{jk}(t)$ in country j. Let $p_j(t)$ and $p_{js}(t)$ denote the price of education and the price of non-tradable good in country j. We use subscript index, i, s and e to stand for tradable good sector, non-tradable good sector, and education sector, respectively, in country j. We use $N_{jm}(t)$ and $K_{jm}(t)$ to stand for the labor force and capital stocks employed by sector m in country j. Let $F_{jm}(t)$ stand for the output level of sector m in country j.

The labor supply

The aggregated labor force $N_j(t)$ of country j is given by

$$N_j(t) = H_j^{m_j(t)}(t) T_j(t) \bar{N}_j(t), \quad (1)$$

where $H_j(t)$ and $T_j(t)$ are respectively the level of human capital and work time in country j. Here, $m_j(t)$ is a positive parameter measuring how household j effectively applies human capital at time in country j.

Marking clearing conditions

We denote wage rate per unit qualified work time in country j and interest rates by $w_j(t)$ and $r_j(t)$. In the free trade system, the interest rate is identical throughout the world economy, i.e.,

$$r(t) = r_j(t).$$

We use $K(t)$ to stand for the capital stocks of the world economy. The total capital stock employed by country j, $K_j(t)$ is allocated between the tradable, non-tradable and education sectors. We use $\overline{K}_j(t)$ to stand for the wealth owned by country j. We use $N_{jq}(t)$ and $K_{jq}(t)$ to respectively stand for labor force and capital stocks employed by sector q. As full employment of labor and capital is assumed, we have:

$$K_{ji}(t) + K_{js}(t) + K_{je}(t) = K_j(t), N_{ji}(t) + N_{js}(t) + N_{je}(t) = N_j(t).$$

We rewrite the above relations as follows:

$$n_{ji}(t)k_{ji}(t) + n_{js}(t)k_{js}(t) + n_{je}(t)k_{je}(t) = k_j(t), n_{ji}(t) + n_{js}(t) + n_{je}(t) = 1, (2)$$

in which

$$k_{jq}(t) \equiv \frac{K_{jq}(t)}{N_{jq}(t)}, n_{jq}(t) \equiv \frac{N_{jq}(t)}{N_j(t)}, k_j(t) \equiv \frac{K_j(t)}{N_j(t)}, q = i, s, e.$$

Production functions

We assume that production of sector (j, q) is to combine qualified labor force $N_{jq}(t)$ and physical capital $K_{jq}(t)$. The production function $F_{jq}(t)$ is described by:

$$F_{jq}(t) = A_{jq}(t)\, K_{jq}^{\alpha_{jq}(t)}(t)\, N_{jq}^{\alpha_{jq}(t)}(t), \alpha_{jq}(t), \beta_{jq}(t) > 0, \alpha_{jq}(t) + \beta_{jq}(t) = 1, j = i, s, (3)$$

where $A_{jq}(t), \alpha_{jq}(t)$ and $\beta_{jq}(t)$ are positive parameters.

Marginal conditions

Let all the prices be measured in terms of the good. We use $p_{js}(t)$ to represent the price of services in country j. Markets are competitive; thus labor and capital earn their marginal products, and firms earn zero profits. The rate of interest, wage rate, and prices are determined by markets. Hence, for any individual firm $r(t)$, $w_j(t)$ and $p_{js}(t)$ are given at each point of time. The production sector chooses the two variables $K_{ji}(t)$ and $N_{ji}(t)$ to maximize its profit. The marginal conditions are:

$$r(t) + \delta_{jk}(t) = \alpha_{ji}(t)\, A_{ji}(t)\, k_{ji}^{-\beta_{ji}(t)}(t), w_j(t) = \beta_{ji}(t) A_{ji}(t) k_{ji}^{\alpha_{ji}(t)}(t), (4)$$

$$r(t) + \delta_{jk}(t) = \alpha_{js}(t)\, A_{js}(t)\, p_{js}(t)\, k_{js}^{-\beta_{js}(t)}(t), w_j(t) = \beta_{js}(t) A_{js}(t)\, p_{js}(t)\, k_{js}^{\alpha_{js}(t)}(t), (5)$$

where $\delta_{jk}(t)$ is depreciation rate of physical capital.

Education sector

We assume that the education sector is characterized of perfect competition. Students are supposed to pay the education fee $p_j(t)$ per unit of time in country. The education sector pays

teachers and capital with the market rates. The cost of the education sector is given by $w_j(t)N_{je}(t) + \left(r(t) + \delta_{jk}(t)\right) K_{je}(t)$. The production function of the education sector is assumed to be a function of $K_{je}(t)$ and $N_{je}(t)$ as follows:

$$F_{je}(t) = A_{je}(t)\, K_{je}^{\alpha_{je}(t)}(t)\, N_{je}^{\alpha_{je}(t)}(t), \alpha_{je}(t), \beta_{je}(t) > 0, \alpha_{je}(t) + \beta_{je}(t) = 1, (6)$$

where $A_{je}(t)$, $\alpha_{je}(t)$, and $\beta_{je}(t)$ are positive parameters. The marginal conditions for the education sector are:

$$r(t) + \delta_{jk}(t) = \alpha_{je}(t)\, A_{je}(t)\, p_{je}(t)\, k_{je}^{-\beta_{je}(t)}(t), w_j(t) = \beta_{je}(t) A_{je}(t)\, p_{je}(t) k_{je}^{\alpha_{je}(t)}(t), (7)$$

Consumer behaviors and wealth dynamics

This study uses Zhang's utility function to describe behavior of households (Zhang, 1993). Consumers make decisions on distribution of time for work and education, consumption levels of tradable and non-tradable commodities, and saving. Let $\bar{k}_j(t)$ stand for wealth of household j. Per household's current income from the interest payment $r(t)\, \bar{k}_j(t)$ and the wage payment $H_j^{m_j(t)}(t)\, T_j(t)\, w_j(t)$ is given by:

$$y_j(t) = r(t)\, \bar{k}_j(t) + H_j^{m_j(t)}(t)\, T_j(t)\, w_j(t).$$

We call $y_j(t)$ the current income. The total value of wealth that consumers can sell to purchase goods and to save is equal to $\bar{k}_j(t)$. Here, we assume that selling and buying wealth can be conducted instantaneously without any transaction cost. The per capita disposable income is then given by:

$$\hat{y}_j(t) \equiv y_j(t) + \bar{k}_j(t) = \left(1 + r(t)\right) \bar{k}_j(t) + H_j^{m_j(t)}(t)\, T_j(t)\, w_j(t). (8)$$

The disposable income is used for saving, consumption and education. Let $T_{je}(t)$ stand for the time spent on education. We assume that the total available time is distributed between education and work. The consumer is faced with the following time constraint:

$$T_j(t) + T_{je}(t) = T_0, (9)$$

where T_0 is the total available time. The consumer is faced with the following budget constraint:

$$c_j(t) + p_{js}(t)\, c_{js}(t) + s_j(t) + p_j(t)\, T_{je}(t) = \hat{y}_j(t). (10)$$

Insert (9) in (10):

$$c_j(t) + p_{js}(t)\, c_{js}(t) + s_j(t) + \bar{p}_j(t)\, T_{je}(t) = \bar{y}_j(t), (11)$$

Where

$$\bar{p}_j(t) \equiv p_j(t) + \bar{w}_j(t), \bar{w}_j(t) \equiv H_j^{m_j(t)}(t)\ w_j(t),$$
$$\bar{y}_j(t) \equiv \left(1 + r(t)\right) \bar{k}_j(t) + T_0\, \bar{w}_j(t). (12)$$

Consumers decide four variables, consumption levels of the two goods, level of saving, and education time. We assume that consumers' utility function is a function of the consumption

level of tradable good $c_j(t)$ the consumption level of non-tradable good $c_{js}(t)$ the education time $T_{je}(t)$ and the level of saving $s_j(t)$ as follows:

$$U_j(t) = c_j^{\xi_{j0}(t)}(t)\, c_{js}^{\gamma_{j0}(t)}(t)\, s_j^{\lambda_{j0}(t)}(t)\, T_{je}^{\eta_{j0}(t)}(t)\,, \gamma_{j0}(t), \xi_{0j}(t), \lambda_{j0}(t), \eta_{j0}(t) > 0,$$

where $\xi_{0j}(t)$ is called the propensity to consume tradable good, $\gamma_{j0}(t)$ the propensity to consume non-tradable good $\eta_{j0}(t)$, the propensity to own wealth, and $\lambda_{j0}(t)$ the propensity to receive education. Maximizing $U_j(t)$ subject to the budget constraint yields:

$$c_j(t) = \xi_j(t)\, \bar{y}_j(t), p_{js}(t)\, c_{js}(t) = \gamma_j(t)\, \bar{y}_j(t), s_j(t) = \lambda_j(t)\, \bar{y}_j(t),$$
$$\bar{p}_j(t)\, T_{je}(t) = \eta_j(t) \bar{y}_j(t), (13)$$

where

$$\xi_j(t) \equiv \xi_{0j}(t)\rho_j(t),\ \gamma_j(t) \equiv \gamma_{j0}(t)\, \rho_j(t), \lambda_j(t) \equiv \lambda_{j0}(t)\, \rho_j(t), \eta_j(t) \equiv \eta_{j0}(t)\, \rho_j(t),$$
$$\rho_j(t) \equiv \frac{1}{\xi_{0j}(t)+\gamma_{j0}(t) + \lambda_{j0}(t) + \eta_{j0}(t)}.$$

In this dynamic system, as any factor is related to all the other factors over time, it is difficult to see how one factor affects any other variable over time in the dynamic system. Our approach to education decision is oversimplified. There are many factors which may affect the decision. For instance, Attanasio and Kaufmann (2014) study the role of expected returns to schooling and of perceived risks (of unemployment and earnings) as determinants of schooling decisions, using Mexican data. They find that expected returns and risk perceptions are play an important role in schooling decisions. Dominitz and Manski (1996) take account subjective expectations of earnings for different schooling degrees. There are also other studies on relations between subjective expectations of earnings and schooling choices in different contexts (Jensen, 2010; Arcidiacono et al. 2012; and Stinebrickner and Stinebrickner, 2012). Although in theory we can take account of these factors by treating the propensities as endogenous variables, for simplicity we consider the propensities fixed in this study.

Wealth accumulation

According to the definitions of $s_j(t)$ the wealth accumulation of the representative household in country j is given by:

$$\dot{k}_j(t) = s_j(t) - \bar{k}_j(t) - \frac{\dot{N}_j(t)}{N_j(t)}\bar{k}_j(t). (14)$$

This equation simply states that the change in wealth is equal to the saving minus dissaving.

Human capital accumulation

According to the study by Hanushek and Woessmann (2008), the cognitive skills of the population, rather than mere school attainment, are strongly related to economic growth, individual earnings, and the distribution. There are many factors which may affect education supply and its quality (e.g., Lazear 2001; Krueger and Whitmore 2001; Bosworth and Caliendo 2007; Maasoumi, *et al*. 2005; Wossmann and West. 2006). A recent study by Kaarsen (2014) on estimating differences in education quality finds: “there are large differences in education quality across countries. One year of schooling in the U.S. corresponds to 3 or even 4 years of schooling in many developing countries. Moreover, these quality differences are able to account for a considerable share of the variation in income across countries.” As human capital is not only affecting by schooling, it is necessary to introduce other possible determinants, such as reading at leisure, available

information and knowledge outside education institutions, family environment, consumption such as travelling, gaming and parting, as well as social environment outside school, which may paly important role in human capital accumulation. We take account of three sources of improving human capital, through education, "learning by producing", and "learning by leisure". Arrow (1962) first introduced learning by doing into growth theory; Uzawa (1965) took account of trade-offs between investment in education and capital accumulation, and Zhang (2007) introduced impact of consumption on human capital accumulation (via the so-called creative leisure) into growth theory. We propose the following human capital accumulation equation

$$\dot{H}_j(t) = \frac{\upsilon_{je}(t)F_{je}^{a_{je}(t)}(t)\left(H_j^{m_j(t)}(t)T_{je}(t)\bar{N}_j(t)\right)^{b_{je}(t)}}{H_j^{\pi_{je}(t)}(t)\bar{N}_j(t)} + \frac{\upsilon_{ji}(t)F_{ji}^{a_{ji}(t)}(t)}{H_j^{\pi_{ji}(t)}(t)\bar{N}_j(t)}$$
$$+ \frac{\upsilon_{jh}(t)\, c_j^{a_{jh}(t)}(t)}{H_j^{\pi_{jh}(t)}(t)} + \frac{\upsilon_{js}(t)\, c_{js}^{a_{js}(t)}(t)}{H_j^{\pi_{js}(t)}(t)} - \delta_{jh}(t)H_j(t), \quad (15)$$

where $\delta_{jh}(t)$ is the depreciation rate of human capital, $\upsilon_{je}(t)$, $\upsilon_{ji}(t)$, $\upsilon_{jh}(t)$, $a_{je}(t)$, $b_{je}(t)$, $a_{ji}(t)$ and $b_{ji}(t)$ are non-negative time-dependent parameters. The signs of the parameters $\pi_{je}(t)$, $\pi_{ji}(t)$, and $\pi_{jh}(t)$ are not specified as they may be either negative or positive. The equation is a synthesis and generalization of Arrow's, Uzawa's, and Zhang's ideas about human capital accumulation. The term

$$\frac{\upsilon_{je}(t)F_{je}^{a_{je}(t)}(t)\left(H_j^{m_j(t)}(t)T_{je}(t)\bar{N}_j(t)\right)^{b_{je}(t)}}{H_j^{\pi_{je}(t)}(t)\bar{N}_j(t)}$$

is the contribution to human capital improvement through education. The term implies that human capital rises in the level of education service F_{je} and in the (qualified) total study time $H_j^{m_j}\, T_{je}\, \bar{N}_j$. The term $H_j^{\pi_{je}}$ indicates implies that it may be more difficult (in the case of π_{je} being large) or easier (in the case of π_{je} being small) to accumulate more human capital. There are many factors which may affect education quality. For instance, there are studies on relationship between class size and student achievement (Boozer and Rouse 2001; Dobbelsteen et al. 2002; Urquiola, 2006; Bosworth, 2014). The term $\upsilon_{ji}F_{ji}^{a_{ji}}/H_j^{\pi_{ji}}$ implies learning by producing effects in human capital accumulation.

Market clearing in education markets

For the education sector, the demand and supply balances in each country:

$$T_{je}(t)\, \bar{N}_j(t) = F_{je}(t). \quad (16)$$

Market clearing in non-tradable good markets

The demand for non-tradable good equals the supply

$$c_{js}(t)\, \bar{N}_j(t) = F_{js}(t). \quad (17)$$

Market clearing in tradable good markets

The total capital stocks in international markets employed by the production sectors is equal to the total wealth owned by all the countries:

$$K(t) \equiv \sum_{j=1}^{J} K_j(t) = \sum_{j=1}^{J} \bar{k}_j(t)\, \bar{N}_j(t)\,. (18)$$

The world production is equal to the world consumption and world net savings:

$$C(t) + S(t) - K(t) + \sum_{j=1}^{J} \delta_{kj}(t)\, K_j(t) = K(t), (19)$$

where

$$C(t) \equiv \sum_{j=1}^{J} c_j(t)\, \bar{N}_j(t)\,, S(t) \equiv \sum_{j=1}^{J} s_j(t)\, \bar{N}_j(t)\,, F(t) \equiv \sum_{j=1}^{J} F_{ji}(t).$$

International trade

The trade balances of the economies are given by:

$$E_j(t) = \left(\bar{K}_j(t) - K_j(t)\right) r(t). (20)$$

When $E_j(t)$ is positive (negative), we say that country j is in trade surplus (deficit). When $E_j(t)$ is zero, country j trade is in balance.

We built the model with trade, economic growth, physical and human capital accumulation in the world economy in which the domestic markets of each country are perfectly competitive, international product and capital markets are freely mobile and labor is internationally immobile. The model synthesizes main ideas in economic growth theory and trade theory in a comprehensive framework. The model is general in the sense that some well-known models in economics can be considered as its special cases.

3. The Dynamics and Equilibrium

We built a multi-country growth model with have the dynamic equations for the economy with any number of economies. Before examining the dynamic properties of the system, we show that the dynamics of J national economies can be expressed by $2J$ differential equations. The following lemma is important as it shows how to follow the dynamics of global economic growth with computer.

Lemma

The motion of $2J$ variables, $\{\bar{k}_j(t)\}$, $k_{1i}(t)$, and $\left(H_j(t)\right)$, where $\{\bar{k}_j(t)\} = \left(\bar{k}_2(t), \ldots, \bar{k}_J(t)\right)$, is given by the following J differential equations:

$$\dot{k}_{1i}(t) = \bar{\Lambda}_1\left(k_{1i}(t), \left(H_j(t)\right), \{\bar{k}_j(t)\}, t\right),$$
$$\dot{\bar{k}}_j(t) = \bar{\Lambda}_j\left(k_{1i}(t), \left(H_j(t)\right), \{\bar{k}_j(t)\}, t\right), j = 2, \ldots, J,$$
$$\dot{H}_j(t) = \Lambda_j\left(k_{1i}(t), \left(H_j(t)\right), \{\bar{k}_j(t)\}, t\right), j = 2, \ldots, J, (21)$$

where $\bar{\Lambda}_j$ and Λ_j are functions of $\{\bar{k}_j(t)\}$, $k_{1i}(t)$, $\left(H_j(t)\right)$, and t defined in the appendix. The values of the other variables are given as functions of $\{\bar{k}_j(t)\}$, $k_{1i}(t)$, $\left(H_j(t)\right)$, and t at any

point in time by the following procedure: $k_{ji}(t)$ by (A3) $\rightarrow k_{js}(t)$ by (A1) $\rightarrow k_{je}(t)$ by (A4) $\rightarrow r(t)$ and $w_j(t)$ by (4) $\rightarrow p_j(t)$ by (A5) $\rightarrow \bar{k}_1(t)$ by (A14) $\rightarrow K_j(t)$ by (A13) $\rightarrow \bar{w}_j(t), \bar{p}_j(t)$ and $\bar{y}_j(t)$ by (12) $\rightarrow \bar{k}_j(t)$ by (A12) $\rightarrow T_j(t)$ by (A11) $\rightarrow T_{je}(t)$ by (13) $\rightarrow N_j(t) = H_j^{m_j(t)}(t)\, T_j(t)\, \bar{N}_j(t) \rightarrow n_{ji}(t)$ and $n_{js}(t)$ by (A7) $\rightarrow n_{je}(t)$ by (A6) $\rightarrow N_{jq}(t) = n_{jq}(t)\, N_j(t) \rightarrow K_{jq}(t) = k_{jq}(t)\, N_{jq}(t) \rightarrow F_{ji}(t)$ and $F_{js}(t)$ by (3) $\rightarrow F_{je}(t)$ by (6) $\rightarrow c_j(t)$ and $s_j(t)$ by (13) $\rightarrow E_j(t) = \left(\bar{K}_j(t) - K_j(t)\right) \bar{N}_j(t)$.

For simulation, we specify values of the parameters. We consider the world consists of three national economies, i.e., $J = 3$. We first assume that all the parameters are time-independent. Then we show that the system fluctuates around the paths with the time-independent parameters when some parameter is subject to some time-dependent perturbations. The population and human capital utilization efficiency of the three economies are specified as follows

$$N_1 = 5, N_2 = 10, N_3 = 20, T_0 = 1, m_1 = 0.9, m_2 = 0.85, m_3 = 0.75. \quad (22)$$

Country $1,2$and $3's$ populations are respectively $5,10$ and 20. Country 3 has the largest population. Country 1 uses human capital most effectively and Country 2 next. The parameters in the production functions and physical capital depreciation rates of the three economies are

$$A_{1i} = 1.3, A_{1s} = 1.2, A_{1e} = 1.1, \alpha_{1i} = 0.32, \alpha_{1s} = 0.35, \alpha_{1e} = 0.45, A_{2i} = 1.25, A_{2s} = 1.1,$$
$$A_{2e} = 1, \alpha_{2i} = 0.32, \alpha_{2s} = 0.36, \alpha_{2e} = 0.45, A_{3i} = 1.2, A_{3s} = 1, A_{3e} = 0.9, \alpha_{3i} = 0.32,$$
$$\alpha_{3s} = 0.37, \alpha_{3e} = 0.45, \delta_{1k} = 0.06, \delta_{2k} = 0.05, \delta_{3k} = 0.05. \quad (23)$$

The total factor productivities are different between three economies. Country 1's total factor productivity is highest and Country 3's total factor productivity is lowest. We call countries $1,2$and 3 respectively as highly developed, developed, and lowly developed economies (HDE, DE, LDE). The output elasticities with respect labor and capital also vary between countries. We specify the values of the parameters, α_j, in the Cobb-Douglas productions approximately equal to 0.3. The depreciation rate of physical capital is specified near 0.05. We specify the household preferences of the three economies as:

$$\gamma_{10} = 0.06, \eta_{10} = 0.07, \xi_{10} = 0.1, \lambda_{10} = 0.73, \gamma_{20} = 0.06, \eta_{20} = 0.06, \xi_{20} = 0.1,$$
$$\lambda_{20} = 0.07, \gamma_{30} = 0.06, \eta_{30} = 0.05, \xi_{30} = 0.1, \lambda_{30} = 0.68. \quad (24)$$

The HDE's propensity to save is 0.73, the DE's propensity to save is 0.7, and the LDE's propensity to save is 0.6. We specify the human capital accumulation as follows:

$$v_{1e} = 1.2, v_{1i} = 3, v_{1h} = 1.2, v_{1s} = 1.2, a_{1e} = 0.3, b_{1e} = 0.5, a_{1i} = 0.4, a_{1h} = 0.1,$$
$$a_{1s} = 0.3, \pi_{1e} = 0.1, \pi_{1i} = 0.7, \pi_{1h} = 0.1, \pi_{1s} = 0.1, \delta_{1h} = 0.05, v_{2e} = 1.1, v_{2i} = 2.7,$$
$$v_{2h} = 1, v_{2s} = 1, a_{2e} = 0.3, b_{2e} = 0.5, a_{2i} = 0.4, a_{2h} = 0.1, a_{2s} = 0.3, \pi_{2e} = 0.1,$$
$$\pi_{2i} = 0.7, \pi_{2h} = 0.1, \pi_{2s} = 0.1, \delta_{2h} = 0.05, v_{3e} = 1, v_{3i} = 2.5, v_{3h} = 1, v_{3s} = 1, a_{3e} = 0.3,$$
$$b_{3e} = 0.5, a_{3i} = 0.4, a_{3h} = 0.1, a_{3s} = 0.3, \pi_{3e} = 0.1, \pi_{3i} = 0.7, \pi_{3h} = 0.1, \pi_{3s} = 0.1,$$
$$\delta_{3h} = 0.05. \quad (25)$$

The human capital depreciation rates of the three economies are equal. The HDE's human capital accumulation efficiency due to education v_{1e} is highest, the DE's is next, and the LDE's is lowest. Similarly, the specified values in (24) imply that the HDE is most effective in accumulating human capital, the DE is next, and the LDE is least effective. As we already provided the procedure to follow the motion of each variable in the system, it is straightforward to plot the motion with computer. We specify the initial conditions as follows:

$$k_{1i}(0) = 7.4, \bar{k}_2(0) = 230, \bar{k}_3(0) = 139, H_1(0) = 92, H_2(0) = 84, H_3(0) = 67.$$

It should be noted that this case was already examined by Zhang (2014). We just summarize the simulation results by Zhang. The motion of the system is given in Figure 1. In the figure the GDPs per capita and the global GDP are defined as follows

$$g_j \equiv \frac{F_{ji} + p_{js}F_{js} + p_{je}F_{je}}{\bar{N}_j}, \quad Y \equiv \sum_j \left(F_{ji} + p_{js}F_{js} + p_{je}F_{je}\right).$$

The HDE's GDP per capita and human capital are enhanced over time, the other two countries' GDP per capita and human capital are lowered. The HDE's total labor force and capital stocks employed are augmented and the other two economies' total labor forces and capital stocks employed are lowered. The prices of education and non-tradable goods fall slightly in the three economies. The rate of interest falls and the wage rates are increased. The HDE's wage income per capita is increased, and the other two economies' wage incomes per capita are reduced. The labor and capital are redistributed between the three sectors in each economy over time. The system approaches an equilibrium point in the long term.

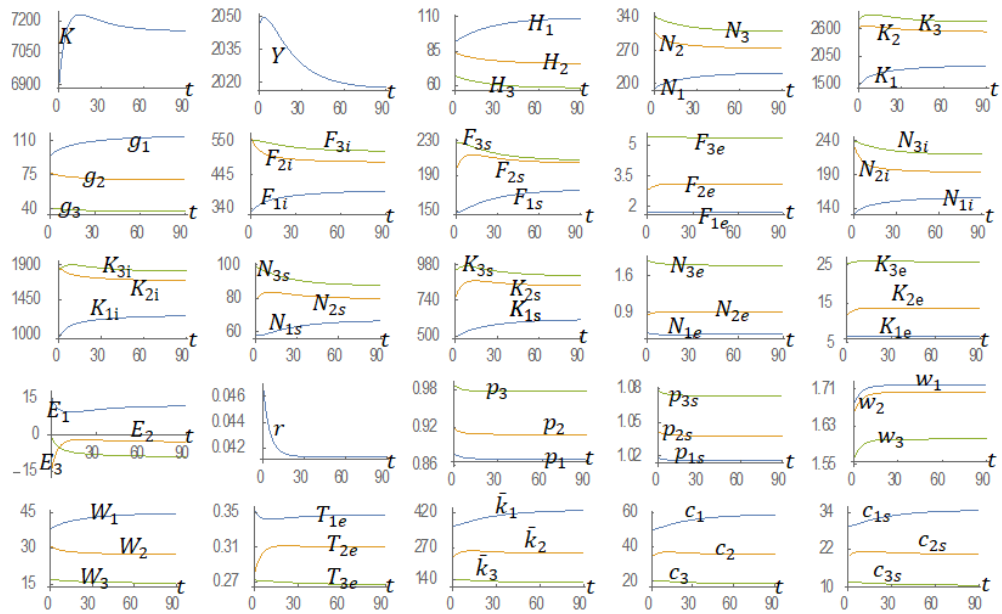

Figure 1: The Motion of the Global Economy

It should be noted that much of the discussion of income convergence in the literature of economic growth and development is based on the insights from analyzing models of closed economies (Barro and Sala-i-Martin, 1995). It is obviously strange to discuss issues related to global income and wealth convergence with a framework without international interactions. The reason for this is that there are few growth models with endogenous wealth and trade on the basis of microeconomic foundation. Figure 1 does not demonstrate that different countries will experience convergence in per capita income, consumption and wealth in the long term. As Barro (2013: 327) observe, "The data reveal a pattern of conditional convergence in the sense that the growth rate of per capita GDP is inversely related to the starting level of per capita GDP, holding fixed measures of government policies and institutions, initial stocks of human capital, and the character of the national population. With respect to education, growth

is positively related to the starting level of average years of school attainment of adult males at the secondary and higher levels." Our model shows different patterns. We show that the representative household from a country with higher GDP per capita spends more time on education. From Figure 1 we observe that the system becomes stationary in the long term. Following the Lemma under (15), we calculate the equilibrium values of the variables as follows

$$\begin{pmatrix} r \\ K \\ Y \end{pmatrix} = \begin{pmatrix} 0.041 \\ 7151 \\ 2017 \end{pmatrix}, \begin{pmatrix} p_1 \\ p_2 \\ p_3 \end{pmatrix} = \begin{pmatrix} 0.87 \\ 0.91 \\ 0.98 \end{pmatrix}, \begin{pmatrix} p_{1s} \\ p_{2s} \\ p_{3s} \end{pmatrix} = \begin{pmatrix} 1.02 \\ 1.04 \\ 1.07 \end{pmatrix}, \begin{pmatrix} g_1 \\ g_2 \\ g_3 \end{pmatrix} = \begin{pmatrix} 114.6 \\ 69.8 \\ 37.3 \end{pmatrix},$$

$$\begin{pmatrix} E_1 \\ E_2 \\ E_3 \end{pmatrix} = \begin{pmatrix} 11.86 \\ -2.92 \\ -8.95 \end{pmatrix}, \begin{pmatrix} N_1 \\ N_2 \\ N_3 \end{pmatrix} = \begin{pmatrix} 223.6 \\ 273.6 \\ 308.8 \end{pmatrix}, \begin{pmatrix} n_{1e} \\ n_{2e} \\ n_{3e} \end{pmatrix} = \begin{pmatrix} 0.0022 \\ 0.0033 \\ 0.0058 \end{pmatrix}, \begin{pmatrix} n_{1s} \\ n_{2s} \\ n_{3e} \end{pmatrix} = \begin{pmatrix} 0.30 \\ 0.29 \\ 0.28 \end{pmatrix},$$

$$\begin{pmatrix} K_1 \\ K_2 \\ K_3 \end{pmatrix} = \begin{pmatrix} 1864 \\ 2544 \\ 2743 \end{pmatrix}, \begin{pmatrix} \bar{K}_1 \\ \bar{K}_2 \\ \bar{K}_3 \end{pmatrix} = \begin{pmatrix} 2151 \\ 2474 \\ 2526 \end{pmatrix}, \begin{pmatrix} k_{1i} \\ k_{2i} \\ k_{3i} \end{pmatrix} = \begin{pmatrix} 7.98 \\ 8.78 \\ 8.27 \end{pmatrix}, \begin{pmatrix} k_{1s} \\ k_{2s} \\ k_{3s} \end{pmatrix} = \begin{pmatrix} 9.13 \\ 10.5 \\ 10.3 \end{pmatrix},$$

$$\begin{pmatrix} F_{1i} \\ F_{2i} \\ F_{3i} \end{pmatrix} = \begin{pmatrix} 395 \\ 484 \\ 518 \end{pmatrix}, \begin{pmatrix} F_{1e} \\ F_{2e} \\ F_{3e} \end{pmatrix} = \begin{pmatrix} 1.74 \\ 3.10 \\ 5.34 \end{pmatrix}, \begin{pmatrix} F_{1s} \\ F_{2s} \\ F_{3s} \end{pmatrix} = \begin{pmatrix} 174.1 \\ 204.3 \\ 207.6 \end{pmatrix}, \begin{pmatrix} W_1 \\ W_2 \\ W_3 \end{pmatrix} = \begin{pmatrix} 44.7 \\ 27.4 \\ 15.4 \end{pmatrix},$$

$$\begin{pmatrix} H_1 \\ H_2 \\ H_3 \end{pmatrix} = \begin{pmatrix} 109.7 \\ 75.9 \\ 58.2 \end{pmatrix}, \begin{pmatrix} T_{1e} \\ T_{2e} \\ T_{3e} \end{pmatrix} = \begin{pmatrix} 0.35 \\ 0.31 \\ 0.27 \end{pmatrix}, \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix} = \begin{pmatrix} 58.9 \\ 35.3 \\ 18.6 \end{pmatrix}, \begin{pmatrix} c_{1s} \\ c_{2s} \\ c_{3s} \end{pmatrix} = \begin{pmatrix} 34.8 \\ 20.4 \\ 10.4 \end{pmatrix},$$

$$\begin{pmatrix} \bar{k}_1 \\ \bar{k}_2 \\ \bar{k}_3 \end{pmatrix} = \begin{pmatrix} 430.3 \\ 247.4 \\ 126.3 \end{pmatrix}.$$

It is straightforward to calculate the six eigenvalues as follows

$$\{-0.23, -0.22, -0.20, -0.04, -0.04, -0.04\}.$$

This implies that the world economy is stable. This implies that we can effectively conduct comparative dynamic analysis.

4. Comparative Dynamic Analysis

We simulated the motion of the dynamic system. This section examines effects of changes in some parameters. It is important to ask questions such as how a change in one country's conditions affects the national economy and global economies. First, we introduce a variable $\bar{\Delta}x(t)$ to stand for the change rate of the variable $x(t)$ in percentage due to changes in the parameter value.

Fluctuations in the total factor productivity of the HDE's tradable sector

First, we study effects of the HDE's technological change in the tradable sector on the global economy. It has been argued that productivity differences explain much of the variation in incomes across countries, and technology plays a key role in determining productivity. We see what will happen to the global economy when the total factor productivity of the HDE's tradable sector experiences the following fluctuations:

$$A_{1i}(t) = 1.3 + 0.1\, sin(t).$$

The simulation result is plotted in Figure 2. As the system contains many variables and these variables are connected to each other in nonlinear relations, it is difficult to verbally explain

these interactions over time. As the total factor productivity is fluctuated, the output levels of the three economies' tradable sectors are oscillatory. The output of the HDE's non-tradable sector is oscillatory and the output levels of the other two economies' non-tradable sectors are reduced initially and are slightly affected in the long term. The human capital levels are slightly affected. The FDE's education fee and education time fluctuate, while the other economies' education fees and education times are slightly affected. The trades and rate of interest oscillate. The wealth levels and consumptions do not fluctuate in any economy.

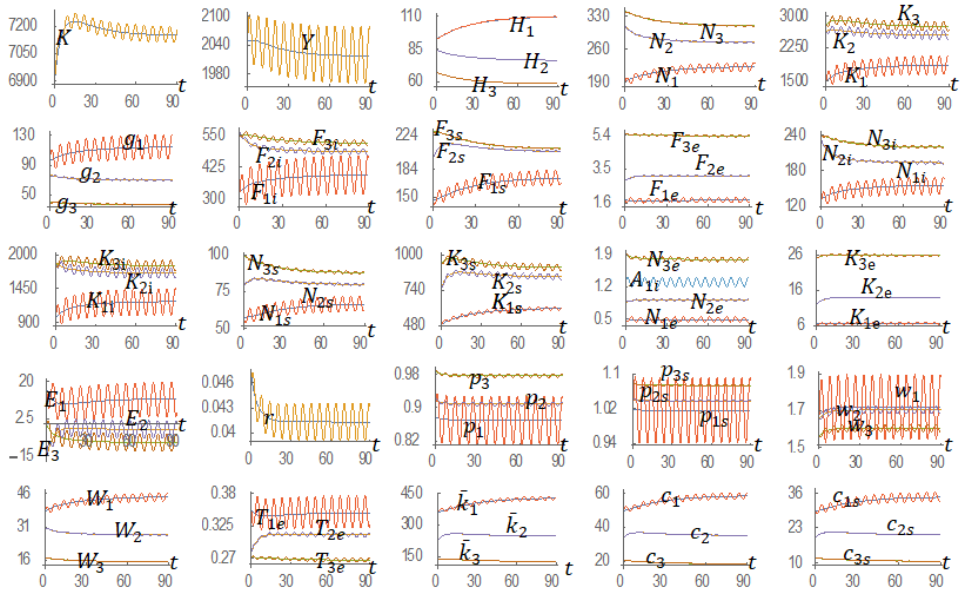

Figure 2: Fluctuations in the Total Factor Productivity of the HDE's Tradable Sector

Fluctuations in the HDE's propensity to receive education

We now study effects of the following fluctuations in the HDE's propensity to receive education

$$\eta_{10}(t) = 0.07 + 0.01\,sin(t).$$

The simulation result is plotted in Figure 3. As the representative household's preference to receive education fluctuates, they cause oscillations in the global wealth and global product. The trade patterns are affected periodically. There are also periodic changes in the other variables as shown in Figure 3.

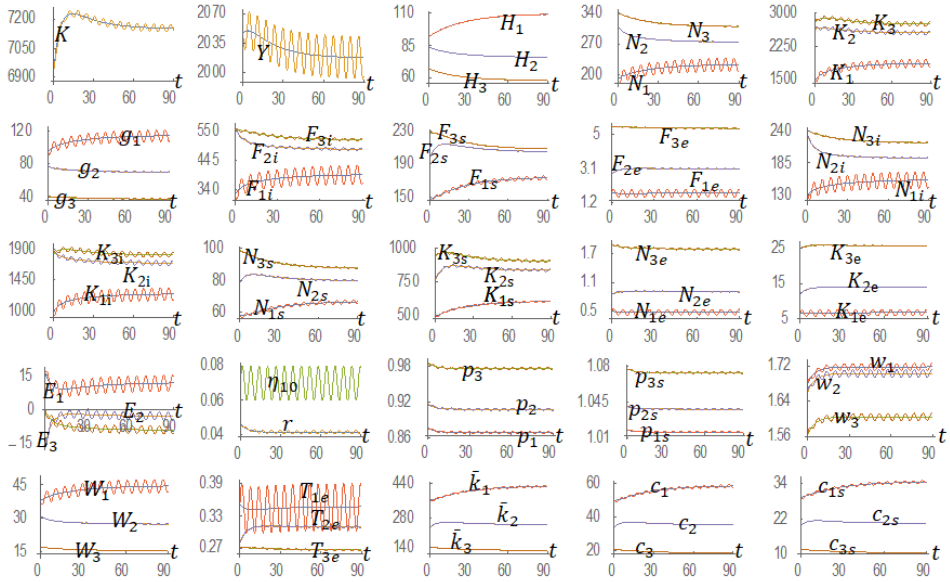

Figure 3: Fluctuations in the HDE's Propensity to Receive Education

Fluctuations in the HDE's efficiency of applying human capital

We now show effects of the following fluctuations the HDE's human capital utilization efficiency:

$$m_1(t) = 0.9 + 0.05\,sin(t).$$

The simulation result is plotted in Figure 4. The parameter changes cause fluctuations in the global wealth and global product. There are slight changes in the human capital levels. The wage rates and rate of interest fluctuate. The output levels of the tradable sectors and trade patterns fluctuate.

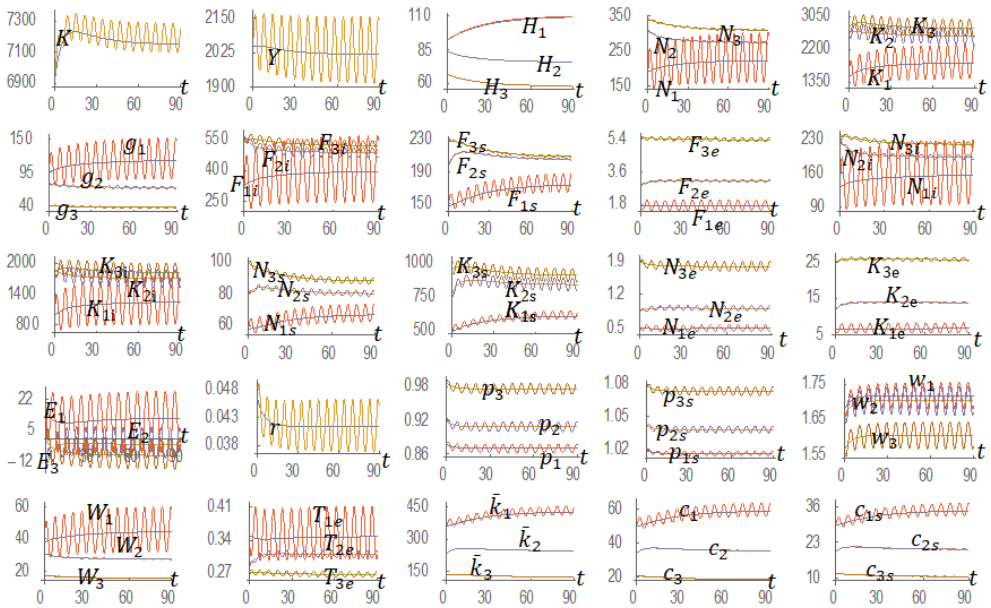

Figure 4: Fluctuations in the HDE's Efficiency of Applying Human Capital

The LDE's propensity to consume non-tradable goods

We now study what will happen to the global economy when the LDE's propensity to consume the non-tradable good fluctuates as follows:

$$\gamma_{03}(t) = 0.06 + 0.01\,sin(t).$$

The simulation result is plotted in Figure 5. As the preference is oscillatory, the global wealth and global output fluctuate. Although there are fluctuations in the economic structure and labor distribution in the LDE, the other two economies are slightly affected.

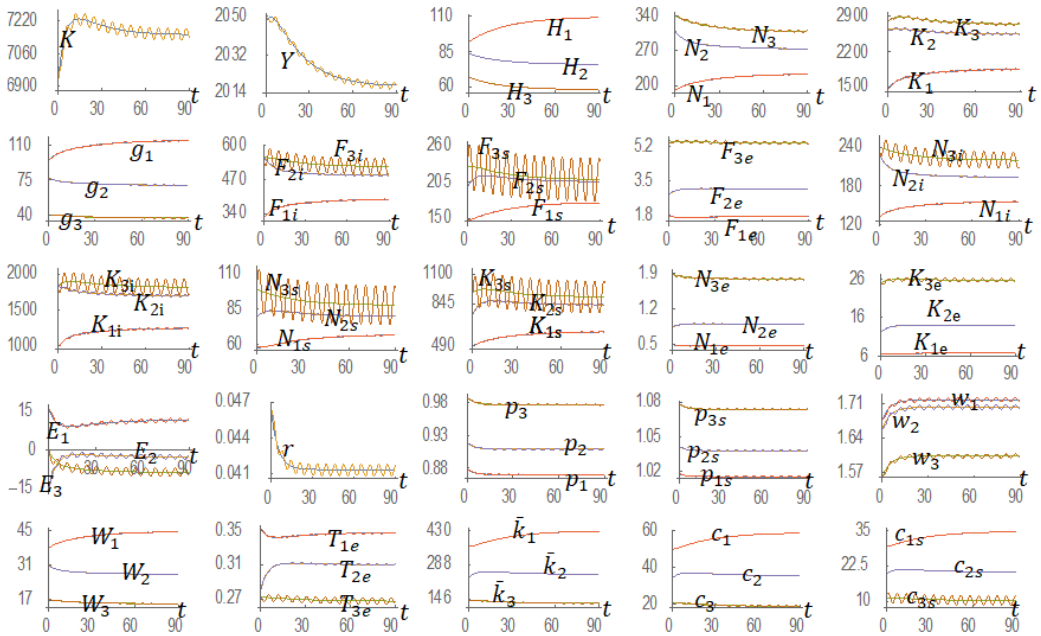

Figure 5: The LDE's Propensity to Consume Non-tradable Goods

Fluctuations in the LDE's propensity to save

We now allow the LDE's propensity to save to experience the following perturbations:

$$\lambda_{10}(t) = 0.73 + 0.02\,sin(t).$$

The simulation results are plotted in Figure 6. We observe that fluctuations in the propensity to save cause weak perturbations in the world economy. A reason is that the effects of saving and dissaving balance each other over time.

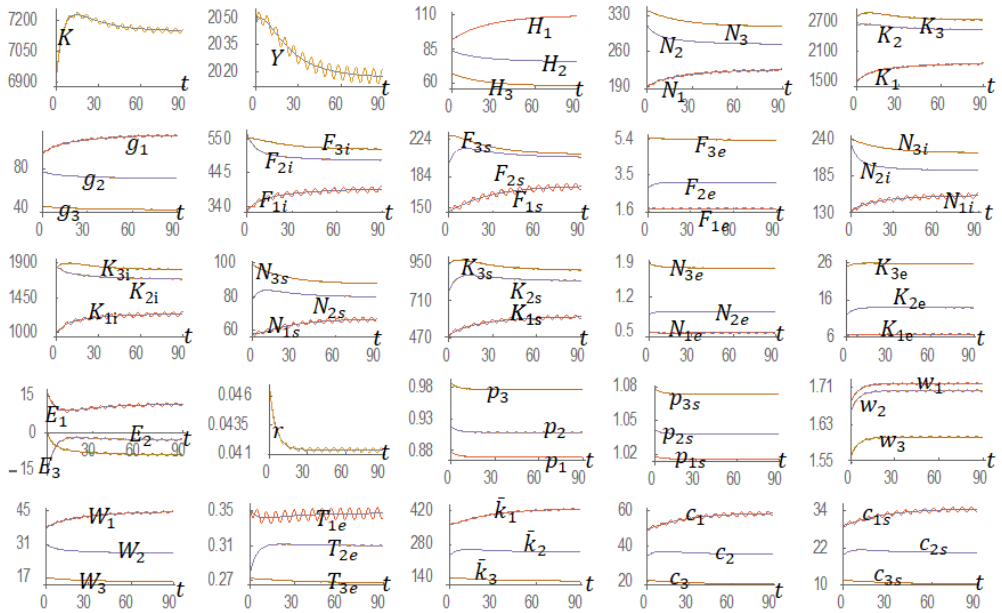

Figure 6: Fluctuations in the LDE's Propensity to Save

5. Concluding Remarks

This paper generalized the multi-country growth model with capital accumulation, human capital accumulation, economic structure and international trade by Zhang (2014) by making all the time-independent parameters as time-dependent parameters. Each national economy consists of one tradable, one non-tradable and one education sector. National economies are different in propensities to save, to obtain education and to consume, and in learning abilities. The model integrates the Solow growth model, the Uzawa two-sector growth model, the Uzawa-Lucas two-sector growth model, and the Oniki–Uzawa trade model within a comprehensive framework. Human capital accumulation is through education in the Uzawa-Lucas model, Arrow's learning by producing, and Zhang's learning by consuming (creative learning). The behavior of the household is described with an alternative approach to household behavior. The model describes a dynamic interdependence between wealth accumulation, human capital accumulation, division of labor, and time distribution between education and work under perfect competition. We simulated the model to demonstrate existence of equilibrium points, motion of the dynamic system, and oscillations due to different exogenous shocks. Our model may be extended in different directions. We may introduce some kind of government intervention in education. There are many models which address issues related to taxation, education policy, distribution of income and wealth, and economic growth (e.g., Bénabou, 2002; Glomm and Kaganovich, 2008). The Solow model, the Uzawa two-sector growth, the Oniki-Uzawa trade model, and the Uzawa-Lucas models are most well-known models in the literature of growth theory. The author introduces Zhang's utility and concepts of current income and disposable income indifferent formal economic models (Zhang, 2016a, 2016b, 2018, 2019). Many limitations of our model become apparent in the light of the sophistication of the literature based on these models.

Appendix: Proving the Lemma

We check the lemma. We omit time in expressions. From (2), we have: $k_{ji} = \alpha_{0j}\, k_{js}, (A1)$ where

$$\alpha_{0j} \equiv \frac{\alpha_{ji}\, \beta_{js}}{\alpha_{js}\, \beta_{ji}}.$$

From (4) and (5), we determine p_{js} as a unique function of k_{ji} as follows:

$$p_{js} = \frac{A_{ji}\, \beta_{ji}\, \alpha_{0j}^{\alpha_{js}}}{A_{js}\, \beta_{js}}\, k_{ji}^{\alpha_{ji}-\alpha_{js}}.$$

By (5) and (7) p_j are determined as unique functions of k_{ji}. From (2), we determine r and w_q as unique functions of k_{ji}. From (4), we k_{ji} as unique functions of k_{1i} as follows:

$$k_{ji} = \left(\frac{A_{ji}\, \alpha_{ji}}{A_{ji}\, \alpha_{1i}\, k_{ji}^{-\beta_{ji}} - \delta_1 + \delta_k} \right)^{1/\beta_{ji}} \quad , J = 1, \dots, J. \, (A3)$$

We have r, p_{js}, p_j, w_j, k_{js} and k_{ji} as unique functions of k_{1i}.

From (4) and (7), we obtain $k_{je} = \alpha_j\, k_{ji}, (A4)$ where

$$\alpha_j \equiv \frac{\alpha_{je}\, \beta_{ji}}{\alpha_{ji}\, \beta_{je}}.$$

We also determine k_{je} as functions of k_{ji}. From (A4), (4) and (7), we obtain

$$p_j = \frac{A_{ji}\, \alpha_{ji}\, \alpha_j^{\beta_j}}{A_{je}\, \alpha_{je}}\, k_{ji}^{\beta_j}, (A5)$$

where $\beta_j \equiv \beta_{je} - \beta_{ji}$. We solve p_j as functions of k_{1i}. By (12), we solve $\bar{w}_j$ and $\bar{p}_j$ as functions of k_{1i} and H_j. From (7) and (16), we have:

$$n_{je} = \frac{p_{0j}\, T_{je}}{N_j}. \quad (A6)$$

where $p_{0j} \equiv \beta_{je} p_j \bar{N}_j / w_j$. From (A6) and (2), we solve:

$$n_{ji} \equiv \frac{\left(k_j - k_{js}\right) N_j + \left(k_{js} - k_{je}\right) p_{0j}\, T_{je}}{\left(k_{ji} - k_{js}\right) N_j}, n_{ji} \equiv \frac{\left(k_{ji} - k_j\right) N_j + \left(k_{je} - k_{ji}\right) p_{0j}\, T_{je}}{\left(k_{ji} - k_{js}\right) N_j}. (A7)$$

From (17) and (13), we have

$$n_{js} = \frac{\bar{N}_j\, \beta_{js}\, \gamma_j\, \bar{y}_j}{w_j\, N_j}, (A8)$$

where we also use $w_j = \beta_{js} p_{js} F_{js} / N_{js}$. From (A7) and (A8), we solve:

$$\left(k_{ji} - k_j\right) N_j + \left(k_{je} - k_{ji}\right) p_{0j}\, T_{je} = \frac{\left(k_{ji} - k_{js}\right) \bar{N}_j\, \beta_{js}\, \gamma_j\, \bar{y}_j}{w_j}. (A9)$$

Insert $N_j = H_j^{m_j} T_j \bar{N}_j$ and $T_{je} = \eta_j \bar{y}_j / \bar{p}_j$ in (A9):

$$T_j = \frac{\widehat{w}_j \bar{y}_j}{k_{ji} - k_j}, (\mathrm{A10})$$

where

$$\widehat{w}_j\big(k_{1i}, H_j\big) = \frac{1}{H_j^{m_j} \bar{N}_j}\left[\frac{\big(k_{ji} - k_{js}\big)\bar{N}_j \beta_{js} \gamma_j}{w_j} - \frac{\big(k_{je} - k_{ji}\big)p_{0j} \eta_j}{\bar{p}_j}\right].$$

From (9) and in (13), we have: $T_j = T_0 - \widetilde{w}_j \bar{y}_j, (A11)$

where $\widetilde{w}_j \equiv \eta_j / \bar{p}_j$. From (A10) and (A11), we have $k_j = k_{ji} - \frac{\widehat{w}_j \bar{y}_j}{T_0 - \widetilde{w}_j \bar{y}_j}. (A12)$

From $K_j = k_j T_j H_j^{m_j} \bar{N}_j$, (A11) and (A12), we have: $K_j = h_{j1} \bar{k}_j + h_{j2}, (A13)$

where we use the definition of $\bar{y}_j$ and $h_{j1} \equiv -(1+r)\big(\widetilde{w}_j k_{ji} + \widehat{w}_j\big)H_j^{m_j} \bar{N}_j,$

$$h_{j2} \equiv T_0 H_j^{m_j} \bar{N}_j k_{ji} - \big(\widetilde{w}_j k_{ji} + \widehat{w}_j\big)H_j^{m_j} \bar{N}_j T_0 \bar{w}_j.$$

Insert (A13) in (18)

$$\bar{k}_1 = \Lambda_k \equiv \frac{1}{h_{11} - \bar{N}_1}\left(\sum_{j=2}^{J}\big(\bar{N}_j - h_{j1}\big)\bar{k}_j - \sum_{j=1}^{J} h_{j2}\right).$$

All the variables can be expressed as functions of $\bar{k}_{1i}$, $\big(H_j\big)$, $\big\{\bar{k}_j\big\}$, and t by the procedure in the Lemma. From the procedure in the Lemma and (15), we have:

$$\dot{H}_j = \Lambda_j\big(\bar{k}_{1i}, \big(H_j\big), \big\{\bar{k}_j\big\}, t\big). (A15)$$

Here, we don't provide explicit expressions of the functions as they are tedious. Substituting the definition of $\bar{y}_j$ into $s_j = \lambda_j \bar{y}_j$ yields:

$$s_j = (1+r)\,\lambda_j \bar{k}_j + \lambda_j T_0 \bar{w}_j. (A16)$$

Substituting (A16) into (14), we have:

$$\dot{k}_1 = \lambda_1 T_0 \bar{w}_1 - R \bar{k}_1 - \frac{\dot{N}_1}{N_1}\bar{k}_1, (A17)$$

$$\dot{k}_j = \bar{\Lambda}_j \equiv \lambda_j T_0 \bar{w}_j - \big(1 - \lambda_j - \lambda_j r\big)\bar{k}_j - \frac{\dot{N}_j}{N_j}\bar{k}_j, j = 2, \ldots J, (A18)$$

in which $R \equiv 1 - \lambda_1 - \lambda_1 r$. Taking derivatives of equation (A14) with respect to t yields:

$$\dot{\bar{k}}_1 = \frac{\partial \Lambda_k}{\partial k_{1i}}\dot{k}_{1i} + \sum_{j=1}^{J}\Lambda_j \frac{\partial \Lambda_k}{\partial H_j} + \sum_{j=2}^{J}\bar{\Lambda}_j \frac{\partial \Lambda_k}{\partial \bar{k}_j} + \frac{\partial \Lambda_k}{\partial t}. (A19)$$

where we use (A15) and (A18). Equaling the right-hand sizes of equations (A19) and (A17), we get:

$$\dot{k}_{1i} = \bar{\Lambda}_1 \equiv \left[\lambda_1 T_0 \bar{w}_1 - R \Lambda_k - \sum_{j=1}^{J}\Lambda_j \frac{\partial \Lambda_k}{\partial H_j} - \sum_{j=2}^{J}\bar{\Lambda}_j \frac{\partial \Lambda_k}{\partial \bar{k}_j} - \frac{\partial \Lambda_k}{\partial t}\right]\left(\frac{\partial \Lambda_k}{\partial k_{1i}}\right)^{-1}. (A20)$$

In summary, we proved the Lemma.

References

Aghion, P. and Howitt, P., 1998. *Endogenous Growth Theory*. Mass., Cambridge: The MIT Press.

Arcidiacono, P., Hotz, V.J., and Kang, S., 2012. Modelling College Major Choices Using Elicited Measures of Expectations and Counterfactuals. *Journal of Economics,* 166 (1), pp. 3–16.

Arrow, K.J., 1962. The Economic Implications of Learning by Doing. *Review of Economic Studies,* 29, pp. 155-73.

Attanasio, O.P. and Kaufmann, K.M., 2014. Education Choices and Returns to Schooling: Mothers' and Youths' Subjective Expectations and Their Role by Gender. *Journal of Development Economics,* 109, pp. 203–16.

Azariadis, C., 1993. *Intertemporal Macroeconomics*. Oxford: Blackwell.

Backus, D.K. and Smith, G.W., 1993. Consumption and Real Exchange Rates in Dynamic Economies with Non-Traded Goods. *Journal of International Economics,* 35, pp. 297–316.

Barro, R.J., 2001. Human Capital and Growth. *American Economic Review, Papers and Proceedings* 91, pp. 12-17.

Barro, R.J., 2013. Education and Economic Growth. *Annals of Economics and Finance,* 14 (2), pp. 301–28.

Barro, R.J. and Lee, J.W., 2013. A New Data Set of Educational Attainment in the World, 1950–2010. *Journal of Development Economics,* 104 (C), pp. 184-98.

Barro, R.J. and Sala-i-Martin, X., 1995. *Economic Growth*. New York: McGraw-Hill, Inc.

Baxter, M., Jermann, U.J., and King, R.G., 1998. Nontraded Goods, Nontraded Factors, and International Non-Diversification. *Journal of International Economics,* 44, pp. 211–29.

Bénabou, R., 2002. Tax and Education Policy in a Heterogeneous-Agent Economy: What levels of Redistrbution Maximize Growth and Efficiency? *Econometrica,* 70, pp. 481-517.

Boozer, M. and Rouse, C., 2001. Intraschool Variation in Class Size: Patterns and Implications. *Journal of Urban Economics,* 50 (1), pp. 163–89.

Bosworth, R., 2014. Class Size, Class Composition, and the Distribution of Student Achievement. *Education Economics,* 22, pp. 141-165.

Bosworth, R. and Caliendo, F., 2007. Educational Production and Teacher Preferences. *Economics of Education Review,* 4, pp. 487–500.

Burmeister, E. and Dobell, A.R., 1970, *Mathematical Theories of Economic Growth*. London: Collier Macmillan Publishers.

Cachanosky, N., 2014. The Mises-Hayek Business Cycle Theory, Fiat Currencies and Open Economies. *The Review of Austrian Economics,* 3, pp. 281-99.

Castelló-Climent, A. and Hidalgo-Cabrillana, A., 2012. The Role of Education Quality and Quantity in the Process of Economic Development. *Economics of Education Review,* 31 (4), pp. 391-409.

Chatterjee, B. S. and Ravikumar, B., 1992. A Neoclassical Model of Seasonal Fluctuations. *Journal of Monetary Economics,* 29 (1), pp. 59–86.

Chiarella, C. and Flaschel, P., 2000. *The Dynamics of Keynesian Monetary Growth: Macro Foundations*. Cambridge: Cambridge University Press

Could, E.D., Moav, O., and Weinberg, B.A., 2001. Precautionary Demand for Education, Inequality, and Technological Progress. *Journal of Economic Growth,* 6, pp. 285-315.

Dobbelsteen, S., Levin, J., and Oosterbeek, H., 2002. The Causal Effect of Class Size on Scholastic Achievement: Distinguishing the Pure Class Size Effect from the Effect of Changes in Class Composition. *Oxford Bulletin of Economics and Statistics,* 64 (1), pp. 17–38.

Dominitz, J. and Manski, C.F., 1996. Eliciting Student Expectations of the Returns to Schooling. *Journal of Human Resources,* 31 (1), pp. 1–26.

Easterlin, R., 1981. Why Isn't the Whole World Developed? *Journal of Economic History,* 41, pp. 1-19.
Edwards, S., 1989. Temporary Terms of Trade Disturbances, the Real Exchange Rate and the Current Account. *Economica,* 56, pp. 343–57.
Erosa, A., Koreshkova, T., and Restuccia, D., 2010. How Important Is Human Capital? A Quantitative Theory Assessment of World Income Inequality. *The Review of Economic Studies,* 77, pp. 1421-49.
Fender, J. and Wang, P., 2003. Educational Policy in a Credit Constrained Economy with Skill Heterogeneity. *International Economic Review,* 44, pp. 939-64.
Flaschel, P., Franke, R., and Semmler, W. 1997. *Dynamic Macroeconomics*. Cambridge, Mass: The MIT Press.
Fleisher, B., Hu, Y.F., Li, H.Z., and Kim, S.H., 2011. Economic Transition, Higher Education and Worker Productivity in China. *Journal of Development Economics*, 94, pp. 86-94.
Frenkel, J.A. and Razin, A., 1987. *Fiscal Policy and the World Economy*. MA., Cambridge: MIT Press.
Gabaix, X., 2011. The Granular Origins of Aggregate Fluctuations. *Econometrica* ,79, pp. 733–772.
Galor, O. and Moav, O., 2004. From Physical to Human Capital Accumulation: Inequality in the Process of Development. *Review of Economic Studies,* 71, pp. 1001-26.
Galor, O. and Zeira, J., 1993. Income Distribution and Macroeconomics. *Review of Economic Studies,* 60, pp. 35-52.
Gandolfo, G., 2005. *Economic Dynamics*. Berlin: Springer.
Giovanni, J. Di., Levchenko, A., and Mejean, I., 2014. Firms, Destinations, and Aggregate Fluctuations. *Econometrica,* 82 (4), pp. 1303–1340.
Glomm, G. and Kaganovich, M., 2008. Social Security, Public Education and the Growth-Inequality Relationship. *European Economic Review* 52, pp. 1009-1034.
Grossman, G.M. and Helpman, E., 1991. *Innovation and Growth in the Global Economy*. Cambridge, Mass.: The MIT Press.
Hanushek, E. and Kimko, D., 2000. Schooling, Labor-Force Quality and the Growth of Nations. American Economic Review, 90, pp. 1194-1204.
Hanushek, E.A., Leung, C.K.Y., and Yilmaz, K., 2014. Borrowing Constraints, College Aid, and Intergenerational Mobility. *Journal of Human Capital*, 8 (1), pp. 1-41.
Hanushek E.A. and Woessmann, L., 2008. The Role of Cognitive Skills in Economic Development. *Journal of Economic Literature,* 46 (3), pp. 607-668.
Hohberger, S., Vogel, L., and Herz, B., 2014. Budgetary-Neutral Fiscal Policy Rules and External Adjustment. *Open Economies Review,* 25, pp. 909-936.
Ikeda, S. and Ono, Y., 1992. Macroeconomic Dynamics in a Multi-Country Economy - A Dynamic Optimization Approach. *International Economic Review,* 33, pp. 629-644.
Jensen, R., 2010. The (Perceived) Returns to Education and the Demand for Schooling. *Quarterly Journal of Economics,* 125 (2), pp. 515–48.
Kaarsen, N., 2014. Cross-country Differences in the Quality of Schooling. *Journal of Development Economics,* 107, pp. 215–224.
Krueger, A.B. and Lindahl, M., 2001. Education for Growth: Why and for Whom. *Journal of Economic Literature,* 39, pp. 1101-1136.
Krueger, A.B. and Whitmore. D.M., 2001. The Effect of Attending a Small Class in the Early Grades on College-Test Taking and Middle School Test Results: Evidence from Project STAR. *Economic Journal,* 111 (468), pp. 1–28.
Lazear, E.P., 2001. Educational production. Quarterly Journal of Economics 116 (3) 777–803.
Lorenz, H.W., 1993. *Nonlinear Dynamic Economics and Chaotic Motion*. Berlin: Springer-Verlag.

Lucas, R.E., 1977. Understanding Business Cycles. *Carnegie-Rochester Conference Series on Public Policy,* 5, pp. 7-29.
Lucas, R.E., 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics,* 22, pp. 3-42.
Maasoumi, E., Millimet, D.L. and V. Rangaprasad, D.M., 2005. Class Size and Educational Policy: Who Benefits from Smaller Classes? *Econometric Reviews,* 24 (4), pp. 333–68.
Maoz, Y.D. and Moav, O., 1999. Intergenerational Mobility and the Process of Development. *Economic Journal,* 109, pp. 677-97.
Mendoza, E.G., 1995. The Terms of Trade, the Real Exchange Rate, and Economic Fluctuations. *International Economic Review,* 36, pp. 101–137.
Mincer, J., 1974. *Schooling, Experience and Earnings*. New York: Columbia University Press.
Nishimura, K. and Shimomura, K., 2002. Trade and Indeterminacy in a Dynamic General Equilibrium Model. *Journal of Economic Theory,* 105, pp. 244-260.
Nolte, D.D., 2015. *Introduction to Modern Dynamics: Chaos, Networks, Space and Time*. London: Oxford University Press
Oniki, H. and Uzawa, H., 1965. Patterns of Trade and Investment in a Dynamic Model of International Trade. *Review of Economic Studies,* 32, pp. 15-38.
Pesenti, P., van Wincoop, E., 2002. Can Nontradables Generate Substantial Home Bias? *Journal of Money, Credit and Banking,* 34, pp. 25–50.
Puu, T., 2011. *Nonlinear Economic Dynamics*. Berlin: Springer.
Raleva, S., 2013. Structural Sources and Characteristics of the Inflation in Bulgaria (1992-2010). *Economic Studies,* 1, pp. 41-71.
Rogoff, K., 2002. The Purchasing Power Parity Puzzle. *Journal of Economic Literature,* 34, pp. 647–668.
Romer, P.M., 1986. Increasing Returns and Long-Run Growth. *Journal of Political Economy,* 94, pp. 1002-1037.
Shone, R., 2002. *Economic Dynamics – Phase Diagrams and Their Economic Application*. Cambridge: Cambridge University Press.
Solow, R., 1956. A Contribution to the Theory of Growth. *Quarterly Journal of Economics,* 70, pp. 65-94.
Sorger, G., 2002. On the Multi-Country Version of the Solow-Swan Model. *The Japanese Economic Review,* 54, pp. 146-64.
Stella, A., 2015. Firm Dynamics and the Origins of Aggregate Fluctuations. *Journal of Economic Dynamics and Control,* 55 (C), pp. 71-88.
Stinebrickner, T. and Stinebrickner, R., 2012. Learning about Academic Ability and the College Drop-Out Decision. *Journal of Labor Economics,* 30 (4), pp. 707–748.
Stockman, A.C. and Dellas, H., 1989. International Portfolio Nondiversification and Exchange Rate Variability. *Journal of International Economics,* 26, pp. 271-289.
Stockman, A.C. and Tesar, L.L., 1995. Tastes and Technology in a Two-country Model of the Business Cycle: Explaining International Comovements. *American Economic Review,* 85, pp. 168–185.
Stulz, R. M., 1987. An Equilibrium Model of Exchange Rate Determination and Asset Pricing with Nontraded Goods and Imperfect Information. *Journal of Political Economy,* 95, pp. 1024-1040.
Tilak, J.B.C., 1989. *Education and Its Relation to Economic Growth, Poverty and Income Distribution: Past Evidence and Future Analysis*. Washington: World Bank.
Tselios, V., 2008. Income and Educational Inequalities in the Regions of the European Union: Geographically Spillovers under Welfare State Restrictions. *Papers in Regional Science,* 87, pp. 403-430.
Urquiola, M. and Verhoogen, E., 2009. Class-size Caps, Sorting, and the Regression Discontinuity Design. *American Economic Review*, 99 (1), pp. 179–215.

Uzawa, H., 1965. Optimal Technical Change in an Aggregative Model of Economic Growth. *International Economic Review,* 6, pp. 18-31.
Wossmann, L. and West, M., 2006. Class-size Effects in School Systems around the World: Evidence from Between-Grade Variation in TIMSS. *European Economic Review,* 50 (3), pp. 695–736.
Zhang, W.B., 1991. *Synergetic Economics*. Heidelberg: Springer-Verlag.
Zhang, W.B., 1993. Woman's Labor Participation and Economic Growth - Creativity, Knowledge Utilization and Family Preference. *Economics Letters,* 42, pp. 105-110.
Zhang, W.B., 2005. *Differential Equations, Bifurcations, and Chaos in Economics*. Singapore: World Scientific.
Zhang, W.B., 2006. *Discrete Dynamical Systems, Bifurcations and Chaos in Economics*. Amsterdam: Elsevier.
Zhang, W.B., 2007. Economic Growth with Learning by Producing, Learning by Education, and Learning by Consuming. *Interdisciplinary Description of Complex Systems,* 5, pp. 21-38.
Zhang, W.B., 2013. Income and Wealth Distribution with Physical and Human Capital Accumulation: Extending the Uzawa-Lucas Model to a Heterogeneous Households Economy. *Latin American Journal of Economics,* 50 (2), pp. 257-287.
Zhang, W.B., 2014. Tradable, Non-tradable and Education Sectors in a Multi-Country Economic Growth Model with Endogenous Wealth and Human Capital. *Economic Research Guardian,* 4 (2), pp. 65-85.
Zhang, W.B., 2016a. Population Growth and Preference Change in a Generalized Solow Growth Model with Gender Time Distributions. *Oradea Journal of Business and Economics*, 1 (2), pp. 7-30.
Zhang, W.B., 2016b. Fashion with Snobs and Bandwagoners in a Three-Type Households and Three-Sector Neoclassical Growth Model. *The Mexican Journal of Economics and Finance,* 11 (2), pp. 1-19.
Zhang, W.B., 2018. A Growth Theory Based on Walrasian General Equilibrium, Solow-Uzawa Growth, and Heckscher-Ohlin Trade Theories. *Interdisciplinary Description of Complex Systems - Scientific Journal,* 16 (3-B), pp. 452-464.
Zhang, W.B., 2019. Money and Price Dynamics under the Gold Standard in the One-Sector Neoclassical Growth Model. *Lecturas de Economía,* 90, pp. 45-69.
Zhao, Y., Guo, S., and Liu, X.F., 2014. Trading Frictions and Consumption-output Comovement. *Journal of Macroeconomics*, 42, pp. 229-240.
Zhu, R., 2011. Individual Heterogeneity in Returns to Education in Urban China during 1995-2002. *Economics Letters,* 113, pp. 84-87.

Bio-note:

Zhang Wei-Bin, PhD (Umeå, Sweden), is Professor in APU since 2000. He was graduated in 1982 from Department of Geography, Beijing University. He got Master Degree and completed Ph.D course at Department of Civil Engineering, Kyoto University in 1987. He completed his dissertation on economic growth theory in June, 1989. Since then he researched at the Swedish Institute for Futures Studies in Stockholm for 10 years. His main research fields are nonlinear economic dynamics (synergetic economics), economic theory, ancient Confucianism, and economic development and modernization of Chinese societies. He single-authorized 300 academic articles (210 in international peer-reviewed journals), 22 academic books in English. He is editorial board members of 14 peer-review international journals. Prof. Zhang is the editor of *Encyclopedia of Mathematical Models in Economics* (in two volumes) as a part of the unprecedented global effort, *The Encyclopedias of Life Support Systems*, organized by The UNESCO.

RESOURCE CURSE AND EITI MEMBERSHIP EFFECT ON THE ECONOMIC GROWTH AND CORRUPTION IN SUB-SAHARAN AFRICA: PART II - AN EMPIRICAL ANALYSIS

Andries Francois Geldenhuys[1], Oluseye Samuel Ajuwon[2]* & Michael Graham[1]
[1]Business School, Stellenbosch University, Western Cape, South Africa
[2]Department of Economics, University of Lagos, Lagos, Nigeria
fgeldenhuys46@gmail.com
aajuwon@unilag.edu.ng
michael.graham@usb.ac.za

Abstract: *This study is the second and concluding part of the study that feature in volume 5(1) of this journal. It examines the impact of the Extractive Industries Transparency Initiative (EITI) membership on Economic Growth and corruption in Sub-Saharan Africa (SSA). A pooled cross-sectional panel study on 46 countries in SSA from 1996 to 2016 was employed. The results show that EITI membership and its statistical interaction with resource dependence have a moderately positive effect on reducing the resource curse on implementing countries by increasing GDP per capita. However, the results do not indicate any significant reduction in the level of corruption associated with governance in the region through EITI membership. The research concludes that the EITI has potential value and should continue to be used as a mechanism to increase transparency in the resource-curse economy. The implementation period for most member countries is, however, still in its infancy and it will be possible to assess the more success of the EITI membership with the passage of time.*

Keywords: Extractive Industries Transparency Initiative (EITI), corruption, transparency, resource curse, economic growth

JEL Classification: 013

1. Introduction

This study is to determine if natural resource information disclosure to civil society organisations, through EITI membership, will increase economic growth, and impact corruption positively in sub-Saharan African Countries. The question of what distinguishes resource-rich states, like Norway (oil) and Botswana (diamonds), from *basket-case economies* (economy characterized by high level of unemployment, and all economic woes), like Venezuela (oil) and Sierra Leone (diamonds), has been investigated in the literature. The extant studies suggest that corruption, which is highly susceptible in extractive industries, plays a prominent role in explaining the divergent fortunes of such resource-rich states (Fisman and Golden, 2017).

Hypotheses

The hypotheses and the a-priori expectations examined in this study, based on Corrigan (2013), are as follows:

- H_1: Natural resource information disclosure to civil society organisations, through EITI membership, will increase economic growth, depending on resource endowment in a member country.

* Corresponding author: Oluseye Samuel Ajuwon

- H_2: Natural resource information disclosure to civil society organisations, through EITI membership, will reduce corruption, depending on resource endowment in a member country.

This paper contributes to the literature on whether transparency, through collective action, is an effective tool to curb corruption and consequently improve economic growth. Evidence of the EITI's impact on corruption is still mixed. David-Barret and Okamura (2013) found that corruption scores of implementing countries improved after signing up to the standard. However, this was contradicted by Kasekende, Abuka and Sarr (2016), who found no evidence to support the relationship. There are limited studies on the effect of EITI membership on economic growth and corruption, with the only cross-country study achieving mixed results. The Corrigan (2013) study examined 200 countries from 1995 to 2009, and found that EIT-implementing countries mitigated the negative effect of resource abundance on GDP per capita, sound policy formation and rule of law, but showed insignificant effects on democracy, political stability and corruption. This study lends credence to the study by Corrigan (2013), in extending the dataset period as well as focusing only on African countries where the issue of resource curse is well pronounced. We find that EITI membership and its statistical interaction with resource dependence have a moderately positive effect on reducing the resource curse on implementing countries by increasing GDP per capita. However, the results do not indicate any significant reduction in the level of corruption associated with governance in the region through EITI membership.

The rest of the paper is structured as follows: Section 2 presents the literature review in brief (for complete literature review, see Geldenhuys, Ajuwon, and Graham (2020)). Section 3 outlines the methodology employed in the study. Section 4 provides a discussion of the findings, while section 5 concludes the study.

2. Literature Review

2.1. Theoretical Literature Review

2.1.1. Resource Curse

Theoretical literature distinguishes between the direct and indirect effects of natural resources on economic growth. The direct effect, commonly known as *Dutch disease*, relates to an appreciation in the real exchange rate of a country due to the inflow of substantial amounts of foreign currency (Sachs and Warner, 2001). This appreciation establishes equilibrium in the labour and non-traded goods market as increased disposable income raises the wages in the non-traded goods sector and increases the demand for non-traded goods. The traded non-resource goods sector loses competitiveness as it is partially crowded out (spending effect) (Leite and Weidmann, 1999). Secondly, the increased wages in the resource sector during a resource boom pull capital and labour away from other sectors (resource pull effect) (Leite and Weidmann, 1999). Entrepreneurial activity and innovation are crowded out by sectoral wage levels as labour gravitates to the resource sector (Sachs and Warner, 2001). The indirect effect is manifested in rent-seeking governance (Leite and Weidmann, 1999).

2.1.2. Corruption and Economic Growth

The theoretical literature offers two contrasting views on the effect of corruption on economic growth; the *grease the wheels* and *sand the wheels* hypotheses. The *grease the wheels* hypothesis states that corruption can negate the negative effect of an inefficient bureaucracy and excessive red tape, increasing economic efficiency (Leff, 1964; Huntington, 1968). However, this view contrasts with the *sand the wheels* hypothesis, whereby corruption reduces economic efficiency and has a detrimental effect on economic growth (Méon and Sekkat, 2005).

2.1.3. Transparency and Corruption

The use of transparency initiatives is viewed as a key element in the fight against corruption in resource-rich states (Kolstad and Wiig, 2008). These initiatives seek in general to improve the sanctioning mechanisms through which civil society can hold governments to account and enhance the development outcomes when natural resources are abundant (Mejía Acosta, 2013). Transparency is expected to open the lines of communication, allow scrutiny of government rents and theoretically incentivise governments to invest in pro-development policies (Corrigan, 2013; Nwapi, 2014). Traditional transparency theory is based on a simplistic model that assumes that information released will produce an engaged and informed citizenry that is motivated to hold government to account (Fenster, 2005).

2.2. Empirical Literature Review

2.2.1. Resource Curse

The debate on whether natural resource abundance is detrimental to economic growth was ignited by a seminal paper by Sachs and Warner (1995). The authors argued that there is an inverse relationship between natural resource intensity and economic growth. The finding was based on cross-country growth regressions for 95 developing countries from 1970 to 1990. This theory was expanded by Sachs and Warner (2001), who tested the same data set for omitted geographical and climate variables. Little direct evidence was found that climate and geography explained the curse, and the "Dutch disease" hypothesis was strengthened by the tendency of resource-abundant countries to be high-priced economies. These findings were supported by Karl (1997) and Ross (1999), who found that oil-rich countries have declining income per capita and displayed lower development outcomes.

2.2.2. Corruption and Economic Growth

The empirical evidence on the detrimental effect of corruption on economic growth has largely reached consensus and rejected the "grease the wheels" argument in favour of the "sand the wheels" hypothesis. Cross-country data indicates that corruption is consistently correlated with lower growth and lower GDP per capita (Rothstein and Holmberg, 2011). The theoretical arguments of the negative effect of corruption on economic growth through lower levels of investment, lower quality of investments, high indirect taxation and the misallocation of resources are largely supported by empirical studies (Dimant and Tosato, 2018).

2.2.3. Transparency and Corruption

The empirical literature shows that increased transparency can reduce corruption, albeit with some caveats, and that transparency on its own does not automatically lead to increased accountability and reduced corruption. Islam (2006), observing 169 countries from 1984 to 1997, found that increased information flows (higher transparency) on economic data led to better governance indicators. Bauhr, Grimes and Harring (2010) found that increased transparency generated different reactions in countries with higher levels of corruption to those with lower levels. In highly corrupt countries, transparency erodes political trust but stimulates civic engagement. The incitement of civic discontent in the short term is however mitigated by greater accountability and better governance in the long term. Corrigan (2013) investigated the influence that membership of the EITI has on economic development and quality of governance, including an indicator for levels of corruption. Using OLS regressions on pooled cross-sectional panel data for 200 countries from 1995 to 2009, the author found that institutional transparency mitigated the resource curse with reference to GDP per capita, facilitated limited improvement in corruption and accountability measures and showed no improvement in stability and violence indicators. To date this is the only

study that has investigated the effect of institutional transparency, through EITI membership, on the resource curse and corruption in resource-rich states.

3. Data and Methodology

3.1. Data

The EITI has 51 implementing countries as of 2018, of which 24 are from SSA (EITI, 2017). In this paper, we include all the 46 countries classified as SSA based on the World Bank's regional definition. The annual data used covered the period 1986 to 2016 (31 observations).

3.1.1. Dependent variables

The dependent variable for economic growth (H_1) is GDP per capita. Economic growth was chosen to determine whether the standard is merely political posturing or a policy directive that increases wellbeing in resource-rich economies.

The dependent variable for corruption (H_2) is the control of corruption measure of the World Governance Indicators (WGI) as developed by Kaufman, Kraay and Mastruzzi (2010). The WGI measures score countries on a scale from -2.5 to 2.5 on a yearly basis, based on six governance indicators: voice and accountability (democracy), political stability/no violence (stability and absence of conflict), government effectiveness (public service quality), regulation quality (policy quality), rule of law (predictability of law measures, property rights) and control of corruption (corruption perception measure). This study only focused on the control of corruption measures, as they are the strongest indicator of the prevalence of rent-seeking in the natural resource sector and align strongly with the central aims of the EITI.

3.1.2. Independent variables

The independent variables are the same for H_1 and H_2. The first independent variable is membership of the EITI. The dataset, as can be seen in Table A1 of Appendix 1, was constructed from qualitative data found in timelines disclosed on the EITI webpages for individual members (EITI, 2018). EITI membership is incorporated through a dummy variable, where membership for SSA countries in a specific year is assigned a "1" if they were a member, or "0" if they were not. One of the key assumptions in determining the variable for EITI membership (EITI_MEM) is the date on which countries become members. In this research assignment, membership is based on the year that the country signalled its intent to join the EITI. This enables the dataset to be expanded for the period of accreditation, which can take between one and seven years, as can be seen in Table A1. This also takes into the account the signalling effect of the country demonstrating its willingness to commit to transparent resource governance and to work towards EITI membership (Corrigan, 2013).

The second independent variable is a proxy for natural resource endowment. This is important as the EITI is specifically focused on resource-rich countries, and this study aims to address the effect the EITI has on the natural resource "curse". The variable RES measures the resource dependence of a country: primary exports to total merchandise exports as published by the United Nations Conference on Trade and Development, with high resource dependence being indicated by a high ratio of primary exports to total merchandise exports (see Table 1).

3.1.3. Control variables

Separate control variables are used in both hypotheses and aim to reduce the omitted variable bias. These control variables are known to correlate with the dependent variables.

For H_1: inflation (annual consumer inflation), investment (gross capital formation as percentage of GDP), government consumption (general government final consumption), democracy levels (PolityIV score), population (total population) and trade openness (imports and exports as percentage of GDP). For H_2: population, negative GDP-per-capita growth and government consumption are used as control variables (see Table 1).

Table 1: Data variables and sources

Reference	Description	Sources
Dependent variables		
GDPPC	Gross Domestic Product per capita (constant 2010 US$)	World Bank Development Indicators
CoC	Control of Corruption	The World Governance Indicators (Kauffman et.al., 2010)
Independent variables		
EITImem	Dummy variable for EITI membership (1=intension, 0=no intension)	EITI website
RES	Resource dependence proxy (primary exports/merchandise exports)	United Nations Conference on Trade and Development (UNCTAD)
Control variables		
INVEST	Gross capital formation (% of GDP)	World Bank Development Indicators (WDI)
INFLATE	Inflation (annual %)	World Bank Development Indicators (WDI)
Govt_Consump	Government consumption	World Bank Development Indicators (WDI)
POL	Combined Polity score	PolityIV Project (Marshal et.al., 2010)
POP	Total population	World Bank Development Indicators (WDI)
OPEN	Openness (Imports as % of GDP + Exports as % of GDP)	World Bank Development Indicators (WDI)
GDPPC-Growth	Gross Domestic Product per capita growth (annual %)	World Bank Development Indicators (WDI)

Source: Computed by the Authors

3.3 Model Assumptions

Robust standard errors were used to address serial autocorrelation and fixed-effect models attempted to compensate for extraneous influences that are common in panel studies. This model uses time-fixed effects by year, that correct for the omitted variable bias (Corrigan, 2013). For intermittent missing data, the closest available year of data was used, with a special focus on EITI-implementing countries. Normality of variables was examined. Where extreme outliers were detected, the log of the variables was used to address deviation from normality.

3.4 Methodology

We follow Corrigan (2013) and estimate equation (1) to provide empirical evidence on hypothesis 1 (H_1) and hypothesis 2 (H_2). The two statistical models have the same basic equation, but different dependent variables – GDP per capita for H_1, and control of corruption for H_2The equation is as follows:

Equation 1:

$$Y_{it} = \beta_0 + \beta_1 RES_{it} + \beta_2 EITI\_MEM_{it} + \beta_3 RES_{it} \times EITI\_MEM_{it} + \beta_4 Z_{it} + \varepsilon \quad (1)$$

Where: Y_{it} = GDP per capita for country *i* at time *t*. RES_{it}= resource endowment. $EITI\_MEM_{it}$ = EITI membership (0 = non-member, 1 = member). Z_{it} = control variables. ε = error – random, normally distributed and independent (Corrigan, 2013). The interaction term between RES_{it} and $EITI\_MEM_{it}$ is the main evaluated variable.

Table 2: Correlation results for the two hypotheses

Hypothesis 1

	GDPPC	INVEST	INFLATE	Govt_Consump	POL	POP	OPEN
GDPPC	1						
INVEST	**0.3357**	1					
INFLATE	**-0.0185**	-0.0202	1				
Govt_Consump	**0.2255**	0.0061	-0.0098	1			
POL	**0.0173**	-0.0758	-0.0421	0.1969	1		
POP	**-0.1331**	-0.1205	0.0019	0.4121	0.0164	1	
OPEN	**0.3294**	0.3434	0.0310	-0.0212	-0.0040	-0.1779	1

Hypothesis 2

	CoC	Govt_Consump	POL	POP	GDPPC-Growth
CoC	1				
Govt_Consump	**0.1038**	1			
POL	**0.4627**	0.1969	1		
POP	**-0.2001**	0.4121	0.0164	1	
GDPPC-Growth	**-0.0253**	-0.0058	-0.0133	-0.005	1

GDP per capita: Gross Domestic Product per capita (constant 2010 US$), CoC: Control of Corruption, EITImem: Dummy variable for EITI membership (1=intention, 0=no intention), RES: Resource dependence proxy (primary exports/merchandise exports), INVEST: Gross capital formation (% of GDP), INFLATE: Inflation (annual %), Government consumption: Govt_Consump, POL: Combined Polity score, POP: Total population, OPEN: Openness (Imports as % of GDP + Exports as % of GDP), GDPPC-Growth: Gross Domestic Product per capita growth (annual%).

Source: Computed by the Authors

4. Analysis

4.1. Introduction

Two models were run separately to determine the effect of EITI membership on resource-rich states' economic growth and level of corruption. In line with the Corrigan (2013) study, a model-building approach was followed. This model starts with correlation table, to identify the most suitable variables for the analysis (Table 2 present the correlation result). This was followed by a simple regression, which include only one independent variable and evolves to the final model that includes all the independent and control variables. An interaction term between resource dependence and EITI membership was used in both models. Subsequently the main coefficients cannot be interpreted; instead, the interaction term coefficients are considered (Corrigan, 2013)

4.2. Findings

4.2.1. GDP per capita

Table 2 shows the leading results for the final model (model 10 in Table 3), including all relevant variables. The null hypothesis, that all coefficients on the independent variables are equal to zero, is rejected with extremely high confidence, above 99.99 per cent (F-test). The coefficient of the constant term is large and significant and is comparable to the t-statistic of the interaction term measured. However, the t-statistic for the interaction term is below 2, indicating moderate significance. The P-value of 0.066 is not significant at the <0.05 level but has moderate positive significance at the 0.1 level. It cannot therefore be completely ruled out that the results would not be observed under the null hypothesis, but there is some

indication that EITI membership does have a positive influence on GDP per capita. This moderate significance is further supported by the R-Squared statistic of 46 per cent.
The model-building results in Table 3 provide additional support to some of the themes of this study. In model 1, resource dependence does have a negative impact on GDP per capita. It is however not very significant, which is plausible given that commodity-fuelled growth has occurred in multiple SSA countries, reducing the expected traditional impact of the resource curse. The introduction of EITI membership in model 2 does reverse the negative impact of resource abundance at the 0.05 significance level. The interaction term in models 3–9 is moderate to highly significant throughout the regressions and interacts positively with GDP per capita, supporting the findings in model 10.

Table 3: Hypothesis 1 – Main results
GDP per capita (Log) – regression results

EITI membership effect on GDP per capita					
	Coef.	**T-statistic**	**P>t**		
RES	0.04	0.52	0.606	R-squared within	0.4595
EITImem	- 0.16	0.08	0.061	F(8, 41)	15.34
RES*EITImem	**0.22**	**1.89**	**0.066**	Prob > F	0.0000
Log (INFLATE)	0.00	0.28	0.778		
Log (INVEST)	- 0.02	- 0.32	0.753		
Log (Govt_Consump)	0.09	2.47	0.018		
Log (POP)	0.73	3.05	0.004		
POL	- 0.01	0.01	0.222		
Log (OPEN)					
Constant	- 6.27	- 1.91	0.063		

Note - GDP per capita: Gross Domestic Product per capita (constant 2010 US$), EITImem: Dummy variable for EITI membership (1=intention, 0=no intention), RES: Resource dependence proxy (primary exports/merchandise exports), INVEST: Gross capital formation (% of GDP), INFLATE: Inflation (annual %), Government consumption: Govt_Consump, POL: Combined Polity score, POP: Total population, OPEN: Openness (Imports as % of GDP + Exports as % of GDP).
Source: Computed by the Authors

Table 4: Hypothesis 1 – Model-building results

GDP per capita (Log) - regression results.										
EITI membership effect on GDP per capita										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
RES	-0.02	0.02	-0.38	-0.01	-0.05	-0.01	-0.02	-0.01	-0.01	0.04
	(-0.21)+	(-0.24)+	(-0.44)+	(-0.13)+	(-0.53)+	(-0.14)+	(-0.28)+	(-0.14)+	(-0.14)+	(-0.52)+
EITI_MEM		0.24	0.08	0.08	0.05	-0.06	0.07	-0.18	-0.18	-0.16
		(6.97)**	(1.00)+	(1.00)+	(0.46)+	(-0.93)+	(0.88)+	(-2.21)**	(-2.21)**	(0.08)*
RES*EITI_MEM			**0.22**	**0.21**	**0.26**	**0.21**	**0.21**	**0.26**	**0.26**	**0.22**
			(1.85)*	**(1.77)***	**(1.99)****	**(2.06)****	**(1.71)+**	**(2.61)****	**(2.61)****	**(1.89)***
Log(INFLATE)				-0.13						0.00
				(-0.88)+						(0.28)+
				0.38						0.78
Log(INVEST)					0.02					-0.02
					(0.29)+					(-0.32)+
					0.78					0.75
Log(GOVT_CONSUMP)						0.18				0.09
						(6.08)**				(2.47)**
						0.00				0.02
POL							0.01			-0.01
							(1.75)*			(0.01)+
							0.09			0.22
Log(POP)								0.91		0.73
								(5.06)**		(3.05)**
Log(Open)									0.91	
									(5.06)**	
T-stat in brackets										
Significance level [<0.05:**, <0.10:*, >0.10:+}]										
Note - GDP per capita: Gross Domestic Product per capita (constant 2010 US$), EITImem: Dummy variable for EITI membership (1=intention, 0=no intention), RES: Resource dependence proxy (primary exports/merchandise exports), INVEST: Gross capital formation (% of GDP), INFLATE: Inflation (annual %), Government consumption: Govt_Consump, POL: Combined Polity score, POP: Total population, OPEN: Openness (Imports as % of GDP + Exports as % of GDP).										

Source: Computed by the Authors

4.2.2 Corruption

Table 6 shows the results for the final model (model 8 in Table 5). The result of the F-test does not reject the null hypothesis, as it is larger than the 0.1 significance level, indicating that the dataset might not have any predictive power. The result of the interaction term indicates a negative influence of EITI membership on corruption, but the result is not statistically significant.

The model-building results in Table 5 are also mostly insignificant. The interaction term between EITI membership and resource dependence on control of corruption is negative throughout, but not statistically significant.

Table 5: Hypothesis 2 – Main results

Control of Corruption - regression results					
EITI membership effect on Control of Corruption					
	Coef.	**T-statistic**	**P>|t|**		
RES	0.10	0.47	0.642	R-squared within	0.0628
EITImem	0.22	1.93	0.061	F(7,42)	1.16
RES*EITImem	**0.25**	**-1.46**	**0.152**	Prob > F	0.3436
Log(Govt_Consump)	0.04	1.00	0.321		
Log(POP)	0.44	-1.22	0.231		
POL	0.00	0.22	0.828		
Log (GDPPC-Growth)	0.01	0.98	0.335		
Constant	5.51	1.03	0.310		

Source: Computed by the Authors

Table 6: Hypothesis 2 – Model-building results

Control of Corruption - regression results								
EITI membership effect on Control of Corruption								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
RES	0.18	0.19	0.26	0.11	0.24	0.25	0.25	0.10
	(1.5)+	(1.54)+	(1.59)+	(0.7)+	(1.35)+	(1.52)+	(1.13)+	(0.47)+
EITI_MEM		0.03	0.23	0.10	0.28	0.25	0.33	0.22
		(0.56)+	(1.24)+	(0.82)+	(1.59)+	(1.33)+	(1.5)+	(1.93)*
RES*EITI_MEM			**-0.29**	**-0.12**	**-0.29**	**-0.32**	**-0.39**	**-0.25**
			(-1.24)+	**(-0.70)+**	**(-1.25)+**	**(-1.36)+**	**(-1.48)+**	**(-1.46)+**
Log(GOVT_CONSUMP)				-0.03				0.04
				(-0.84)+				(1.00)+
Log(POP)					-0.20			-0.44
					(-0.93)+			(-1.22)+
POL						0.00		0.00
						(0.44)+		(0.22)+
Log (GDPPC-Growth							0.00	0.01
							(0.37)+	(0.98)+
T-stat in brackets								
Significance level [<0.05:**, <0.10:*, >0.10:+}]								
Note - CoC: Control of Corruption, EITImem: Dummy variable for EITI membership (1=intention, 0=no intention), RES: Resource dependence proxy (primary exports/merchandise exports), Government consumption: Govt_Consump, POL: Combined Polity score, POP: Total population, GDPPC-Growth: Gross Domestic Product per capita growth (annual%).								

Source: Computed by the Authors

4.3. Result

The statistical analysis of 46 countries in SSA shows that EITI membership and its statistical interaction with resource dependence have a moderately positive effect on reducing the resource curse in implementing countries, by increasing GDP per capita. The results support the findings of Corrigan (2013); however, the positive effect of EITI membership in SSA is less significant than in the rest of the world. The lower significance is possibly due to the overall weak governance that plagues the region, which reduces the effectiveness of standards like the EITI, as transparency and accountability measures are most effective when there are checks and balances and a strong civil society that has the ability to act. The analysis found that resource dependence does not have a significant negative effect on economic growth, which does not conform to the traditional resource curse literature. The results do not indicate that EITI membership has no specific beneficial effect on levels of corruption in the region. This supports the findings of Corrigan (2013), who found no significance for the interaction between control of corruption and EITI membership. The consistently negative (however statistically insignificant) interaction between EITI membership and control of corruption runs counter to the expected hypothesis and empirical literature. A potential explanation for this phenomenon is a negative selection bias for EITI-implementing countries, which tend to have high levels of corruption to begin with. This is reflected by Botswana and South Africa not being members of the EITI, even though they are two of the most advanced democracies in the region. Corruption research traditionally suffers from indicators that do not capture the full effect of the nature of corruption in a given country. Current corruption measures, including the one used in this research assignment, capture perceived corruption instead of objective levels of corruption and tend not to vary significantly over time. The EITI could potentially be considered a “band-aid” solution that addresses some of the symptoms in resource governance without really addressing some of the causes, and its ability to fight corruption is limited to particular corruption areas (Corrigan, 2013). Research in this area could potentially benefit from using different measurements of corruption that parse out factors that are more or less affected by frameworks such as the EITI.

The central thesis of this study, that collective action through EITI membership and information disclosures can reduce corruption and subsequently indirectly reduce the harmful effect of resource abundance on economic growth, is not fully supported. The EITI potentially fails to address complex linkages and power relations between stakeholders, especially state manipulation of data and disclosure output, which undermines the effective mobilisation of collective action and its ability to hold government to account (Smith et al, 2012). As noted by Hilson and Maconachie (2009), the EITI has diagnosed the challenge of resource abundance and corruption in SSA “far too superficially”, with some governments merely posturing and not implementing governance reforms. Examples of this are Chad (current member) and Equatorial Guinea (delisted in 2010), which remain some of the most oppressive regimes in the world (Hilson and Maconachie, 2009). Although evidence for this indirect effect is not visible, the direct effect of EITI membership on economic growth has gained some support. This study supports the likelihood that membership of international organisations signals to investors that the government is committed to reforms, and could lead to increased foreign investment and aid flows. If more money is coming into the country and less resource revenue is flowing out illicitly due to oversight by civil society, the benefit of EITI membership could be substantial. Even though the corruption perception levels remain high, more funds being available for spending on infrastructure and human development (health and education) does provide some validation for the implementation of the standard.

5. Conclusion

A pooled cross-sectional panel study was performed on the 46 countries in SSA based on the World Bank regional definition, for the period 1996 to 2016. The study identified membership of the EITI has a positive effect on GDP per capita in SSA. Corruption levels remain high in the region and are not shown to be affected by EITI membership. These results indicate that the EITI has potential value and should continue to be used as a mechanism to increase transparency in the resource sector.

The implementation period for most member countries is still in its infancy. The success of the EITI will therefore be better assessed after a period of time. The credibility of the standard will be enhanced by convincing OECD countries, as well as some other richer economies in SSA (Botswana and South Africa), to join the EITI and use their existing institutional quality to set the benchmark for other implementing members. There is large scope for capacity-building across the standard, where the more developed nations can use approximation through membership to enhance the ability of less developed nations to hold their governments to account by empowering civil society and aligning local EITI frameworks with regional best practices.

Further research in this area is required once the EITI has had more time to develop and members to embed knowledge into their local frameworks. The use of alternative measurements that capture objective corruption could be beneficial in strengthening the link between the EITI and good governance. Another area of research that could be further explored is the effect of EITI membership on the value of illicit financial flows. Vast amounts of government resource revenue have flooded out of SSA illicitly, which could be countered by the keen eye of CSOs and the expansion of institutional transparency measures.

References

Bauhr, M., Grimes, M. and Harring, N. 2010. Seeing the state: The implications of transparency for societal accountability. University of Gothenburg: Quality of Government Institute Working Paper Series 2010:15.

Corrigan, C.C. 2013. Breaking the resource curse: Transparency in the natural resource sector and the extractive industries transparency initiative. *Resources Policy* 40, pp.17–30.

David-Barret, L. and Okamura, K. 2013. The transparency paradox: Why do corrupt countries join EITI? ERCAS Working Paper No. 38. Berlin: European Research Centre for Anticorruption and State-Building.

Dimant, E., & Tosato, G. (2018). Causes and effects of corruption: what has past decade's empirical research taught us? A survey. *Journal of Economic Surveys*, 32 (2), pp. 335-356.

Fenster, M. 2005. The opacity of transparency. *Iowa Law Review* 91 (3), pp. 885–949.

Fisman, R. and Golden, M.A. 2017. *Corruption: What everyone needs to know*. New York: Oxford University Press.

Geldenhuys, A.F., Ajuwon, O.S., and Graham, M., 2020. Resource curse and EITI Membership effect on The Economic Growth and Corruption in sub-Saharan Africa: Part I - A Theoretical Review. *Oradea Journal of Business and Economics*, 5 (1), pp.18-28.

Hilson, G. and Maconachie, R. 2009. Good governance and the Extractive Industries in sub-Saharan Africa. *Miner. Process. Extr. Metall. Rev*. 30 (1), pp. 52–100.

Huntington, S.P. 1968. *Political order in changing societies*. New Haven: Yale University Press.

Islam, R., 2006. Does more transparency go along with better governance? *Economics & Politics*, 18 (2), pp.121-167.

Karl, T. L. 1997. *The paradox of plenty: Oil booms and petro-states*. Berkeley and Los Angeles: University of California Press.

Kasekende, E., Abuka, C. and Sarr, M. 2016. Extractive Industries and corruption: Investigating the effectiveness of EITI as a scrutiny mechanism. *Resources Policy* 48 (C), pp. 117-128.
Kaufmann, D., Kraay, A. and Mastruzzi, M. 2010. *The worldwide governance indicators: Methodology and analytical issues*. Policy Research Working Paper Nr.5430. The World Bank Development Research Group, Macroeconomic and Growth Team.
Kolstad, I. and Wiig, A. 2008. Is transparency the key to reducing corruption in resource-rich countries? *World Development,* 37 (3), pp. 521–532.
Leff, N.H. 1964. Economic development through bureaucratic corruption. *American Behavioral Scientist* 8:8–14. Reprinted in A.J. Heidenheimer, M. Johnston & V.T. LeVine (Eds) 1989. *Political corruption: A handbook*. Oxford: Transaction Books, pp. 389–403.
Leite, C.A. and Weidmann, J. 1999. *Does Mother Nature corrupt? Natural resources, corruption and economic growth*. Working Paper WP/99/85. International Monetary Fund.
Mejía Acosta, A. 2013. The impact and effectiveness of accountability and transparency initiatives: The governance of natural resources. *Development Policy Review,* 31, pp. 89–105.
Méon, P. and Sekkat, K. 2005. Does corruption grease or sand the wheels of growth? *Public Choice,* 122, pp. 69–97.
Nwapi, C. 2014. Enhancing the effectiveness of transparency in Extractive Resource Governance: A Nigerian case study. *Law and Development Review,* 7 (1), pp. 23–47.
Ross, M.L. 1999. The political economy of the resource curse. *World Politics,* 51 (2), pp. 297–322.
Rothstein, B. and Holberg, S. 2011. Correlates of corruption. Working Paper Series 2011:12. University of Gothenburg: The Quality of Government Institute.
Sachs, J.D. and Warner, A.M. 1995. *Natural resource abundance and economic growth*. Cambridge, MA: Centre for International Development and Harvard Institute for International Development.
Sachs, J.D. and Warner, A.M. 2001. The curse of natural resources. *European Economic Review*. 45 (4–6), pp. 827–838.
Smith, S.M., Shepherd, D.D. and Dorward, P.T. 2012. Perspectives on community representation with the Extractive Industries Transparency Initiative: Experiences from South-East Madagascar. *Research Policy* 37, pp. 241–250.

Bio-Note

Geldenhuys Andries Francois (Mr) holds a Master's degree in Development Finance from the University of Stellenbosch Business School, South Africa, and works at Transparency International, a leading anti-corruption NGO, in Berlin, Germany. He is also a certified Chartered Accountant [CA(SA)].
Ajuwon Oluseye Samuel (Dr) is a lecturer of economics at the University of Lagos, Nigeria, with a PhD in Development Finance from the University of Stellenbosch Business School, South Africa. His area of research is in macroeconomics, international finance, and development finance, with a special focus on financing small businesses.
Graham Michael (Prof) is the Programme Head, Development Finance. He was previously Associate Professor of Finance at Stockholm Business School in Sweden before joining USB. Prof Graham's research interest lies in empirical corporate finance, corporate governance and financial markets. He teaches Corporate Finance, Structured Finance, Infrastructure Finance and International Finance and has extensive and international teaching experience, having taught in Australia, Finland and Singapore.

APPENDIX A
Table A1: List of EITI Members in SSA

Country	Date of official membership	Date of joining intention	Status
Burkina Faso	2009	2007	Yet to be assessed against 2016 standard
Cameroon	2007	2005	Yet to be assessed against 2016 standard
Central African Republic	2011	2007	Suspended due to political instability
Chad	2007	2007	Yet to be assessed against 2016 standard
Cote d'Ivoire	2008	2007	Yet to be assessed against 2016 standard
Democratic Republic of Congo	2008	2005	Yet to be assessed against 2016 standard
Ethiopia	2014	2009	Yet to be assessed against 2016 standard
Ghana	2010	2003	Meaningful progress
Guinea	2007	2005	Yet to be assessed against 2016 standard
Liberia	2009	2007	Meaningful progress
Madagascar	2008	2008	Yet to be assessed against 2016 standard
Malawi	2015	2014	Yet to be assessed against 2016 standard
Mali	2007	2006	Meaningful progress
Mauritania	2007	2005	Meaningful progress
Mozambique	2009	2008	Meaningful progress
Niger	2007	2005	Inadequate progress (suspended)
Nigeria	2009	2008	Meaningful progress
Republic of Congo	2007	2004	Yet to be assessed against 2016 standard
São Tomé and Príncipe	2012	2005	Meaningful progress
Senegal	2013	2012	Yet to be assessed against 2016 standard
Seychelles	2014	2013	Yet to be assessed against 2016 standard
Sierra Leone	2008	2006	Yet to be assessed against 2016 standard
Tanzania	2009	2008	Meaningful progress
Togo	2010	2009	Yet to be assessed against 2016 standard
Zambia	2009	2008	Meaningful progress

Source: Computed by the Authors

DETERMINANTS OF CUSTOMER LOYALTY TO MOBILE PHONE BRANDS

Edith Onowe Odia, Simon Ayo Adekunle*
Department of Business Administration, Faculty of Management Sciences, University of Benin, Benin City, Nigeria
edyy2002ng@yahoo.com
adeksim@yahoo.com

Abstract: *This study empirically examined customer loyalty to mobile phone brands in Nigeria with specific objectives of establishing customers' preference for the different brands of mobile phone; ascertain the rationale for customer loyalty and preference for mobile phones; and examining the influence of demographic variables on customer loyalty to mobile phone usage. A survey research design with the use of questionnaire was adopted to generate the needed data for the study. The population of the study comprised users of mobile phones in the university community, ministries, and secondary schools in Benin City, Nigeria. Copies of questionnaire were administered to two hundred (200) respondents out of which one hundred and ninety-four (194) were returned and found useable. Statistical tools including simple percentage, mean, t-test and analysis of variance (ANOVA) were employed for data analysis through the use of Statistical Package for Social Sciences (SPSS 22.0). The study found that there is a significant relationship between respondents' demographics (gender, age and educational qualification) and customer loyalty at a 5% level of significance. Based on the investigated factors influencing mobile phone purchases such as quality, functionality, cost, durability and ease of maintenance, the study revealed that Nokia, Blackberry and Samsung are the most preferred mobile phones in Nigeria. The study, therefore, recommends that manufacturers of mobile phones should ensure that their products are of good quality, durable, affordable, easy to repair and capable of performing multiple functions so that those customers who like using more than one phone with different functional varieties can be loyal to a particular brand.*

Keywords: Brand loyalty, Customer, Durability, Mobile phones, Quality.

JEL classification: M3, M31, M310.

1. Introduction

The whole world has now become a global village where people can reach one another in different parts of the world with the help of modern technologies such as mobile phones within a short period (Aidoo and Nyamedor, 2008; Srinivasan, 2018). Mobile phones have evolved from analogue to digital (Jin, 2018). The first generation of mobile phones were analogue, but subsequent generations have been predominantly digital (Pascal, 2007). In the 1990s, analogue phones were deployed by Nigerian Telecommunications Limited (NITEL), the only national carrier then. Satellite phone was also available (Adeyinka, *et al.,* 2007). However, these mobile phones were not accepted by the generality of Nigerians because they were not only expensive but also, they were seen as status symbols rather than a necessity (Pascal, 2007). The launching of a new mobile telecoms technology known as the Global System for Mobile communication (GSM) in Nigeria in 2001 transformed the telecommunication sector which has been instrumental to the rapid increase in telecommunications accessibility (Bakare and Gold, 2011). GSM dominated the digital

* Corresponding Author: Dr. Simon Ayo Adekunle

cellular market with 70% of the market and more than 500 million subscribers in 169 countries in 2000 with worldwide mobile users of 2.13 billion and 4 billion in 2005 and 2011 respectively (Pascal, 2007; Radicati, 2014).

Statistics record showed that as at 2004, there were over 5000 direct and 400,000 indirect employments the Tel-communication industry in Nigeria (Bakare and Gold, 2011; Adomi, 2006). This sector appeared to have improved the nation's GDP as its contributions increased from 0.32% in 2000 to 3.66% in 2009 (NCC, 2012) and generated over 200 billion Naira (Adeyinka *et al.,* 2007). It is purported that Nigeria has the largest market (the Computer Village in Lagos) for GSM in Africa (Kenneth, 2007).

Mobile phones are "one of the modern telecommunication technologies that have emerged over the past decades to facilitate communication among people within and across countries" (Dziwornu, 2013, p.151). Nowadays, mobile phones are used by different individuals in society (Lipschultz, 2019) such as the office cleaner, auto mechanic, drivers, students, farmers, market women to the businessman and the Chief Executive Officer (CEO) of both private and public institutions in Nigeria. They perform varieties of functions among which are making and receiving calls, text messages, music player, multimedia messaging and Internet browsing, among others. There are several brands and sizes of mobile phone handsets with different ranges of prices and functionalities as well as network providers on the Nigerian market that render the aforementioned services.

In promoting the marketing concept of treating customers as kings, there is a need for mobile phone manufacturers to continuously pay adequate attention to the needs of their customers to make them loyal (Adomi, 2006). Satisfied customers are more likely to be loyal customers and give the firms a larger share of their businesses (Otto *et al.,* 2019). Companies are realizing that losing a customer means losing more than a single sale; it means losing the stream of purchases that the customer would make over a lifetime of patronage (Kotler and Armstrong, 2010). It is on this basis that this study examines the factors affecting customer loyalty to mobile phone brands in Nigeria. Specifically, the study sought to establish customers' preference for the different brands of mobile phones; ascertain the rationale for customer loyalty and preference for mobile phones; and identify the demographic variables that influence customer loyalty to mobile phone brands.

2. Review of Related Literature

Brand loyalty is a deeply held commitment to re-buy a preferred brand of goods or services in the future despite situational influences and marketing efforts having the potential to cause switching behavior (Krivic and Loh, 2018). It exists when a customer, because of experience, is sufficiently satisfied with a particular brand that he or she buys that brand or with a retailer, he or she buys from when the need arises without considering other alternatives (Etzel, *et al.*, 2007; Kotler and Keller, 2009; Agbaje, 2011). The concept of loyalty has admittance to the business context that is massively used in the field of marketing to describe the customer's willingness to continue patronizing a firm over the long term; it is emerging as the marketplace currency for the twenty-first century (Singh and Sirdeshmukh, 2000; Karunaratna, 2014). According to Anderson and Jacobsen (2000, p.65), "customer loyalty is the result of an organization creating a benefit for a customer so that they will maintain or increase their purchases from the organization." It is apparent that the success of a firm largely depends on its capability, not only to attract consumers towards its brand but also retain them in the long run.

Various authors at different times have identified several factors that influence customers' choice and loyalty to mobile phone brands across the globe. One of the pioneering studies on mobile phone choice by Riquelme (2001) examined how much self-knowledge consumers have when choosing between different mobile phone brands. The study was built on six key attributes such as telephone features, connection fee, access cost,

mobile-to-mobile phone rates, call rates and free calls. The study revealed that consumers with prior experience with a product can predict their choices relatively well.

Karjaluoto, *et al.* (2005) examined factors affecting consumer choice of mobile phone in Finland. The study focused on factors that influence the intention to acquire new mobile phones on one hand and factors that influence mobile phone change on the other hand. The study classified the factors into seven categories namely innovative services, multimedia, design, brand and basic properties, outside influence, price and reliability. The study revealed that factor innovative services and factor multimedia were the most important factors that affect mobile phone choice. Also, technical problems were found to be the basic reason to change mobile phones among students while price, brand, interface, and properties were the most influential factors affecting the actual choice between brands.

Aidoo and Nyamedor (2008) explored the factors that determine the choice of mobile phone brand among residents of Kumasi metropolis in Ghana. The study revealed that reliable quality and user-friendliness are the two most important factors underlying the choice of brand of mobile phone. The study also found that 76 percent of the respondents owned a mobile phone and also most people did not use mobile phone because of its high cost. The analysis also revealed that Nokia is the most used mobile phone and the brand of mobile phones used by the consumer is associated with educational level attainment and occupational status of the consumer.

Singla and Bansal (2010) identified and compared key attributes that influence mobile phone purchasing between Sangrur and Ludhiana consumers in India. According to the authors, mobile phone users wanted their handsets to be loaded with multiple functions, entertainment is the most important among them. They wanted their mobile phones to be fully loaded with top-end features, but at the same time, they wanted all these at affordable costs. Similarly, the study conducted by Mokhlis and Yaakop (2012) examined seven independent dimensions namely innovative features, image, price, personal recommendation, durability and portable aspects, media influence, and post-sales service as different choice criteria in mobile phone selection among Malaysian consumers. The study found that the top three most important factors influencing consumer choice of mobile phone handsets were: innovative features, personal recommendation and price. It was recommended that the promotion of new mobile phone models should go beyond highlighting properties to highlighting what users can do with all the technical features.

In the study conducted by Saif, Razzaq, Amad, and Gul (2012) on the factors that affect Pakistani consumers in their mobile phone choice decision, four important factors such as price, size/shape, new technology features and brand name were examined. The study found that when selecting between different mobile phone handsets, consumers prefer well-known brands instead of no familiar brands. The study further shows that price does affect consumers' choice for a mobile phone but becomes a less important factor as consumers move from low monthly income to higher income earning consumers. The study also revealed that male respondents were more interested in the new technological developments in the mobile phone industry as compared to female respondents.

Dziwornu (2013) investigated the factors affecting mobile phone purchase decision in the Greater Accra Region of Ghana, using a binary logit regression model approach. Results from the study show that Nokia and Samsung phones were the two main brands of phones used by majority of the respondents interviewed. Also, the study revealed that advanced technology features such as internet browsing, durability and quality of mobile phone handsets the main factors that are likely to positively and significantly affect mobile phone purchase decisions. It was therefore recommended that manufacturers and marketers of mobile phone handsets should produce and market more durable and high-quality mobile phone handsets with modern technology features that are targeted at the educated youth.

Adekunle and Ejechi (2018) examined how service quality measured by convenience, functionality and perceived usefulness impact on users' satisfaction and repurchase

intention. Data were collected using 486 validly filled copies of questionnaire by smartphone users. The study found that convenience, functionality and perceived usefulness significantly influence users' satisfaction. The study also revealed that perceived usefulness significantly impacts on users' repurchase intention. The study concluded that users' repurchase intention is influenced by users' satisfaction and service quality.

Inegbedion and Obadiaru (2019) in their study on modeling brand loyalty using the Nigerian telecommunication industry found that 21% of the GSM users in the country will be loyal to MTN while Airtel will retain 27% of the total market. The study also reveals that Globacom and 9Mobile will retain 35% and 1% of the market share respectively.

It can be observed from the review of previous studies that quality, recommendations by family and friends, durability, innovative services, multimedia, design, brand and basic properties, outside influence, price and reliability are the major factors that influence customers' choice and loyalty to mobile phone brands across the globe. This study, therefore, examined the opinions of customers on major attributes of mobile phones such as quality, cost, functionality, durability and ease of maintenance in Nigeria.

3. Methodology

The survey research design was adopted for this study. The population of the study comprised users of mobile phones in Benin City, Edo State, Nigeria. A sample of two hundred (200) mobile phone users were selected from the different stakeholders which include students, academic staff, non-academic staff and other business individuals working in the University community, ministry workers, secondary school teachers, among others. The copies of questionnaire used as a research instrument were administered in the Second Semester of 2012/2013 academic session when all the aforementioned stakeholders were fully on Campus for different academic and business activities at the Ugbowo Campus of the University of Benin. Also, seven popular brands of mobile phones in Nigeria namely: Nokia, Blackberry, Samsung, Tecno, LG, HTC and Sony Ericson were used for this study. The study obtained data from the primary source through questionnaire administration as a research instrument. The questionnaire consists of two (2) parts namely: respondents' demographics and questions that cover customers' loyalty, preference and rationale for a choice of mobile phone. Out of the two hundred (200) questionnaires administered to respondents, one hundred and ninety-four (194) were returned and found useable. The data collected were analyzed using different statistical tools such as frequency table, simple percentages, mean, t-test and analysis of variance (ANOVA) with the aid of Statistical Packages for Social Sciences (SPSS) software.

4. Results and Discussions

4.1. Description of Company Profile

This section presents the results that emanated from the data analysis in line with the research objectives as well as the discussion of findings. The respondents were asked where and how they obtained their phones to provide background information on the sources of mobile phones used by the respondents.

Table 1. Source of obtaining mobile phones among respondents

S/N	Source	Frequency	%
1	Accredited distributors	70	36.1
2	General market	61	31.4
3	Gift from others	63	32.5
Total		194	100

Source: Authors' fieldwork

The result reveals that majority of the sampled respondents either purchased their mobile phones from accredited distributors. This category accounts for 36.1%. 61 (31.4%) of the respondents obtained their phones from the general market place 32.5% of the respondents got their phone as a gift from someone/somewhere/friends.

4.2. Customer preference for the different brands of mobile phones

In establishing the mobile phone users' preference for the different brands of mobile phones, respondents were asked to indicate their preference for some selected popular brands of phones in Nigeria. The responses to the different questions are presented in Table 2:

Table 2. Preference for mobile phones

S/N	Variable/Brand of Phones	Frequency	%
	Preferred mobile phone(s)		
1	Nokia	97	49
2	Blackberry	44	22
3	Samsung	24	12
4	Tecno	13	07
5	HTC	14	07
6	Sony Ericson	04	02
7	LG	04	02
	Total	**200***	**100**

Note: * indicates that a respondent ticked more than one option
Source: Authors' fieldwork

Table 2 presents popular brands of phones in the market as at the time of the study and how they are preferred by the respondents. The result shows that Nokia, Blackberry and Samsung products are the most preferred and popular brands of mobile phones with 49%, 22%, 12% respectively. The other brands such as Tecno, HTC, LG and Sony Ericsson were jointly preferred by only 17% of the entire respondents. The finding that Nokia, Blackberry and Samsung phones are the most preferred is consistent with Dziwornu (2013).

4.3. Rationale for customer loyalty and preference for different mobile phones brands

In ascertaining the rationale for customer loyalty and preference for the different brands of mobile phones sampled for this study, respondents were asked to express their opinions on some factors such as durability, functionality of the brand, quality, cost and ease of maintenance that can influence customers to be loyal to a particular brand of mobile phone. The result is shown in Table 3 below:

Table 3. Customers' opinions on factors of mobile phones brands

S/N	Brand of Phone	Durability		Quality		Functionality		Easy to Maintain		Product Cost		Ranking
		Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
1	Nokia	69	30	57	25	38	17	46	20	20	09	**1st**
2	Blackberry	09	18	13	26	19	38	03	06	06	12	**2nd**
3	Samsung	11	24	14	31	12	27	06	13	02	04	**3rd**
4	Tecno	07	29	05	21	07	29	05	21	00	00	**4th**
5	HTC	02	13	04	25	05	31	03	19	02	13	**5th**
6	Sony	04	36	05	45	00	00	01	09	01	09	**6th**
7	LG	02	33	02	33	01	17	01	17	00	00	**7th**
Total (Freq)		**104**		**100**		**82**		**65**		**31**		
Ranking		**1st**		**2nd**		**3rd**		**4th**		**5th**		

Source: Authors' fieldwork

Respondents were asked to use the aforementioned factors to rate the different brands of mobile phones selected for this study. The result as shown in Table 3 reveals that Nokia, Blackberry and Samsung are the most preferred mobile phones in Nigeria as they were ranked first, second and third respectively. Others such as Tecno, HTC, Sony Ericson and LG were ranked fourth, fifth, sixth and seventh respectively. In the same vein, Table 2 also reveals that durability and quality are the main factors that promote customer loyalty to the brand of the phone(s) they use as these factors were ranked first and second respectively. Functionality, ease of maintenance and product costs were ranked third, fourth and fifth respectively.

This study found that product quality and durability are the major factors that keep customers loyal to a particular brand of a mobile phone. This finding is in agreement with the study of Aidoo and Nyamedor (2008) that found that reliable quality of the mobile phone is the most important factor considered by users. Also, product functionality is found to be an important factor in this study. This finding agrees with that of Karjaluoto, *et al* (2005) that consumers purchase new phones because their existing one's capacity is not appropriate. Importantly also, this study revealed that product cost was not a major factor considered by customers to make them loyal. This finding is supported by studies conducted by Aidoo and Nyamedor (2008), Singla and Bansal (2010), and Saif*, et al,* (2012) that found that mobile phone users wanted their mobile phones to be fully loaded with top-end features, but at the same time they wanted all these at affordable costs. However, Pakola, *et al.* (2007) found that price was regarded as the most important motive affecting the decision to purchase the current mobile phone model for consumers in Finland.

Table 4. Number of phones and manufacturers' information

S/N	Variable	Frequency	Percentage
1	Respondents with more than one phone	107	55.15
2	Respondents with only one phone	87	44.85
Total		194	100
1	Phones from the same manufacturers	32	29.91
2	Phones from different manufacturers	75	70.09
Total		107	100

Source: Authors' fieldwork

Table 4 above reveals that 107 (55.15%) of the sampled respondents use more than one phone. 87 out of the 194 respondents used only one phone. This latter category accounts for only 44.85% of the total respondents used for this study. In providing more information on how loyal a customer is to the product of a particular company, the respondents that indicated that they have more than one phone were asked whether the phones were produced by the same manufacturer or company. The result shows that only 32 out of the 107 respondents purchased their phones from the same manufacturer. This accounts for only 29.91% of the entire respondents. 70.09% of the respondents did not patronize the same manufacturer in getting the other phones.

4.4. Influence of respondents demographics on their loyalty to a brand of phone

This section presents the analysis of consumers' demographic influences on mobile phone brand loyalty using simple percentages, T-Test and analysis of variance (ANOVA). Also, post hoc analysis was conducted using Student-Newman-Keuls (S-N-K) Procedure.

Table 5. Gender influences on customer loyalty

S/N	Sex	Yes	%	No	%	Total	%	t-value	p-value	Decision
1	Male	23	71.9	26	34.7	49	45.8	-2.979	0.000	Significant
2	Female	9	28.1	49	65.3	58	54.2			
Total		32	100	75	100	100	100			

Source: Authors' fieldwork

The t-Statistic of -2.979 with the p-value of 0.004 reveals that there is a significant difference in customer loyalty between male and female mobile phone users. Table 5 further shows that majority of the respondents that have more than one phone are female as this group accounts for 54.2% while their male counterpart accounts for 45.8%. Notwithstanding, more females use multiple phones, loyalty index of 0.762 (23 out of 32) indicates that the males are more loyal with index of 0.28. Of the 49-total number of males using multiple phones, 46.9% were found to be loyal while only a meager 15.5% (9) of the 58 female respondents using multiple phones were found to be loyal in the selection of cell phones. This finding aligns with the studies of Karjaluoto, *et al* (2005), Ogunyemi (2010), and Balakrishnan and Raj (2012) that found that differences exist between males and females concerning what attracts them to buy a particular mobile phone.

Table 6. Age influences on customer loyalty

S/	Age	Yes	%	No	%	Total	%	F-Value	P-value	Decision
1	18 – 30	29	90.6	40	53.3	69	64.5	7.998	0.001	Significant
2	31 – 40	1	3.1	25	33.3	26	24.3			
3	41 and Above	2	6.3	10	13.3	12	11.2			
Total		32	100	75	100	100	100			

Source: Authors' fieldwork

Also, the results reveal that most of the respondents fall between the age brackets of 18 – 30 years old. This group account for 64.5% of the entire respondents. This is followed with respondents between the age of 31 – 40 years old while respondents that are 41 years old and above have the least percentage. The percentages of these categories are 24.3% and 11.2% respectively. The analysis of variance (ANOVA) results with F-Statistic of 7.998 and p-value of 0.001 shows that there is a significant difference between respondents' age and their loyalty to the brands of mobile phones. Of the 69-total number of respondents age between 18 – 30 years using multiple phones 42% (29) were found to be loyal. For age between 31 – 40 years, only 3.8% (1) of the multiple phone holders were discovered to be loyal. Lastly, of the 12 respondents, age above 40 years old users of multiple phones, only 16.7% (2) were found to be loyal. Further analysis revealed that 90.6% (29) of the loyal 32 (30%) were between the age of 18 – 30 years while only a very small proportion 3.15% (1) of loyal users are between ages of 31 – 40years. Lastly, only (2) 6.25% of loyal users are ages 41 and above.

Table 7. Loyalty to mobile phone selection and respondents' age: Multiple range tests based on Student-Newman-Keuls (S-N-K) procedure

	More Loyal Users	Less Loyal Users
INDEX	Group 1	Group 2
Mobile Phone	Users between 18 – 30 years Users age above 40	Users age above 40 yrs Users between 31 to 40 yrs

Source: Authors' fieldwork

It could be seen from the post hoc (S-N-K) analysis that the respondents between 18 – 30 are as loyal as those above 40 years of age, but are not as loyal as those between 31 – 40 years of age.

Table 8. Educational influences on customer loyalty

S/N	Education	Yes	%	No	%	Total	%	F-value	P-value	Decision
1	WASSCE/ NECO	21	65.6	17	22.7	38	35.5	10.652	0.000	Significant
2	HND/B.Sc	9	28.1	44	58.7	53	49.5			
3	M.Sc/PhD	2	6.3	14	18.6	16	15			
Total		32	100	75	100	107	100			

Source: Authors' fieldwork

Lastly, respondents with HND/B.Sc dominated the sample as this group accounts for 49.5%. This is followed by respondents with WASSCE/NECO and M.Sc/Ph.D with 35.5% and 15% respectively. In the same vein, the analysis of variance (ANOVA) results with F- Statistic of 10.652 and p-value of 0.000 shows that respondents' loyalty to the brands of mobile phones is dependent on their educational qualification. Still, on the educational factor, 55.3% (21) of the 38 WASSCE/NECO holders who use multiple phones were found to be loyal, while 17% (9) of the 53 HND/B.Sc holders were discovered to be loyal, only 12.5% (2) of the 16 M.Sc./PhD holders were loyal in the selection of mobile cell phones.
The result of the Student-Newman-Keuls (S-N-K) post hoc test ranked holders of WASSCE/NECO as the more loyal group while HND/B.Sc holders and MSc/PhD were ranked in group two as the less loyal users of cell phones.

Table 9. Loyalty to mobile phone selection and respondents' education: Multiple range tests based on Student-Newman-Keuls (S-N-K) procedure

	More Loyal Users	Less Loyal Users
INDEX	Group 1	Group 2
Mobile Phone Selection	WASSCE/NECO holders	HND/B.Sc holders MSc/PhD holders

Source: Authors' fieldwork

The result of the S-N-K post hoc ranked holders of WASSCE/NECO in group 1 as the more loyal while HND/B Sc holders and M Sc/PhD were ranked in group two as the less loyal users of cell phones.

5. Conclusion

Mobile phones are gaining rapid acceptance among different individuals in the society such as the office cleaner, drivers, auto mechanic, students, market women to the businessman and the Chief Executive Officer (CEO) of both private and public institutions in Nigeria. The rapid acceptance and usage of mobile phones in Nigeria is positioning the manufacturing firms and other stakeholders in the business in a strategic way to maximize profit. However, for firms manufacturing mobile phones as well as their dealers to keep on maximizing profit, regular and continuous patronage must be guaranteed by customers. This will enhance their survival and growth. The orientation of some business organizations is that because they are opened for transaction and they have what the customers may need, is enough for

customers to come in and continuously trade or do business with them. But unknown to so many organizations that there are so many factors, influences and other considerations that make customers patronize them. It is on this premise that this study empirically examined customer loyalty to mobile phones brand in Nigeria. The study identified some demographic variables such as gender, age and educational qualifications and found that the variables significantly influence customer loyalty. Also, an empirical analysis of factors influencing mobile phones purchases such as quality, functionality, cost, durability and ease of maintenance revealed that Nokia, Blackberry and Samsung are the most preferred mobile phones in Nigeria.

6. Recommendations

Based on the research findings, the study, therefore, recommends as follows. First, manufacturers of mobile phones should ensure that their products are of good quality, durable, affordable, easy to repair and capable of performing multiple functions. Second, manufacturers of mobile phones should produce phones that have different features and functions that can serve multiple purposes so that those customers who like using more than one phone with different functional varieties can be loyal to a particular brand. Third, the use of distributors who have good advertising and publicity capacities and also have large networks of sales points should be given priority so that their brand can be easily accessed as this would help maintain a good image and enhance customer loyalty. Fourth, cell phone manufacturers and marketers should target or focus more on the male youth with a low educational background as they were found to be more loyal in the use of a particular brand of phone. Finally, the managerial implication of this study is that it will help manufacturers and marketers of mobile phone products to know the product attributes that can make their present and potential customers to be loyal and therefore redesign their products to meet the needs and aspirations of their target markets.

References

Adekunle, S.A. and Ejechi, J.O., 2018. Modelling repurchase intention among smartphones users in Nigeria. *Journal of Modelling in Management*, 13*4*, pp.794-814.

Adeyinka, T., Ajiboye, J.O., Adu, E.O. and Wojuade, J.I., 2007. Stakeholders' perceptions of the impact of GSM on Nigeria rural economy: Implication for an emerging communication industry. *Journal of Information Technology Impact*, 7 (2), pp.131-144.

Adomi, E.E., 2006. Mobile phone usage patterns of library and information science students at Delta State University, Abraka, Nigeria. *Electronic Journal of Academic and Special Librarianship*, 7 (1), pp.1-11.

Agbaje, J. E. 2011. Customer satisfaction and customer loyalty in the transport industry. (B.Sc Project, Department of Business Administration, University of Benin, Benin City).

Aidoo, E., and Nyamedor, B. 2008. *A study on factors that determine the choice of brands of mobile phone: A case study in the Kumasi Metropolis*. (B.Sc. Project, Department of Mathematics and Statistics, University of Cape Coast).

Anderson, H. and Jacobsen, P.N., 2000. Creating loyalty: Its strategic importance in your customer strategy. *Customer Relationship Management*, 55, pp. 55-67.

Bakare, A.S., 2011. Estimating the impacts of global system for mobile telecommunication (gsm) on income, employment and transaction cost in Nigeria. *Journal of Economics and International Finance*, 3 (1), pp.37-45.

Balakrishnan, V. and Raj, R.G., 2012. Exploring the relationship between urbanized Malaysian youth and their mobile phones: A quantitative approach. *Telematics and Informatics*, 29 (3), pp.263-272.

Dziwornu, R.K., 2013. Factors affecting mobile phone purchase in the greater Accra region of Ghana: a binary logit model approach. *International Journal of Marketing Studies*, 5 (6), p.151.
Etzel, M. J., Walker, B. J., and Stanton, W. J. 2007. *Marketing* (4th edition). New York: McGraw-Hill/Irwin Inc.
Inegbedion, H. and Obadiaru, E., 2019. Modelling brand loyalty in the Nigerian telecommunications industry. *Journal of Strategic Marketing*, *27* (7), pp.583-598.
Jin, D.Y., 2018. Evolution of Korea's mobile technologies: a historical approach. *Mobile Media and Communication*, 6 (1), pp.71-87.
Karjaluoto, H., Karvonen, J., Kesti, M., Koivumäki, T., Manninen, M., Pakola, J., Ristola, A. and Salo, J., 2005. Factors affecting consumer choice of mobile phones: Two studies from Finland. *Journal of Euromarketing*, 14 (3), pp.59-82.
Karunaratna A.C. 2014. Services quality and customer loyalty: Adequacy of SERVQUAL model. *Global Journal of Commerce and Management Perspective, 3* (4), pp. 20-26
Kenneth, O. N. 2007. The impact of GSM mobile phones on Nigeria, *Publication of Ezine Articles*, [online] Available at: http://www.ezinearticles.com.Accessed [25 August 2014]
Kotler, P., and Armstrong, G. 2010. *Principles of marketing,* 13th Edition. New Jersey: Pearson Prentice Hall
Kotler, P., and Keller, K. L. 2009. *Marketing management* (12th edition). New Jersey: Pearson Education Inc.
Krivic, S.J. and Loh, A., 2018. Factors relating to brand loyalty of a fitness health club franchise business in Vienna, Austria. *International Research e-journal on Business and Economics*, *2* (2), p.56-71.
Lipschultz, J.H., 2019. *Social Media Measurement and Management: Entrepreneurial Digital Analytics*. Routledge.
Mokhlis, S., and Yaakop, A. Y. 2012. Consumer choice criteria in mobile phone selection: An investigation of Malaysian University students. *International Review of Social Sciences and Humanities*, 2 (2), pp.203–212.
Ogunyemi, O. 2010. *Consumption and (in) appropriate use of mobile phone among teenage Africans in the UK*. Lincolnshire, England.
Otto, A.S., Szymanski, D.M. and Varadarajan, R., 2020. Customer satisfaction and firm performance: insights from over a quarter century of empirical research. *Journal of the Academy of Marketing Science, 48,* pp.543-564. Retrieved from: https://link.springer.com/content/pdf/10.1007/s11747-019-00657-7.pdf
Pakola, J., Pietilä, M., Svento, R., and Karjaluoto, H. 2007. *An investigation of consumer behaviour in mobile phone markets in Finland.* Submission to 32rd EMAC Conference, Track: New Technologies and E-Marketing.
Pascal, O. 2007. Nigeria: Mobile phone series. Retrieved from: http://www.naijatechguide.com/2007/10/nigeria-mobile-phone-series.html
Radicati, S., 2014. Mobile statistics report 2014-2018: executive summary. *The Radicati Group, Inc., Palo Alto, CA, USA*. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Radicati%2C+S.%2C+2018.+Mobile+statistics+report%2C+2014-2018.+Palo+Alto%2C+CA%3A+The+Radicati+Group%2C+Inc.&btnG=#d=gs_cit&u=%2Fscholar%3Fq%3Dinfo%3A9V1dRZBu4hAJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D1%26hl%3Den
Riquelme, H. 2001. Do consumers know what they want? *Journal of Consumer Marketing,* 18 (5), pp.437–448.
Saif, N., Razzaq, N., Amad, M., and Gul, S. 2012. Factors affecting consumers' choice of mobile phone selection in Pakistan. *European Journal of Business and Management,* 4 (12), pp.16–26.

Singh, J., and Sirdeshmukh, D. 2000. Agency and trust mechanisms in consumer satisfaction and loyalty judgements. *Journal of the Academy of Marketing Science*, 28, pp.150-167.
Singla, S., and Bansal, S. 2010. A study on the factors affecting choice criteria of consumers for mobile handsets: A comparative analysis in Ludhiana and Sangrur Districts. *Asian Journal of Management Research*, 2 (1), pp.443–456.
Srinivasan, R. (2018). *Whose global village? Rethinking how technology shapes our world*. NYU Press.

Bio-note

Dr. (Mrs) Odia, E. O. is an Associate Professor in the Department of Business Administration at the University of Benin, Benin City, Nigeria. Her research area includes branding, green marketing, consumer behaviour, and gender issues. Before joining University of Benin in 2011, she acted as the HOD, Department of Accounting/Business Administration, Benson Idahosa University. She is an Associate Examiner for the National Open University of Nigeria (NOU) as well as an Assessor for Institute of Chartered Accountant of Nigeria (ICAN). She is a Member of The Academy of Management Nigeria and Organisation of Women in Science for Developing Countries (OWSD).
Dr. Simon Ayo Adekunle is a First Class Honours graduate of Business Administration in the Department of Business Administration, University of Benin, Benin City, Nigeria. He is a Lecturer and Certified Data Analyst. Adekunle has published in reputable international journals such as African Journal of Management and Economic Studies, Journal of Modelling in Management, Management of Environmental Quality: An International Journal and so on. He has reviewed for Journal of Modelling in Management, International Journal of Organizational Analysis, Management Sciences Review among others. He is currently the Business Editor of Nigeria Journal of Business Administration – a journal domiciled in the Department of Business Administration, University of Benin. His research interest and areas of specialization are operations management, risk management, corporate sustainability and marketing.

CONVERGENCE/DIVERGENCE ANALYSIS AND DIFFERENTIATION IN MACROECONOMIC VARIABLES IN THE DEVELOPMENT OF THE RUSSIAN FEDERATION

Aleksy Kornowski
Faculty of Management and Social Communication, Jagiellonian University in Krakow, Krakow, Poland
alex.kornowski@gmail.com

Abstract: *The purpose of this paper is to analyze the economic development and the diversification of the individual regions of the Russian Federation (RF) on the basis of taxonomic indices and a convergence/divergence analysis of five macroeconomic variables, namely registered unemployment rate, investment per capita, gross domestic product (GDP) per capita, wages, and the number of organizations conducting research and development (R&D) per million inhabitants, for the period between 2000 and 2012 (the period was chosen due to lack of data for years 2014, 2015 and 2016 for few regions). The study covers 79 regions, and the data used for the analyses comes from the Russian Statistical. The principal method of analysis is the taxonomic index based on Euclidean metrics. The spatial differentiation in the development of RF regions demonstrates the specific character of the individual regions of Russia. The analysis made leads to the conclusion that the most developed regions in terms of the analyzed variables are of industrial and mining character, while the least developed ones are agricultural in character. The structure of this paper is as follows: the spatial differentiation of macroeconomic variables in RF regions, registered unemployment rate, per capita investment, per capita GDP, wages, and number of organizations conducting R&D activities per million inhabitants is discussed in section 2; the definition of a taxonomic index based on Euclidean metrics is presented in section 3; the analysis of the diversified development of RF regions based on taxonomic indicators is given in section 4, a preliminary convergence/divergence analysis is presented in section 5, while section 6 provides a key conclusions.*

Keywords: Russian Federation, economic development, regional economic development, differentiation of macroeconomic variables.

JEL classification: O11.

1. Introduction

When analyzing the development of the Russian economy, one should be aware of its developmental specificities in the individual parts of the country. In terms of economic development, Russia can be divided into two parts: the European part and the Asian part. The European part is characterized by a larger number of inhabitants and a relatively underdeveloped mining industry. In contrast, the Asian part features a well-developed mining and processing industry, with a relatively small number of inhabitants (Russian Statistical Office, 2020). This paper begins with the discussion of the spatial differentiation of macroeconomic variables in RF regions, followed by a definition of the Euclidean metric-based taxonomic index applied in the study, an analysis of the diversity in regional development in the Russian Federation based on the taxonomic indices, and a comparison of the degree of spatial differentiation of the analysed variables. The paper closes with an initial analysis of the σ-convergence of these macroeconomic variables and conclusions that

the most developed RF regions include good condition of the service sector and the development of industry branches specific and their immediate environment, such as mechanical engineering, food industry, oil and gas processing, research and development, pharmaceutical industry, metallurgy, chemical industry, and production of building materials.

2. Literature review

The experience of many countries shows that the processes of economic growth and development of economies are characterized by considerable imbalance both in time and in space. The results of empirical research suggest that the equalization of development levels occurs to a greater extent between regions of a given country and member countries of regional integration systems than on an international scale (Barro, Sala-i-Martin 2004: 410). However, under the influence of deepening economic globalization it is often difficult to find empirical evidence supporting the thesis, that reducing the disparities in regional development is characteristic of most national economies.

This problem also affects the economy of the Russian Federation. Historically determined, including experiences related to the period of central planning, mean that economic inequalities between regions are largely responsible for the current polarization of the country's economic development. The issue of differentiation of economic development and taxonomic indicator is discussed in Blackwelder (1966), Cole (1968), Taylor (1970), Sneath and Sokal (1973), Mezzich and Solomon (1980), Majewski (1999), Dykas (2010), Tokarski and Jabłoński (2010), Kornowski (2015),

The issue of convergence is one of the most developing areas of research within the framework of macroeconomic theory of economic growth, is discussed in Islam (2003), Gajewski and Tokarski (2004), Malaga and Kliber (2007), Misiak, Tokarski and Włodarczyk (2011).

3. Spatial differentiation of selected macroeconomic variables in the regions of the Russian Federation

3.1. Registered unemployment rate

Table 1 presents the differentiation of the unemployment rate in RF regions between 2000 and 2012, divided into quintile groups.

Table 1: Spatial differentiation of the unemployment rate (%) registered in the regions of the Russian Federation in period between 2000 and 2012

Group	RF Region (Unemployment Rate)
1 6.29[1]	Moscow (1.64); St. Petersburg (3); Moscow Oblast (3.97); Chukotka Autonomous Region (5.1); Tula Oblast (5.15); Yaroslavl Oblast (5.24); Lipetsk Oblast (5.25); Samara Oblast (5.37); Belgorod Oblast (5.6); Novgorod Oblast (5.66); Kostroma Oblast (5.68); Kaluga Oblast (5.96); Tver Oblast (6.01); Republic of Tatarstan (6.17); Chelyabinsk Oblast (6.2); Leningrad Oblast (6.28).
2 7.8	Republic of Mordovia (6.3); Vologda Oblast (6.42); Ivanovo Oblast (6.64); Nizhny Novgorod Oblast (6.68); Ryazan Oblast (7.01); Oryol Oblast (7.04); Magadan Oblast (7.2); Ulyanovsk Oblast (7.26); Sverdlovsk Oblast (7.28); Arkhangelsk Oblast (7.32); Voronezh Oblast (7.47); Tyumen Oblast (7.53); Kursk Oblast (7.55); Penza Oblast (7.61); Khabarovsk Krai (7.73); Krasnodar Oblast (7.8).

[1] Upper limit of group.

3 8.54	Kirov Oblast (7.82); Udmurt Republic (7.9); Republic of Bashkortostan (7.93); Perm Oblast (7.94); Republic of Karelia (7.98); Pskov Oblast (8.07); Bryansk Oblast (8.12); Krasnoyarsk Oblast (8.17); Kaliningrad Oblast (8.18); Saratov Oblast (8.27); Volgograd Oblast (8.37); Vladimir Oblast (8.39); Orenburg Oblast (8.48); Sakhalin Oblast (8.49); Stavropolsky Krai (8.49).
4 9.68	Smolensk Oblast (8.56); Kemerovo Oblast (8.64); Primorsky Krai (8.64); Tambov Oblast (8.65); Amur Oblast (8.8); Republic of Khakassia (8.82); Republic of Sakha (Yakutia) (8.84); Novosibirsk Oblast (9); Omsk Oblast (9.02); Chuvash Republic (9.09); Murmansk Oblast (9.12); Altai Krai (9.2); Jewish Autonomous Oblast (9.22); Rostov Oblast (9.23); Astrakhan Oblast (9.65); Kamchatka Krai (9.67).
5	Tomsk Oblast (9.7); Irkutsk Oblast (9.85); Mari El Republic (10.19); Komi Republic (10.48); Kurgan Oblast (11.07); Altai Republic (11.58); Zabaykalsky Krai (11.64); Republic of North Ossetia – Alania (11.7); Republic of Adygea (11.75); Republic of Buryatia (13.74); Karachay-Cherkess Republic (15.08); Republic of Kalmykia (17); Kabardino-Balkaria (17.54); Republic of Dagestan (19.85); Tyva Republic (20.35); Republic of Ingushetia (48.17).

Source: own summary based on the data from the Russian Statistical Office website.

Considering the data presented in Table 1, one observes that the spatial differentiation of the unemployment rate in RF regions from 2000 to 2012 is as follows:
The spatial diversification of the unemployment rate in RF regions from 2000 to 2012 (Table 1) is as follows:

1) The lowest unemployment rate, not exceeding 6.29%;

Group (1) includes regions with a well-developed mining industry, a well-developed service sector and a B&R sector;

2) Low unemployment, from 6.29% to 7.8%;
3) Medium unemployment rate, from 7.9% to 8.54%;
4) High unemployment rate, from 8.55% to 9.67%;
5) The highest unemployment rate, above 9.68%;

Group (5) includes regions with a relatively underdeveloped industrial and service sector. These are mostly agricultural regions characterized by a low level of GDP per capita (see Table 3).

3.2. Investments per capita

Table 2 presents the spatial differentiation of per capita investment from 2000 to 2012, divided into quintile groups.

Table 2: Spatial differentiation of per capita investments (USD) at constant prices from 2012 in the period between 2000 and 2012

Group	RF Region (Per Capita Investment)
1 563.15	Republic of Ingushetia (284.02); Tyva Republic (313.6); Kabardino-Balkaria (370.04); Republic of North Ossetia – Alania (402.09); Altai Krai (406.5); Ivanovo Oblast (426.94); Bryansk Oblast (427.53); Karachay-Cherkess Republic (448.18); Pskov Oblast (477.04); Kostroma Oblast (492.43); Kirov Oblast (497.16); Republic of Adygea (516.86); Kurgan Oblast (518.35); Mari El Republic (530.45); Stavropolsky Krai (532.18); Republic of Buryatia (540.98).

2 716.11	Vladimir Oblast (577.93); Saratov Oblast (579.72); Republic of Kalmykia (586.52); Oryol Oblast (592.6); Republic of Dagestan (594.09); Volgograd Oblast (596.42); Udmurt Republic (616.19); Penza Oblast (616.8); Ulyanovsk Oblast (640.23); Chuvash Republic (655.4); Tula Oblast (667.12); Rostov Oblast (684.47); Omsk Oblast (704.76); Altai Republic (713.03); Zabaykalsky Krai (714.34); Kursk Oblast (715.83).
3 942.59	Ryazan Oblast (717.24); Smolensk Oblast (729.72); Republic of Karelia (749.64); Novosibirsk Oblast (752.08); Republic of Khakassia (770.88); Tambov Oblast (775.59); Republic of Mordovia (791.43); Voronezh Oblast (804.1); Chelyabinsk Oblast (813.92); Republic of Bashkortostan (818.79); Tver Oblast (860.38); Irkutsk Oblast (874.63); Samara Oblast (884.17); Orenburg Oblast (896.14); Yaroslavl Oblast (900.85).
4 1390.46	Perm Oblast (953.03); Novgorod Oblast (954.77); Murmansk Oblast (966.41); Nizhny Novgorod Oblast (990.02); Sverdlovsk Oblast (1019.45); Kaluga Oblast (1022.35); Kemerovo Oblast (1046.8); Moscow Oblast (1089.84); Belgorod Oblast (1116.7); Kaliningrad Oblast (1119.51); Astrakhan Oblast (1120.21); Primorsky Krai (1217.2); Lipetsk Oblast (1270.77); Kamchatka Krai (1290.78); St. Petersburg (1299.7); Vologda Oblast (1389.45).
5	Tomsk Oblast (1391.98); Jewish Autonomous Oblast (1406.53); Krasnoyarsk Oblast (1421.41); Moscow (1422.47); Republic of Tatarstan (1484.79); Khabarovsk Krai (1508.81); Krasnodar Oblast (1520.18); Amur Oblast (1554.45); Magadan Oblast (1712.91); Arkhangelsk Oblast (1726.61); Leningrad Oblast (2305.34); Komi Republic (2476.77); Republic of Sakha (Yakutia) (2834.24); Chukotka Autonomous Region (3955.42); Sakhalin Oblast (5519.24); Tyumen Oblast (5881.76).

Source: own summary based on the data from the Russian Statistical Office website.

The spatial diversification of per capita investment in RF regions from 2000 to 2012 (Table 2) is as follows:

1) The lowest value of per capita investment not exceeding 563.15 USD;

Group (1) includes the least attractive regions for investors owing to their underdeveloped industrial, mining or agricultural sectors;

2) Low level of per capita investment from 563.15 to 716.11 USD;
3) Medium level of per capita investment from 716.12 to 942.59 USD;
4) High level of per capita investment from 942.60 to 1390.46 USD;
5) The highest level of per capita investment above 1390.46 USD;

Group (5) includes the most attractive regions for investors owing to their mining and industrial sectors that are actively being developed in the regions.

3.3. Gross domestic product per capita

Table 3 illustrates the gross domestic product per capita from 2000 to 2012, divided into quintile groups.

Table 3: Spatial differentiation of per capita gross domestic product (USD) at constant prices from 2012 in the period between 2000 and 2012

Group	RF Region (Per Capita GDP)
1 2447.47	Republic of Ingushetia (996.57); Republic of Kalmykia (1698.53); Republic of Dagestan (1741.3); Karachay-Cherkess Republic (1749.49); Kabardino-Balkaria (1755.78); Tyva Republic (1809.39); Ivanovo Oblast (1902.33); Republic of Adygea (1925.48); Republic of North Ossetia – Alania (1989.46); Altai Republic (2099.06); Bryansk Oblast (2241.83); Mari El

	Republic (2243.66); Stavropolsky Krai (2316.35); Altai Krai (2378.43); Penza Oblast (2400.67); Republic of Mordovia (2422.79).
2 3018.26	Kirov Oblast (2463.93); Kurgan Oblast (2468.26); Pskov Oblast (2472.43); Chuvash Republic (2533.47); Tambov Oblast (2622.54); Ulyanovsk Oblast (2713.28); Oryol Oblast (2777.45); Kostroma Oblast (2800.84); Vladimir Oblast (2838.74); Saratov Oblast (2867.1); Rostov Oblast (2880.74); Republic of Buryatia (2910.42); Smolensk Oblast (2925.18); Zabaykalsky Krai (2948.35); Voronezh Oblast (2952.69); Astrakhan Oblast (3012.05).
3 3971.91	Ryazan Oblast (3043.11); Tula Oblast (3051.29); Tver Oblast (3116.11); Kursk Oblast (3248.2); Volgograd Oblast (3307.32); Jewish Autonomous Oblast (3396.85); Republic of Khakassia (3467.37); Kaluga Oblast (3476.59); Krasnodar Oblast (3649.88); Udmurt Republic (3660.89); Novosibirsk Oblast (3720.06); Nizhny Novgorod Oblast (3844.74); Yaroslavl Oblast (3925.48); Omsk Oblast (3959.38); Novgorod Oblast (3960.82).
4 5028.07	Chelyabinsk Oblast (3974.69); Republic of Bashkortostan (3981.98); Kaliningrad Oblast (4026.56); Amur Oblast (4037.97); Republic of Karelia (4071.45); Primorsky Krai (4115.1); Kemerovo Oblast (4288.14); Irkutsk Oblast (4417.77); Orenburg Oblast (4546.8); Lipetsk Oblast (4570.44); Belgorod Oblast (4651.31); Samara Oblast (4707.5); Sverdlovsk Oblast (4832.94); Moscow Oblast (4899.69); Khabarovsk Krai (4916.84); Perm Oblast (5015.1).
5	Vologda Oblast (5047.52); Leningrad Oblast (5390.11); Republic of Tatarstan (5521.62); Tomsk Oblast (5643.53); Arkhangelsk Oblast (5732.84); Kamchatka Krai (5889.77); Murmansk Oblast (6022.11); St. Petersburg (6584.55); Krasnoyarsk Oblast (6676.84); Magadan Oblast (7144.47); Komi Republic (7593.91); Republic of Sakha (Yakutia) (8128.02); Chukotka Autonomous Region (13909.79); Moscow (14856.61); Sakhalin Oblast (15603.92); Tyumen Oblast (21717.76).

Source: own summary based on the data from the Russian Statistical Office website.

The spatial differentiation of per capita GDP in RF regions from 2000 to 2012 can be characterized as follows:

1) The lowest gross per capita GDP not exceeding 2447.47 USD;

Group (1) includes regions with a poorly developed service sector and a high registered unemployment rate (see Table 3);

2) Low value of gross per capita GDP from 2447.47 to 3018.26 USD;
3) Medium value of gross per capita GDP from 3018.26 to 3971.91 USD;
4) High value of gross per capita GDP from 3971.91 to 5028.07 USD;
5) The highest gross value per capita GDP above 5028.07 USD;

Group (5) comprises regions with a well-developed mining and industrial sector. They are also characterized by a low registered unemployment rate (see Table 1).

3.4. Wages

Spatial differentiation of wages in the RF regions from 2000 to 2012, broken down into quintile groups, is presented below.

Table 4: Spatial differentiation of wages in the regions of the Russian Federation between 2000 and 2012

Group	RF Region (Wages)
1 247.59	Republic of Dagestan (178.76); Republic of Kalmykia (210.65); Karachay-Cherkess Republic (213.18); Kabardino-Balkaria (214.68); Republic of North Ossetia – Alania (216.93); Republic of Mordovia (224.17); Altai Krai (224.88); Mari El Republic (230.22); Bryansk Oblast (231.78); Tambov Oblast (233.29); Republic of Ingushetia (233.6); Republic of Adygea (234.83); Ivanovo Oblast (235.78); Chuvash Republic (240.26); Ulyanovsk Oblast (245.36); Oryol Oblast (246.15).
2 278.26	Kirov Oblast (248.57); Kurgan Oblast (250.78); Stavropolsky Krai (254.95); Kostroma Oblast (255.36); Penza Oblast (256.55); Voronezh Oblast (259.51); Pskov Oblast (259.67); Kursk Oblast (260.71); Altai Republic (261.81); Saratov Oblast (262.52); Vladimir Oblast (270.66); Smolensk Oblast (270.82); Volgograd Oblast (273.78); Udmurt Republic (274.35); Rostov Oblast (277.24); Orenburg Oblast (278.26).
3 325.85	Ryazan Oblast (278.31); Tula Oblast (289.78); Astrakhan Oblast (292.18); Tver Oblast (293.42); Lipetsk Oblast (294.88); Belgorod Oblast (296.56); Krasnodar Oblast (299.78); Nizhny Novgorod Oblast (300.51); Republic of Bashkortostan (307.09); Novgorod Oblast (309.48); Yaroslavl Oblast (310.85); Omsk Oblast (310.87); Tyva Republic (316.61); Kaluga Oblast (322.5); Samara Oblast (324.46).
4 394.58	Republic of Tatarstan (326.21); Chelyabinsk Oblast (329.86); Perm Oblast (331.34); Kaliningrad Oblast (332.23); Republic of Buryatia (333.05); Novosibirsk Oblast (337.47); Republic of Khakassia (339.13); Kemerovo Oblast (350.95); Zabaykalsky Krai (351.59); Vologda Oblast (357.36); Jewish Autonomous Oblast (358.09); Sverdlovsk Oblast (377.31); Republic of Karelia (377.91); Leningrad Oblast (382.29); Irkutsk Oblast (389.32); Amur Oblast (394.42).
5	Primorsky Krai (394.83); Tomsk Oblast (408.16); Arkhangelsk Oblast (418.08); Krasnoyarsk Oblast (443.18); Khabarovsk Krai (449.48); Moscow Oblast (460.91); St. Petersburg (483.92); Komi Republic (498.3); Murmansk Oblast (547.41); Republic of Sakha (Yakutia) (576.46); Kamchatka Krai (656.02); Sakhalin Oblast (658.39); Magadan Oblast (670.24); Moscow (681.81); Tyumen Oblast (785.16); Chukotka Autonomous Region (918.32).

Source: own summary based on the data from the Russian Statistical Office website.

When analyzing the data shown in Table 4, one notices that the spatial differentiation of wages in the RF regions from 2000 to 2012 is as follows:

a) The lowest salary not exceeding 247.59 USD;

Group (1) includes regions with a poorly developed mining sector. Most of them are industrial or agricultural;

b) Low salary level from 247.59 to 278.26 USD;
c) Medium salary level from 278.26 to 325.85 USD
d) High salary level from 325.85 to 394.58 USD;
e) The highest salary level above 394.58 USD;

Group (5) comprises regions with well-developed mining and industrial sectors.

3.5. Number of R&D organizations in the region per million inhabitants

Table 5 lists the quintile groups in terms of the number of R&D organizations in RF regions between 2000 and 2012.

Table 5: Number of research and development organizations in RF regions in the period between 2000 and 2012 per million inhabitants

Group	RF Region (Number of R&D Organizations per Million of Inhabitants)
1 13	Republic of Ingushetia (5.09); Jewish Autonomous Oblast (7.01); Stavropolsky Krai (7.46); Orenburg Oblast (8.19); Republic of Khakassia (8.2); Lipetsk Oblast (9.54); Republic of Dagestan (10.13); Leningrad Oblast (10.18); Kemerovo Oblast (10.62); Kostroma Oblast (11.06); Karachay-Cherkess Republic (11.29); Zabaykalsky Krai (11.38); Republic of Adygea (11.47); Chuvash Republic (11.64); Krasnodar Oblast (11.75).
2 16	Mari El Republic (13.02); Chelyabinsk Oblast (13.15); Vologda Oblast (13.31); Ryazan Oblast (13.89); Altai Krai (14.23); Republic of Mordovia (14.29); Belgorod Oblast (14.41); Smolensk Oblast (14.74); Kirov Oblast (14.75); Kurgan Oblast (14.95); Ulyanovsk Oblast (15.08); Tula Oblast (15.25); Kaliningrad Oblast (15.42).
3 21	Pskov Oblast (15.8); Amur Oblast (16.13); Udmurt Republic (16.15); Republic of Buryatia (16.18); Irkutsk Oblast (16.22); Bryansk Oblast (16.3); Kabardino-Balkaria (16.4); Republic of Bashkortostan (16.78); Tyumen Oblast (16.85); Kursk Oblast (16.91); Penza Oblast (17.16); Samara Oblast (17.68); Novgorod Oblast (17.76); Volgograd Oblast (17.98); Republic of North Ossetia – Alania (18.54); Perm Oblast (19.38); Krasnoyarsk Oblast (19.85); Republic of Karelia (20.48).
4 25	Vladimir Oblast (20.55); Astrakhan Oblast (20.58); Saratov Oblast (20.92); Komi Republic (21.07); Omsk Oblast (21.26); Arkhangelsk Oblast (21.3); Tambov Oblast (21.75); Oryol Oblast (22.16); Primorsky Krai (23.17); Ivanovo Oblast (23.25); Yaroslavl Oblast (23.26); Republic of Sakha (Yakutia) (23.84); Rostov Oblast (23.9); Tyva Republic (24.04); Sakhalin Oblast (24.28); Republic of Tatarstan (24.77).
5	Voronezh Oblast (25.58); Khabarovsk Krai (25.97); Republic of Kalmykia (26.42); Sverdlovsk Oblast (26.46); Tver Oblast (27.7); Nizhny Novgorod Oblast (29.37); Chukotka Autonomous Region (31.03); Murmansk Oblast (31.25); Altai Republic (35.02); Moscow Oblast (35.78); Kaluga Oblast (36.65); Kamchatka Krai (41.45); Novosibirsk Oblast (43.99); Magadan Oblast (44.64); Tomsk Oblast (53.4);Moscow (82); St. Petersburg (84.13).

Source: own summary based on the data from the Russian Statistical Office website.

Considering the data presented in Table 5, one observes that the number of R&D organizations in RF regions from 2000 to 2012 is as follows:

1) The smallest number of organizations not exceeding 13;

Group (1) includes agricultural regions with a poorly developed mining industry.

2) Small number of organizations from 13 to 16;
3) Medium number of organizations from 16 to 21;
4) Large number of organizations from 21 to 25;
5) The highest number of organizations above 25;

Group (5) comprises regions with a large number of R&D organizations. The specific character of these regions is explained by the government's location of industry in the Urals

and beyond during World War II, and a well-developed mining industry in the regions in question.

4. Defining a taxonomic index based on Euclidean metrics

When analyzing the diversification of economic development in RF regions, one should introduce the concepts of a stimulant and a deterrent of economic development. A stimulant of economic development is understood as an economic variable whose high level implies the desired state of the phenomenon under investigation. On the other hand, a deterrent is an economic variable whose high level implies an undesirable state of the studied phenomenon (Majewski, 1999: 10).

Statistical relationship between the stimulant $\left(s_{mk}^{l}\right)$ and deterrent $\left(d_{mk}^{l}\right)$ is expressed in the following transformation:

$$s_{mk}^{l}=\frac{1}{d_{mk}^{l}} \tag{1}$$

where:

– indices *l, m* and *k* refer to the studied region, period and stimulant/deterrent index respectively.

In order to define a taxonomic index for a region's economic development based on a distance in Euclidean metrics, a standardization process was made using formula (2). The standardization process is based on the following relationship:

$$\bar{s}_{mk}^{l}=\frac{s_{mk}^{l}}{\max_{lk}\left(s_{mk}^{l}\right)} \tag{2}$$

where:

$\bar{s}_{mk}^{l}$ – standardized stimulant.

The values $\bar{s}_{mk}^{l}$ belong to the interval $[0,1]$, which enables comparing any values of various standardized stimulants.

In the case where the value of the simulant equals 1, this can be interpreted as follows: in *l* region, in *k* year, variable *m* assumes the maximum value in the investigated group. This entails the following conclusion: the higher/lower the values adopted by the standardized stimulant ($\bar{s}_{mk}^{l}$), the higher/lower the degree of a region's development in terms of the variable described by the stimulant.

These variables comprise four stimulants: investment per capita, GDP per capita, the number of organizations carrying out R&D per million inhabitants, and wages. In this context, the deterrent is the registered unemployment rate. These variables, however, may not reflect the regional development accurately. In order to obtain a complete picture of regional development, a taxonomic index based on Euclidean metrics must be used. The Euclidean distance indicator enables analyzing independent variables as absolute values. This approach was also used in the analysis of *powiat* ('district') development in Poland by Tokarski and Jabłoński (2010), Dykas (2010).

Formula (3) shows the distances of standardized stimulants from 1 for this metric:

$$WT=\sqrt{\sum_{k=1}^{T}\sum_{m=1}^{n}\left(1-\bar{s}_{mk}^{l}\right)^{2}} \quad (3)$$

where:
n – number of stimulants used,
T – number of years in the period considered.

This taxonomic index measures the distance between the theoretical pattern that takes the maximum values of variables for each stimulant of *i* region in *k* year. It follows that a lower (higher) distance of the indicator is accompanied by a higher (lower) level of development of the region in terms of the variables under consideration. The WT indicator can take values from the interval $\left[0,\sqrt{nT}\right]$, where *n* is the number of stimulants analyzed.

5. Differentiation in the development of the Russian Federation's regions based on Euclidean distance index

The analysis covers 79 regions of the RF in the period between 2000 and 2012. The data was taken from the website run by the Russian Statistical Office. Drawing on the data collected, index values for these regions were calculated.
Table 6 presents the classification of RF regions in terms of the level of economic development measured by the taxonomic index, divided into quintile groups.

Table 6: Classification of RF regions based on to values of the taxonomic index in the years 2000-2012

Group	RF Region (Taxonomic Index)
1 6.804	Moscow (5.082); Chukotka Autonomous Region (5.705); Tyumen Oblast (5.713); St. Petersburg (5.846); Sakhalin Oblast (5.951); Magadan Oblast (6.271); Republic of Sakha (Yakutia) (6.458); Kamchatka Krai (6.461); Tomsk Oblast (6.5); Moscow Oblast (6.502); Komi Republic (6.641); Murmansk Oblast (6.682); Khabarovsk Krai (6.761); Arkhangelsk Oblast (6.779); Kaluga Oblast (6.798); Novosibirsk Oblast (6.803).
2 7.069	Republic of Tatarstan (6.805); Krasnoyarsk Oblast (6.806); Sverdlovsk Oblast (6.867); Leningrad Oblast (6.883); Nizhny Novgorod Oblast (6.914); Yaroslavl oblast (6.923); Primorsky Krai (6.941); Tver Oblast (6.964); Samara Oblast (6.976); Vologda Oblast (6.982); Amur Oblast (6.987); Perm Oblast (7.016); Republic of Karelia (7.025); Novgorod Oblast (7.032); Belgorod Oblast (7.034); Lipetsk Oblast (7.068).
3 7.192	Voronezh Oblast (7.077); Kaliningrad Oblast (7.078); Altai Republic (7.083); Irkutsk Oblast (7.089); Omsk Oblast (7.103); Chelyabinsk Oblast (7.107); Tula Oblast (7.117); Astrakhan Oblast (7.118); Republic of Bashkortostan (7.127); Krasnodar Oblast (7.128); Rostov Oblast (7.134); Oryol Oblast (7.16); Kemerovo Oblast (7.161); Vladimir Oblast (7.184); Saratov Oblast (7.189).
4 7.283	Tambov Oblast (7.193); Ivanovo Oblast (7.195); Kursk Oblast (7.196); Volgograd Oblast (7.205); Udmurt Republic (7.206); Ryazan Oblast (7.211); Jewish Autonomous Oblast (7.219); Republic of Mordovia (7.231); Penza Oblast (7.24); Smolensk Oblast (7.251); Orenburg Oblast (7.257); Ulyanovsk Oblast (7.261); Republic of Buryatia (7.269); Kostroma Oblast (7.275); Republic of Khakassia (7.281); Zabaykalsky Krai (7.282).

5	Pskov Oblast (7.285); Tyva Republic (7.29); Republic of Kalmykia (7.291); Kirov Oblast (7.308); Bryansk Oblast (7.319); Kurgan Oblast (7.349); Republic of North Ossetia – Alania (7.358); Chuvash Republic (7.358); Altai Krai (7.373); Mari El Republic (7.39); Stavropolsky Krai (7.42); Republic of Adygea (7.437); Kabardino-Balkaria (7.447); Karachay-Cherkess Republic (7.497); Republic of Dagestan (7.544); Republic of Ingushetia (7.693).

Source: own summary based on the data from the Russian Statistical Office website.

Analyzing the data from Table 6, the resulting spatial differentiation in terms of the taxonomic index value is as follows:

a) The most developed regions where the index value does not exceed 6.804;

Group (1) includes regions with the best-developed mining industry or service sector;

b) Highly developed regions where the index value ranges from 6.804 to 7.069;
c) Medium-developed regions where the index value ranges from 7.069 to 7.192;
d) Poorly developed regions where the index value ranges from 7.192 to 7.283;
e) The worst-developed regions where the index value exceeds 7.283;

Group (5) includes regions with a poorly developed mining or processing industry or a poorly developed service sector. They are mostly agricultural regions.

6. Preliminary analysis of convergence/divergence

This part of the study provides a comparison of the spatial differentiation of the macroeconomic variables discussed and a preliminary analysis of convergence/divergence processes.

Table 7: Selected spatial differentiation indices of the investigated macroeconomic variables

Diff. index	**Variable**				
	Unemployment rate	**Investment per capita**	**GDP per capita**	**Wages**	**Number of R&D org.**
Max/Min	38.31	45.23	26.55	5.99	29.28
V_S	0.40	1.07	0.78	0.43	0.66
V_d	0.34	0.56	0.45	0.30	0.42
V_Q	0.40	0.78	0.65	0.42	0.59

V_S – coefficient of variation based on standard deviation; V_d – coefficient of variation based on average deviation; V_Q – coefficient of variation based on quadrant deviation; GDP – gross domestic product; R&D – research and development.
Source: own calculations based on the data from the Russian Statistical Office website.

In this part of the paper, an analysis of convergence/divergence processes is presented. For this purpose, these processes need to be defined first (Malaga, Kliber, 2007).
In the light of macroeconomics, the concept of convergence refers to the process of levelling up the values of the main macroeconomic variables across countries or regions with different variable output values. Performing a convergence analysis can provide an answer to the question whether regions (countries) with significantly different output levels of certain variables will approach each other in magnitude or grow further away from each other. Making up the distance to the most developed economies (regions) is the process of real convergence, while growing apart of a poorer economy (region) from better developed economies (regions) is called the process of divergence.
Two technical dimensions of convergence can be found in the literature: σ-convergence and β-convergence. σ-convergence occurs when the dispersion of a macroeconomic variable between regions or countries decreases over time, while β-convergence occurs when there

is a decreasing dependence between the achieved rate of economic growth and the initial level of the investigated macroeconomic variable. It should be mentioned that, apart from σ-convergence and β-convergence, other types of convergence are discussed in the literature, for example, conditional convergence, unconditional conditional and club convergence.

In general, σ-convergence is measured by changes in the standard deviation of the variable under investigation. If the standard deviation increases (decreases) with time, then it is said to be the process σ-convergence (σ-divergence).

In the latter part of this paper, the process σ-convergence will be tested not by changes in the standard deviation, which is an absolute measure of dispersion of a variable, but by changes in the coefficients of variation V_S, V_d and V_Q, which are relative measures of dispersion. Figures 1-3 show the individual coefficients of variation.

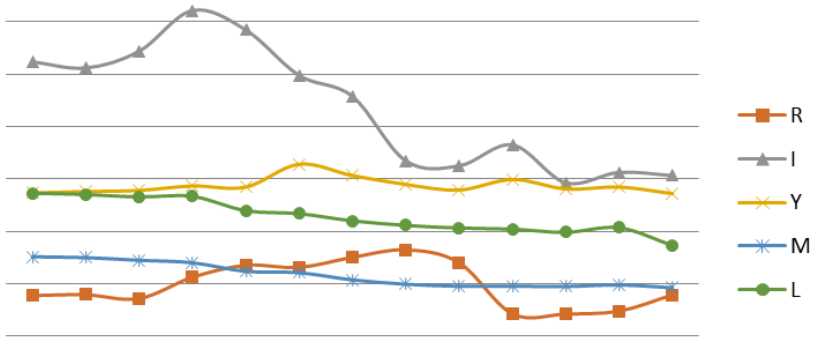

Figure 1: Coefficients of variation V_S of the investigated macroeconomic variables for the period between 2000 and 2012

R – unemployment rate; I – investment per capita; Y – GDP per capita; M – wages; L – number of R&D organizations

Source: own study based on the data from the Russian Statistical Office website.

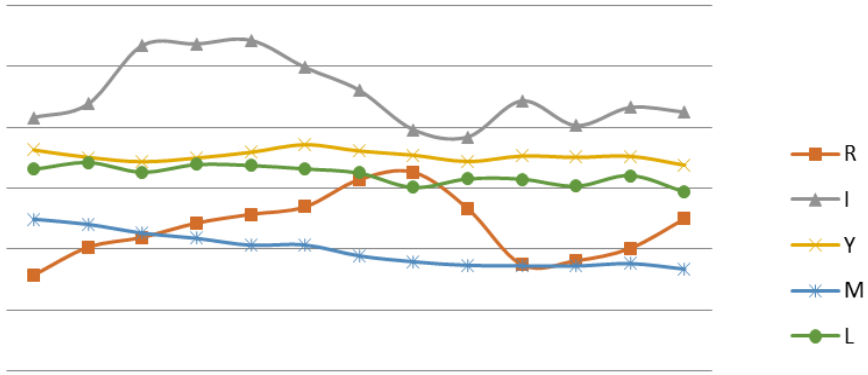

Figure 2: Coefficients of variation V_d of the investigated macroeconomic variables for the period between 2000 and 2012

R - unemployment rate; I - per capita investments; Y - GDP per capita; M - wages; L - number of R & D organizations

Source: own study based on the data from the Russian Statistical Office website.

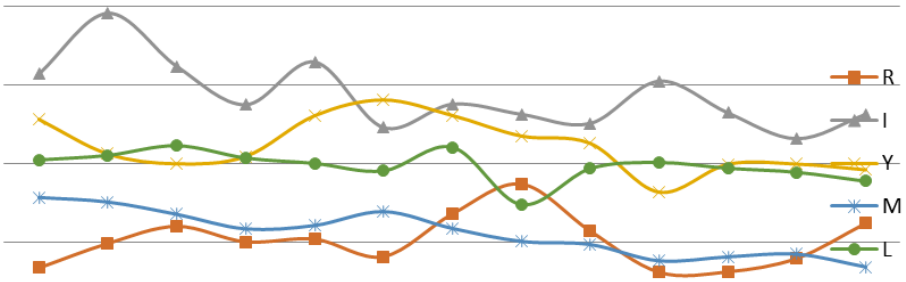

Figure 3: Coefficients of variation V_Q of the investigated macroeconomic variables for the period between 2000 and 2012
R - unemployment rate; I - per capita investments; Y - GDP per capita; M - wages; L - number of R & D organizations
Source: own study based on the data from the Russian Statistical Office website.

Figures 1-3 illustrate that the process of spatial σ-convergence in the regions of the Russian Federation concerned the following macroeconomic indicators:

- GDP per capita: V_S fell from about 0.75 in 2000 to 0.74 in 2012, V_d from 0.46 to 0.44, and V_Q from 0.71 to 0.58.
- Wages: coefficient of variation V_S dropped from about 0.50 in 2000 to 0.39 in 2012, V_d from 0.35 to 0.27, and V_Q from 0.51 to 0.34;
- Number of R&D organizations per million inhabitants: coefficient of variation V_S dropped from about 0.75 in 2000 to 0.55 in 2012, V_d from 0.43 to 0.39, and V_Q from 0.61 to 0.55.

The convergence process did not concern the spatial differentiation of per capita investment, as the investigated coefficients of variation increased in some years and decreased in others. On the other hand, there was σ-divergence process in the case of the registered unemployment rate. The coefficients of variation for this macroeconomic variable varied from 0.35 in 2000 to 0.36 in 2012 (V_S), from 0.26 to 0.35 (V_d), and from 0.33 to 0.45 (V_Q).

7. In conclusion

This paper gives a σ-convergence/divergence analysis and a statistical analysis regarding the level of development of RF regions in the period from 2000 to 2012. The regions were compared in terms of: registered unemployment rates, per capita investment, per capita GDP, wages, and the number of R&D organizations per million inhabitants. The level of economic development in the RF can be linked to the structure of the individual region's economy. The mining industry, processing of crude oil and natural gas, as well as research and development work are conducive to growth in investment, while the well-developed service sector is conducive to growth in wages and employment (Russian Institute of Spatial Planning, 2020).

The level of development was also considered by means of the taxonomic index. The following conclusions can be drawn from the study. The most developed RF regions include: Moscow (5.082), Chukotka Autonomous Region (5.705), Tyumen Oblast (5.713) and St. Petersburg (5.846). The high level of economic development in Moscow and St. Petersburg, are explained by the good condition of the service sector and the development of industry branches specific to Moscow, St. Petersburg and their immediate environment, such as mechanical engineering, food industry, oil and gas processing, research and development , pharmaceutical industry, metallurgy, chemical industry, and production of building materials. In addition, the hospitality sector is also well-developed in

Saint Petersburg. Industry in these regions is labour-intensive. The high level of industrial development is accompanied by an increase in GDP, wages and employment.
In the case of the Chukotka Autonomous Okrug, with a small number of residents, there is a well-developed oil and gas industry and mining industry (extraction of non-ferrous metals). The small number of residents and relatively large capital expenditures in the mining industry had a positive impact on the region's ranking among the most developed RF regions.
The high level of development in the Tyumen Region is due to the administrative affiliation to the last Khanty-Mansi Autonomous District and to the Yamal-Nenets Autonomous district.
Khanty-Mansiysk Autonomous Okrug is characterized by a well-developed oil and natural gas industry, power industry, oil and gas processing, food industry, research and development, and pharmaceutical industry. It is worth noting that the Khanty-Mansiysk Autonomous Okrug has the largest share in oil and gas production in Russia. Yamal-Nenets Autonomous Okrug has a well-developed oil and natural gas industry. These industry features in the Tyumen Oblast, coupled with investment in research and development, determine the region's position in the ranking. The mining industry in the Tyumen Oblast attracts investment related to the production of natural gas and oil, resulting in an increase in employment, wages and fixed assets.
The worst developed regions are the southern Caucasian regions: Republic of Ingushetia (7.693), Republic of Dagestan (7.544), Karachay-Cherkess Republic (7.497), Kabardino-Balkaria (7.447).
In these regions, the industry and the tertiary sector are underdeveloped. Most of the Caucasian regions are also agricultural areas. In the North Caucasian zone there are terrorist threats, economic insecurity and criminalization of Caucasian regions' economy, which affects their investment appeal. The political outlook is instable, so there are no government subsidies.
It should be noted that not all the data of the Russian Statistical Office reflects the actual state of affairs concerning the processes taking place in the Russian economy. The data concerning unemployment (high level of hidden unemployment) and wages (grey zone/ unrecorded wages) is not entirely reliable.
The registered unemployment rate in most regions of the Russian Federation is also much smaller than the actual one. This can be explained by the lack of interest in registering unemployed individuals owing to inadequate management policies in Russian employment offices and to minimal support for the unemployed from the Russian government (with the exception of North Caucasian republics, where support for the unemployed is much higher than in other RF regions). This is corroborated by the registered unemployment rate in the Republic of Ingushetia, which is much closer to the actual one compared to the rest of RF regions.

References

Barro, R. J., Sala-i-Martin, X., 2004. *Economic Growth*. Cambridge, Massachusetts, London, England: The MIT Press.
Blackwelder, A. R., 1966. *Taxonomy. A Text and Reference Book,* New York: Wiley.
Cole, A. J., 1968. *Numerical Taxonomy.* New York: Academic Press.
Dykas, P., 2010. Taksonomiczne wskaźniki przestrzennego zróżnicowania rozwoju powiatów województwa podkarpackiego [Taxonomic indices of spatial differentiation in the development of the districts of Podkaprackie Province]. *Studia-Prawno Ekonomiczne*, LXXX, pp. 91-116.
Gajewski, P., Tokarski, T., 2004. Czy w Polsce występuje efekt konwergencji regionalnej? [Is there regional convergence in Poland?]. *Studia Ekonomiczne*, 1–2/XL–XLI, pp. 45-70.
Islam, N., 2003. What Have We Learnt from the Convergence Debate? *Journal of Economic Surveys*, 17(3), pp. 309–362.

Kornowski, A., 2015. Zróżnicowanie zmiennych makroekonomicznych oraz rozwoju regionów części azjatyckiej Federacji Rosyjskiej [Differentiation of macroeconomic variables and development in the regions of the Asian part of the Russian Federation]. *Humanities and Social Sciences*, XX (22), pp. 55-77

Majewski, S., 1999. *Szeregowanie krajów przy pomocy Diagramu Czekanowskiego i* Taksonomicznego Miernika Rozwoju [Ranking of countries based on the Czekanowski Diagram and Taxonomic Development Metric]. *Wiadomości Statatystyczne*, 8, pp. 76-84.

Malaga, K., Kliber, P., 2007. *Konwergencja a nierówności regionalne w Polsce w świetle neoklasycznych modeli wzrostu* [Convergence and regional inequalities in Poland in the light of neoclassical models of development]. Poznan, Wydawnictwo Akademii Ekonomicznej w Poznaniu.

Mezzich, J. E., Solomon, H., 1980. *Taxonomy and Behavioral Science.* New York: Academic Press.

Misiak, T., Tokarski, T., Włodarczyk, R.W., 2011. *Konwergencja czy dywergencja polskich rynków pracy [Convergence or divergence of Polish labour markets]*. „Gospodarka Narodowa" 7–8, pp. 47-69.

Russian Institute of Spatial Planning (Институт территориального планирования), Available at www.urbanica.spb.ru. [Accessed 03.03.2020].

Russian Statistical Office (Федеральная служба государственной статистики – Росстат), Available at www.gks.ru. [Accessed 03.03.2020].

Sneath, P. H. A., Sokal, R. R., 1973. *Numerical Taxonomy.* San Francisco: W. H. Freeman.

Taylor, P. J., 1970. Quantitative methods in regional taxonomy. *Progress in Geography*, 2, pp.3-64.

Tokarski, T., Jabłoński, Ł., 2010. Taksonomiczne wskaźniki przestrzennego zróżnicowania rozwoju powiatów [Taxonomic indices of spatial differentiation in district development]. *Studia-Prawno Ekonomiczne*, LXXXI, pp. 261-289.

Bio-note

Aleksy Kornowski is PhD of the Faculty of Management and Social Communication at the Jagiellonian University, Cracow, Poland. Main research interests: regional economic development, HRM, cross cultural management.

TAX REVENUE PERFORMANCE IN SUB-SAHARAN AFRICA COUNTRIES: ARE THERE EMPIRICAL EVIDENCE FOR MACROECONOMIC VARIABLES?

Nosakhare Arodoye*, Dickson Oriakhi, Milton Iyoha
Department of Economics, Faculty of Social Sciences, University of Benin, Benin City, Nigeria
nosakhare.arodoye@uniben.edu
deoriakhi@yahoo.com
iyohama@yahoo.com

Abstract: *This study, examines the dynamic effects of macroeconomic factors on the overall tax revenue performance of thirty-three (33) Sub-Saharan African countries for eighteen years that range from 2000-2017 employing the system generalized method of moments methodology. This study provides empirical evidence for the dynamic and significant effects of macroeconomic variables on tax revenue performance in SSA countries. Arising from our empirical findings, the study recommends that, on the average, governments of SSA countries should establish the necessary macroeconomic preconditions for the effective and efficient administration of the countries' tax systems to further boost her taxable capacity and fiscal surpluses.*

Keywords: Macroeconomic Variables, Tax Revenue, Growth, Generalized Methods of Moment, Dynamic Panel, sub-Saharan Africa

JEL: C23, C33, E62, F41, H20, O55

1. Introduction

The issue of the effects of macroeconomic variables on tax revenue performance has often times been of concerns to governments of the Sub-Saharan Africa (SSA) countries because of the relatively low tax bases and tax returns from the SSA region compared to those of the other regions of the world. For instance, the tax-to-Gross Domestic Product (GDP) ratio of the sub-Saharan Africa region ranges between 13.8 percent to 18.5 percent from 2003 through 2015 compared to that of the European Union that ranges between 19.5 percent to 20.6 percent for the same period (World Bank, 2016).

The declining level of tax returns in the SSA region may be attributed to the inabilities of most countries in the SSA region to lift its tax share above some five percentage points of GDP since the mid-1990s while other regions like the Common Wealth of Independent States, Latin America and emerging Asia have maintained a flat or marginal increase in their tax-to-GDP ratios (International Monetary Funds, 2015).

The disturbing trend of the relatively low tax returns as a percentage of GDP may likely be attributed to the effects of macroeconomic variables on the tax bases of the various countries that comprise the region. However, macroeconomic factors had often been identified in literature (for example the studies; Ghura, 1998; Yohou, Goujon, Larporte and Guerineau 2015 etc) as factors determining tax revenue performance. A large proportion of the recorded evidence are related to regions like Asia and Latin America. To the best of our knowledge, the investigation of the effects of various macroeconomic factors on tax revenue performance in SSA countries is yet to receive adequate empirical investigation. This study contributes to existing economic literature by bridging this identified gap.

* Corresponding author: Nosakhare Arodoye

The findings of the study would advance thoughtfulness in tax planning and in turn, would guide tax policy choices and facilitate implementation of appropriate tax policy reforms. The study used annual data for thirty-three (33) sub-Saharan Africa countries for sixteen (18) years that range from 2000 to 2017, and the choice of the period and countries are based on data availability, and countries included are fair representation of the SSA region, accounting for over 70 percent of the region's GDP. Following the introductory section, the study includes: the review of relevant literature, empirical methodologies, the presentation and discussion of empirical results, recommendations and conclusion of the study.

2. Review of Relevant Literature

Torrance and Morrissey (2014) investigate the relationship between taxation and indigenous institutions in thirty-six SSA countries from the period of 1970 to 2010, using the Persimonious model and incorporating institutional variables with threshold effects. Their empirical results show that institutional variables have a positive relationship with tax ratios. Yohou, Goujon, Laporte and Guerineau (2015) examine the influence of high aid flows on the tax effort of twenty-eight SSA countries from the period of 1984 to 2010, using the panel smooth threshold regression model. Their results showed that aid has a country specific and time - varying differentiated effect on the countries' tax revenue. Furthermore, they revealed that lower aid flows are harmful to tax effort while larger ones promote tax collection. Again, trade openness indicators are found to depend on the aid and tax indicators used.

Series of researchers (for example, Lotz and Morss, 1967; Stotsky and WoldeMariam, 1997; Piancastelli, 2001; Teera and Hudson, 2004, and Fenochietto and Pessino, 2013) believe that the level of development of countries greatly influence their tax revenue performance, and they have found empirical support for a positive and significant relationship between real gross domestic product per capita and tax revenue performance.

The theoretical framework for this study is rooted in the prescription of extant literature (like Leuthold, 1987; Ghura, 1998; Oriakhi, 2005; and Langford and Ohlenburg, 2015) with significant modifications. In finding the various element of tax bases, existing studies (for example, Leuthold, 1987; Ghura, 1998; Oriakhi, 2005; Langford and Ohlenburg, 2015 and Arodoye and Izevbigie, 2019) have demonstrated that specific tax bases(for example, agriculture value added, real GDP, trade openness, private sector credit etc) significantly influence tax shares. Therefore, the effects of some of the tax bases are endogenously incorporated in developing the general framework for this study.

As a way of contributing to extant literature, this study added two new variables to the tax performance models and the determinants of tax ratio in SSA. These variables include: government expenditure as a percentage of GDP and private sector credit as percentage of GDP. The first variable captured the consistency of government expenditure programmes as well as the provision of public goods and services, and private sector credit as percentage of GDP captured the influence of the actual allocation of credit to the private sector on tax revenue mobilization, and this allows us to capture the private sector fiscal capacity in this study.

3. Methodology

To examine the dynamic effects of macroeconomic variables on tax revenue performance in SSA, this study adopted the dynamic Autoregressive Distributed Lag (ARDL) framework using system-Generalized Method of Moments (sys-GMM) estimation technique as well as fixed effect and random effect methodologies for robustness checks.

The sys-GMM is better suited for this study because: it is more robust for missing data; accounts for simultaneity bias and reversed causality, especially when lagged values of the

dependent variable enter the equation as an instrument, instead of entering explicitly as regressors.

The sys-GMM regression is undertaken with the share of total tax revenue in *gross domestic product* (ttr_gdp) as the dependent variable which represents the overall tax system of the SSA countries. The instrumental variables this study adopted were the lagged values of all the independent variables. The model specified for this study is based on the theoretical literature reviewed – (like: Leuthold, 1987; Ghura, 1998; Oriakhi, 2005; and Langford and Ohlenburg, 2015) with significant modifications as identified in the section for theoretical framework. This study analyzed the following Panel sys-GMM model:

$$ttr\_gdp_{i,t} = \alpha_0 + \alpha_1 ttr\_gdp_{i,t-1} + \alpha_2 ECON_{i,t} + \varepsilon_{it} \quad \ldots \quad 1$$

Where: $ECONS_{i,t}$ represents a vector of traditional economic determinants of tax revenue performance. These economic factors are: *real per capita gross domestic product* $(rgdppc)$, *share of agriculture in gross domestic product* (agr_gdp), *trade openness* $(open)$, *inflation rate(infl), public debt* $(pdebt)$*,Private Sector Credit to GDP ratio(psc), natural resource rent(percent GDP)* $(nresd)$*,government expenditure to gross domestic product ratio(gexpr)*while $i's$ and $t's$ represent individual country and time frame, respectively. For fixed effects specification, $\varepsilon_{i,t} = \mu_{i,t}$, where μ_i denotes the country specific effects and ε_{it} captures the random effects. The data employed for the study were sourced from the 2018 World Bank Development Indicators (WDI) and the 2018 International Centre for Tax and Development (ICRD) datasets.

4. Empirical Analysis

This study, investigates the dynamic impacts of macroeconomic factors on tax revenue performance. The scope of the study consists of thirty-three SSA countries, between 2000 and 2017. Tax revenue performance may be significantly influenced by several macroeconomic factors that have been tested by the dynamic panel data econometric methodology.

Descriptive Statistics

The average tax revenue contributed by the selected thirty-three (33) countries in SSA is 16.15 percent of the region's GDP. Among other variables, the average contribution of agriculture is 25.53 percent of the region's GDP, and the average value of trade openness is 76.18 percent in the SSA region. These marked difference in trade openness, agriculture value added (percent of GDP) and the level of development are indicative of the different tax bases among the different groups within the SSA region. The kurtosis for the variables of the SSA countries have positive excess values, suggestive of the presence of leptokurtic behaviours in the distributions, and the variables are closely bunched around the mode (See Table 1 in Annex).

Properties of Dataset: Tests for Stationarity and Panel Co – integration Tests

To conduct the stationarity tests, this study employed the Levin, Lin and Chu (LLC) technique, that is, homogeneous in the dynamics of autoregressive coefficients for the elements of the panel structure (common unit roots processes) test, and Im, Pesaran and Shin (IPS), Augmented Dickey Fuller-Fisher (ADF-F) and Phillip Peron-Fisher (PP-F) that allows for heterogeneity in dynamic relationships (individual unit roots processes) test and

controlled for cross – sectional dependence among the variables. Essentially, the stationarity test for this study follows the heterogeneous unit root processes (IPS, ADF-F and PP-F), though, the homogeneous unit root process (LLC) results is reported alongside for completeness. The results show that the variables have first - order integration, and hence the panel estimations exhibit both common and individual unit root processes.
The panel co - integration tests for this study show evidence of a co-integrating relationship as indicated by the significance of the homogeneous residual-based - and heterogeneous residual-based co integration tests. Hence, the result from the co-integration test supports panel pooling procedures for estimation in this study (See Tables 2 and 3 in the Annex)

Econometric Analysis of the dynamic effects of Macroeconomic Factors on Tax Revenue Performance in sub-Saharan Africa

Table 4 (see Annex) reported the empirical outputs of the fixed effect model, random effect model and the System - Generalized Method of Moments. The variables employed in the system GMM estimation technique are in their first difference, and the sys-GMM technique is based on the Arellano-Bond's estimation procedure. However, the variables are in their levels in both the fixed effect and random effect models. The fixed effect and random effect models are relevant for this study because we will rely on these methods to ascertain the robustness of our results. Moreover, this study conducted similar analysis for the Middle-Income Countries (MICs) and Low-Income Countries (LICs) SSA countries in order to verify if these respective groupings have effects on our baseline equation, and if tax revenue performance models in SSA are susceptible to changing levels of development.
The diagnostic statistics for the SSA region, and those of their respective groupings are quite impressive. The F-statistics show that macroeconomic factors employed in the analysis are jointly significant. This simply suggests that the macroeconomic factors are collectively significant to explaining tax revenue performance (proxy by tax-to-GDP ratio) in SSA and across the various groupings at one percent significance level. The Hausman's model specification test reveals preference for random effect (that is, indicating that random effect is more appropriate) in the SSA and Middle-Income Countries, while those of Low-Income Countries indicate that fixed - effect model is more appropriate, that is, indicating concern for individual country-specific effects in the LICs.
This study conducted the Hansen's J over-identifying restriction test of the respective models, and the result indicates the acceptance of null hypothesis of the validity of the instruments, and this satisfies the conditions of the over-identifying restriction test statistics of greater than 0.1, and no statistical significance. Our study reports the absence of second order autocorrelation for SSA and the respective income groups in the region.
We begin our analysis from the SSA region and then successively see how the macroeconomic factors perform in the other income groups. The sys-GMM estimates have impressive statistical performance than those of the static estimators (fixed - and random effect models) in the SSA region. However, the coefficients of macroeconomic factors in the three estimation techniques essentially have similar signs, while virtually all the variables are statistically significant in the sys-GMM estimates (except for that of inflation (CPI)).Hence, we adopted the sys-GMM estimates for this study for interpretational convenience, and also to alleviate the fear of endogeneity bias and possible bias in our regression estimates.
The effect of agriculture as share of GDP is negative and statistically significant at 10% level. The estimated coefficient indicates that a one percent increase in agriculture value added lowers tax ratio by about 6.6 percent. This suggests that increasing agriculture value added in the SSA region leads to lower tax ratio. This finding is indicative of large subsistence sector with a low taxable surplus of the agricultural sector in the SSA region. This finding is consistent with the studies of Stotsky and WoldeMariam (1997), Teera and Hudson (2004), Oriakhi (2005), Addison and Levin (2011) and Fenochietto and Pessino (2013) that agricultural sector is notably a "hard-to -tax" sector as a result of its subsistence nature.

The effect of trade openness is positive and statistically significant at 10% significance level. A one percent increase in trade openness is expected to increase tax shares by 16.6 percent. This finding suggests that a favourable improvement in trade openness will stimulate the tax revenue performance of the SSA region. This finding is consistent with those of Ghura (1998); Teera and Hudson (2004); Oriakhi (2005); Cottarelli (2011) and Addison and Levin (2011) that the degree of trade openness is a fundamental factor determining tax revenue performance in most developing countries (SSA countries inclusive).

The level of development (measured by real GDP per capita) is statistically significant, and exerts positive impact on the SSA region's tax revenue performance. A percentage increase in real GDP per capita is expected to increase tax-to-GDP ratio by 54.9%, which indicates a relatively high magnitude compared to that of the agriculture and trade sectors. Rising per capita GDP results in higher tax-to-GDP ratio. This finding is in line with those of Stotsky and WoldeMariam (1997); Ghura (1998); Pessino and Fenochietto (2010) and Ndiaye and Korsu (2011) that the level of development is more relevant in examining tax revenue performance.

Consumer Price Index has negative and not significant impact on SSA's tax ratio. A percentage increase in the CPI decreases the tax ratio of the region by 3.6 percent. Increase in CPI leads to lower tax-to-GDP ratio in the region.However, the not significant effect of the CPI may have resulted from the likely indirect effect of inflation on tax ratio.This finding is in line with the studies of Ghura (1998); Pessino and Fenochietto (2010); Fenochietto and Pessino (2013) and Langford and Ohlenburg (2015) that inflation constrains tax revenue collection effort, and inflation may also shrink the overall tax revenue performance of most developing countries.

The effect of government expenditure (percent of GDP) - measures the active participation of government in economic activities, is positive and statistically significant at one percent level. A percentage increase in government expenditure (percent of GDP) is expected to increase tax shares by 26.6%. The result confirms that active participation of government in economic activities stimulates the willingness to pay taxes in the SSA region. This finding is in agreement with the study of Oriakhi (2005) that government expenditure (percent of GDP) has direct impact on tax revenue collection in African economies.

The estimated impact of public debt is negative and significant, and this suggests that higher debt reduces tax ratio (a percentage increase in the level of public debt lowers tax ratio by 1.4%) in the SSA region. This result also indicates that rising public debt burden may create macroeconomic imbalance that may invariably reduce the tax levels of the SSA countries. This finding is consistent with the conclusion of Teera and Hudson (2004) and Gupta (2007) that rising public debt creates imbalance in the economy, and this may constrain the taxable capacity of the country.

Aid has a significant negative effect on tax ratio. A percentage increase in aid lowers tax ratio by 2.9%. This simply suggests that rising aid in the SSA region lowers tax revenue collection. This result is in line with the study of Addison and Levin (2011) that aid inflows shrink the level of taxation in the SSA region.

The effect of natural resource rent (percent of GDP) is negative and significant at 10% level. A percentage increase in the variable lowers tax level by 1.7%. This suggests that countries raising substantial revenue from natural resource may have reduced incentives for tax collection.This result is in agreement with the study of Bornhorst, Gupta and Thornton (2008) that hydrocarbon revenues lowers domestic tax revenue mobilization.

Private sector credit (percent of GDP) has a significant positive impact on tax shares. A percentage increase in the variable is expected to stimulate tax ratio by 7.1%. This suggests that rising allocation of credit to the private sector of the economy will stimulate overall tax revenue mobilization, and the taxable capacity of countries. This finding is in line with the conclusion of Langford and Ohlenburg (2015) that the higher level of the variable reflects

more effective and efficient tax administration, and by extension enhance tax revenue mobilization.

The results of the sys-GMM estimates are similar (in terms of signs and significance effects) to that of the fixed effect and random effect models except for the not significant government expenditure (percent GDP) variable). This shows the stability and consistency of our parameters. Apparently, virtually all economic factors appear to significantly influence tax revenue performance.

For the different income groups, the sys-GMM estimates are quite impressive and similar to that of the SSA region. First, for the MICs, all variables are rightly signed (except for natural resource rent and agriculture value added, and they were both not significant).In this case, inflation was found to exert negative and significant effect on tax ratio unlike that of the full sample analysis. Additionally, in the MICs, trade openness and real GDP per capita had positive and significant effects on tax ratios. Second, for the LICs, the variables have expected signs (except for agriculture value added, and it was not significant). However, virtually all variables are not significant (except for that of real GDP per capita). These findings of both income groups emphasized the overwhelming influence of the level of development on tax revenue performance in SSA countries. However, the wide variation in the level of significance amongst the variables across the income groups may be due in part to the smaller sample size(this is because the sys-GMM requires a relatively large observations), and the empirical outcomes may also suggests evidence of structural changes across the income groups.

5. Recommendations and Conclusion

(i) Recommendations:

Some policy lessons can be drawn from the findings of this study that will necessitate some policy directions which may proffer relevant policy recommendations for policy makers.

1. There is need to provide policy options that will make the tax systems of the SSA region more buoyant by instituting tax policies that would reduce informalities in agricultural sector, and establishing open macroeconomic policies (particularly anti-smuggling policies) to enhance tax yields from international trade.
2. It is necessary for the governments of the SSA region to initiate and implement policies that will reduce external debts and debt service payment obligations to avert the “crowding out” effect of debt on investments vis-à-vis economic growth, this would enhance the taxable capacity of private and public sector investors
3. There is need for the governments of the various SSA countries to consistently embark on capital projects and programmes that will directly affect the citizens and/or tax payers welfare, and this will further boost the income tax capacities and yields of the SSA countries.

(ii) Conclusion:

The concerns for the assessment of tax revenue performance for most SSA countries is the curtailment of fiscal deficits and the overall improvement in the development of the countries in the SSA region. Moreso, this study has analyzed the dynamic effects of macroeconomic variables on the overall performance of the tax systems for thirty – three countries over a period of eighteen (18) years taking into account the level of development or income groups employing the system generalized methods of moment methodology.

The results from this study revealed that macroeconomic factors contribute significantly to the tax revenue performance of the SSA countries. Our empirical results show that trade openness, real GDP per capita, government expenditure (percent of GDP) and private sector credit (percent of GDP) exert positive and significant impact on the overall tax revenue performance of the SSA region. However, agriculture value added, public debt,

inflation, natural resource rent (percent of GDP) and aid (ODA received) mostly exert negative and significant effect

This study was constrained by the fact that the entire SSA countries were not covered due to data non-availability. In addition, some variables like tax exemptions, tax treaties and tax incentives were not tested due to the inability to physically visit the various tax authorities of the SSA countries, and these variables would have been interacted with macroeconomic factor to achieve more substantive policy implications. Further research direction can be gained be introducing governance factors into the tax-growth regression model to ascertain the impact of institutional quality on tax revenue performance in SSA countries.

Acknowledgement

We profoundly appreciate the Staff and Students of the Department of Economics, University of Benin for their immense concerns and supports.

References

Arodoye, N. L and Izevbigie, J.N. 2019.Sectoral Composition and Tax Revenue Performance in ECOWAS countries. *Oradea Journal of Business and Economics*, 4 (2), pp. 45-55.

Bornhorst, F., Gupta, S. and Thornton, J. 2008. *Natural Resource Endowments, Governance, and Domestic Revenue Effort: Evidence from a Panel of Countries*. IMF Working Paper No. 170, Washington: International Monetary Fund.

Cottarelli, C., 2011. *Revenue Mobilization in Developing Countries*. Washington D.C: Fiscal Affairs Department, IMF.

Fenochietto, R. and Pessino, C. 2013. *Understanding Countries' Tax Effort*. Working Paper No. 244. Washington: International Monetary Fund.

Ghura, D., 1998. *Tax Revenue in sub-Saharan Africa: Effects of Economic Policies and corruption*. IMF Working Paper No. 135. Washington: IMF.

Gupta, A.S., 2007. *Determinants of Tax Revenue Efforts in Developing Countries*. Working Paper No. 184. Washington: IMF.

International Monetary Fund 2015. *Dealing with the Gathering Clouds' in Sub-Saharan Africa Regional Economic Outlook*. Washington: IMF Publication Service.

Langford, B., and Ohlenburg, T., 2015. *Tax Revenue Potential and Effort: An Empirical Investigation.* Working Paper. Houghton, London: International Growth Centre

Leuthold, J.H., 1987. *Tax Shares in Developing Economies: A Panel Study*. BEBR Faculty Working Paper No. 1412. Urbana-Champaign: University of Illinois.

Lotz, J. R. and Morss, E.R.1967. *Measuring 'Tax Effort' in Developing Countries*, International Monetary Fund Staff Papers 14(3), pp.478-499. IMF: Palgrave Macmillan

Ndiaye, M.B.O. and Korsu, R.D. 2011. *Tax Effort in ECOWAS Countries*. Freetown, Sierra Leone: West African Monetary Agency (WAMA).

Oriakhi, D.E, 2005. Taxable capacity and tax performance in African economies: Anevaluation of tax effort in Nigeria. (Unpublished Doctoral's thesis). University of Benin, Benin City, Nigeria.

Pessino, C. and Fenochietto, R. 2010. Determining Countries' Tax Effort. *Hacienda Publica Espanaloa/Revistade Economia Publica*. 195 (4), pp. 65-87.

Piancastelli, M. 2001. *Measuring the Tax Effort of Developed and Developing Countries: Cross - country Panel Data Analysis* – 1985/95. Discussion Paper 3843. CEPR.

Stotsky, J.G. and WoldeMariam, A. 1997. *Tax Effort in Sub-Saharan Africa*. IMF Working Paper, No.107. Washington, D.C: IMF.

Teera, J.M and Hudson, J. 2004. Tax Performance: A Comparative Study. *Journal of International Development,* 16, pp. 785 – 802.

Torrance, S. and Morrissey, O. 2014. *Taxation and Indigenous Institutions in Sub – Saharan Africa*. Centre for Research in Economic Development and International Trade, Research

Paper 4. A paper presented at the International Workshop on mobilizing domestic revenue in Developing Countries, DIE, Bonn, 24 -25 September, 2013.
Yohou, H.D., Goujon, M., Laporte, B. and Guerineau, S. 2015. *Are High Aid Flows Harmful to Tax Effort in sub-Saharan Africa*? CERDI-University of Auvergne

Bio – Note

Dr Arodoye Nosakhare Liberty is a lecturer in the department of Economics, University of Benin, Nigeria, and his areas of research includes: Public Finance, Public Sector Economics, Institutional Economics, Labour Economics and Econometrics.
Professor Oriakhi is a Professor of Economics with the Department of Economics, University of Benin, Nigeria, and his areas of research includes: Public Finance, Public Sector Economics, Structure of Nigerian Economy and Petroleum Economics.
Professor Iyoha is a Professor of Economics, and his areas of research includes: Macroeconomics, Econometrics, Fiscal Policy and International Trade.

ANNEX Table 1: Descriptive Statistics of variables for the estimation of macroeconomic variables and tax performance in the sub-Saharan Africa countries (2000 – 2017)

								Jacque Bera	
Variables	**Mean**	**Median**	**Standard Deviation**	**Minimum**	**Maximum**	**Skewness**	**Kurtosis**	**statistics**	**Prob.**
Total Tax Revenue as percentage of GDP	16.15	13.52	9.84	0.95	62.83	1.88	6.83	633.94	0.00
Real per capita GDP constant 2010 US $' 000	2108.20	774.55	2861.62	205.07	13617.88	1.93	5.77	497.37	0.00
Trade Openness	76.18	65.71	37.81	20.96	225.02	1.35	4.74	226.44	0.00
Agriculture value added as percentage of GDP	25.53	25.71	15.55	1.95	59.23	0.05	2.06	19.6	0.00
Inflation(annual CPI,inflation%)	88.87	87.48	30.22	2.91	250.62	0.54	4.91	105.91	0.00
Public Debt	8592.7	1261.01	34626.79	2.43	396970.70	7.19	62.02	81176.6	0.00
Government expenditure as percentage of GDP	109.37	109.88	18.37	59.50	200.97	0.91	7.31	482.64	0.00
Private Sector Credit (domestic credit to private sector % of GDP)	20.73	13.92	26.12	0.20	160.13	3.48	15.81	4673.30	0.00
Aid (Net ODA received)	8.66	7.28	7.86	0.25	62.19	1.82	9.09	1106.02	0.00
Natural Resource Rent, % of GDP	14.65	9.37	15.29	0.01	77.06	1.80	5.82	460.91	0.00

Source: Authors' Computation

Table 2: Stationarity Tests - analysis of macroeconomic variables and tax performance of the sub –Saharan Africa countries

Table 2.a.

Variables	Homogeneous (Common Unit Root Process)				Remarks
	Null hypothesis:Unit root (assumes common unit root process)				
	LLC				
	I(0)		I(1)		
	Stat.	Prob.	Stat.	Prob.	
Tax Revenue(% GDP)	-3.27***	0.00	-10.39***	0.00	I(1)
Real GDPpc	-0.74	0.23	-7.74***	0.00	I(1)
Agric. Value Added	-4.82***	0.00	-9.18***	0.00	I(1)
Trade Openness	-8.37***	0.00	-13.90***	0.00	I(1)
Govt. Exp.(%GDP)	-3.28***	0.00	-12.89***	0.00	I(1)
Private Sect. Credit	-0.88	0.19	-5.44***	0.00	I(1)
Aid	-5.08***	0.00	-12.51***	0.00	I(1)
Natural Resource Rent	-4.84***	0.00	-9.98***	0.00	I(1)
Inflation	-0.14	0.12	-5.93***	0.00	I(1)
Public Debt	22.8	1.00	-4.28***	0.00	I(1)

Table 2.b.

Variables	Heterogeneous (individual Unit Root Process)												Remarks
	Null hypotheses : Unit root (assumes individual unit root process)												
	IPS				ADF- F				PP - F				
	I(0)		I(1)		I(0)		I(1)		I(0)		I(1)		
	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	
Tax Revenue(% GDP)	-2.04**	0.02	-6.41***	0.00	90.30**	0.03	158.77***	0.00	105.62***	0.00	433.32***	0.00	I(1)
Real GDPpc	-1.36	0.91	-4.15***	0.00	55.94	0.81	123.90***	0.00	53.26	0.87	284.09***	0.00	I(1)
Agric. Value Added	-1.54*	0.06	-5.69***	0.00	102.03***	0.00	148.11***	0.00	213.72***	0.00	108.12***	0.00	I(1)
Trade Openness	-4.45***	0.00	-8.85***	0.00	114.82***	0.00	190.18***	0.00	248.39***	0.00	106.81***	0.00	I(1)
Govt. Exp.(%GDP)	-0.60	0.27	-8.21***	0.00	71.31	0.31	187.96***	0.00	98.00***	0.00	429.57***	0.00	I(1)
Private Sect. Credit	-1.47	0.93	-3.08***	0.00	56.64	0.79	105.79***	0.00	67.70	0.42	238.56***	0.00	I(1)
Aid	-2.53***	0.01	-8.65***	0.00	99.76***	0.00	194.32***	0.00	182.16***	0.00	462.79***	0.00	I(1)
Natural Resource Rent	-1.22	0.11	-6.00***	0.00	80.03	0.11	147.64***	0.00	96.43***	0.01	397.59***	0.00	I(1)
Inflation	2.51	0.99	-2.56***	0.01	47.18	0.96	110.07***	0.00	68.09	0.41	185.41***	0.00	I(1)
Public Debt	2.87	0.97	-3.07***	0.01	17.08	1.00	155.92***	0.00	33.85	0.99	265.87***	0.00	I(1)

Source: Authors' Computation. LLC : Levin, Lin and Chu t* ; IPS = Im, Pesaran and Shaw W-stat, ADF - F: Augmented Dickey Fuller-Fisher Chi-Square, PP - F = Phillips Peron -Fisher Chi - Square; stat. = statistics; prob. = probability. *** 1%; **5%; *10% Significant levels

Table 3: Residual - Based Co - integration Test Results of macroeconomic variables and tax revenue performance in sub-Saharan Africa countries

Homogeneous – Kao						**Heterogeneous - Pedroni**			
	Series					**Series**			
Statistics	**Full Sample**		**Macroeconomic Variables and Tax Performance**		**statistics**	**Macroeconomic Variables and Tax Performance**		**Weighted**	
	stat.	**Prob**	**stat.**	**prob.**		**stat.**	**prob.**	**stat.**	**prob.**
ADF	-5.29	0.00***	-4.74	0.00***	Within Dimension (Common AR Coef.)				
					panel v-statistics	13.97	0.00***	15.92	0.00***
					panel rho - statistics	-6.70	0.00***	-5.58	0.00***
					panel PP - statistics	-14.38	0.00***	-20.16	0.00***
					panel ADF statistics	-4.50	0.00***	-4.50	0.00***
					Between Dimension (Individual AR Coefs.)				
					Group rho statistics	-7.34	0.00***		
					Group PP statistics	-28.93	0.00***		
					Group ADF statistics	**-2.63**	**0.00*** **		

Source: Authors' Computation. stat. = statistics; prob. = probability. *** 1%; **5%; *10% Significant levels.

Table 4: Macroeconomic Variables and Tax Revenue Performance in SSA Countries. 2000 – 2017

Variables	SSA Region			Middle Income Economies+			Low Income Economies		
	Fixed Effect	Random Effect	Sys-GMM	Fixed Effect	Random Effect	Sys-GMM	Fixed Effect	Random Effect	Sys-GMM
Constant	1.978*** (10.337)	1.921*** (11.957)		4.875*** (2.817)	4.282*** (4.283)		1.660*** (6.704)	1.822*** (8.042)	
One-Period lag of Tax-to-GDP Ratio			0.224*** (16.255)			0.244*** (7.894)			0.382* (1.693)
agriculture value added	-0.013*** (-2.532)	-0.011*** (-2.513)	-0.066* (-1.886)	-0.088* (-1.814)	-0.081* (-1.723)	0.018 (0.839)	-0.021** (-2.152)	-0.051** (-2.008)	0.072 (0.162)
Trade Openness	0.006*** (8.763)	0.006*** (8.928)	0.166* (1.816)	0.415*** (4.613)	0.413*** (4.657)	0.149* (1.739)	0.003*** (2.997)	0.031*** (3.405)	0.121 (1.205)
Real GDP per capita	0.875* (1.828)	0.586* (1.816)	0.549*** (3.951)	0.161* (1.946)	0.145* (1.827)	0.202** (2.636)	0.001* (1.698)	0.001** (2.028)	0.826* (1.820)
Inflation (annual CPI, %)	-0.053 (-0.036)	-0.001 (-0.649)	-0.036 (-0.769)	-0.138 (-1.532)	-0.145** (-2.189)	-0.053* (-1.887)	-0.003*** (-3.283)	-0.001 (-1.172)	-0.282 (-0.681)
Government Expenditure (% GDP)	0.002 (1.511)	0.002 (1.539)	0.266*** (-2.552)	1.051*** (4.084)	0.964*** (3.968)	0.054 (1.221)	0.002 (1.165)	0.002 (0.861)	0.423 (0.897)
Public Debt	-0.061** (-2.401)	-0.012** (-2.429)	-0.014*** (-5.248)	-0.041** (-2.481)	-0.045*** (-2.763)	-0.005 (0.513)	-0.529* (-1.867)	-0.078* (1.944)	-0.025 (-0.234)
Aid (Net ODA Received, %GDP)	-0.008*** (-3.022)	-0.007*** (-2.870)	-0.029*** (5.937)	-0.087** (-2.465)	-0.084** (-2.434)	-0.012 (-1.434)	0.003 (1.284)	0.005 (1.423)	-0.017 (-0.319)
Natural Resource Rent (% GDP)	-0.006*** (-3.993)	-0.006*** (-3.843	-0.017* (1.962)	-0.053*** (3.275)	-0.051*** (3.272)	0.008 (0.681)	-0.001 (-0.189)	-0.001 (-0.394)	-0.002 (-0.033)
Private Sector Credit (%GDP)	0.004*** (5.053)	0.004*** (5.248)	0.071*** (3.604)	0.151*** (2.958)	0.154*** (3.040)	0.009 (0.020)	0.032*** (10.328)	0.027*** (9.902)	0.065 (0.284)
R-Square	0.507	0.499		0.503	0.497		0.462	0.404	
Adjusted R-Square	0.484	0.491		0.447	0.477		0.413	0.385	
F-Statistics	21.556***	57.540***		8.981***	25.035***		9.416***	20.974***	
Hausman Test	6.895			2.201			26.175***		
Arellano Bond AR(1)			-3.863***			NA			NA
Arellano Bond AR(2)			-0.942 (0.346)			-0.336 (0.737)			-0.426 (0.669)
Hansen J-Statistics			16.726 (0.860)			108.565(0.310)			5.391 (0.715)

Source: Authors' Computation. *, **,*** = 1%, 5% and 10%. + MICs= 2001-17, NA = Not Available.

FOREIGN DIVERSIFICATION AND PERFORMANCE OF QUOTED DEPOSIT MONEY BANKS IN SELECTED SUB-SAHARA AFRICAN COUNTRIES

Osagie Osifo*, Esther Ikavbho Evbayiro-Osagie
Department of Banking and Finance, Faculty of Management Sciences, University of Benin, Benin City, Edo State, Nigeria
osagie.osifo@uniben.edu
esther.evbayiro-osagie@uniben.edu

Abstract: *Foreign diversification offers prospective market opportunities which afford firms prospects for greater growth and penetration of global markets. This study investigated the effect of foreign diversification on performance of quoted deposit money banks in selected Sub-Sahara African countries; Botswana, Ghana, Kenya, Malawi, Mauritius, Namibia, Nigeria, South Africa, Uganda, Zimbabwe and Zambia. The study employs secondary data collected and computed from sampled deposit money banks annual audited financial statements. Employing the use of descriptive statistics, correlation analysis, panel unit root analysis, co-integration test, multivariate panel data analysis and the system- GMM for a period of 2007 – 2017, the data were estimated with the aid of Eviews 9.0 econometric statistical package. Using dependent variables (Net interest margin and Tobin Q), explanatory variables of foreign diversification, bank's size and bank's age respectively. The findings revealed that foreign diversifications have negative and significant effect on all the performance indicators (NIM and TOBIN Q) used in the study. The explanatory variable (foreign diversification) was significant at 1% significance level. The findings from robustness check showed that the coefficients of foreign diversification are also largely negative for most of the banks. This study therefore recommends, amongst others, banks should consider diversification as a long run strategy for promoting growth and other forms of expansions. This can be achieved by promoting more regional banking integration within the sub-region. Given that formalities are already on the ground to facilitate entry and establishment within economies in the regional blocs, diversification in this direction will involve less institutional obstacles.*

Keywords: System-GMM, Foreign diversification, Regional banking, Net interest margin.

JEL classification: G30, G34.

1. Introduction

All over the globe, businesses are establishing outlets in other areas in order to remain competitive and hedge against risk and provide more returns for their shareholders. The deposit money banks in selected sub-Sahara African countries are not left out in this new scheme of expanding their reach to their customers in other parts of the world. The urge for corporate managers to positively structure how the firm's business is conducted because corporate firms are working in milieu that are ever more vague, multifarious, aggressive, dynamic and volatile (Ojo, 2009). According to Thomson, Gamble, and Strickland (2004), the worth of decision-making strategic input, plans and implementation has an extremely affirmative effect on earnings, cash flows, and returns on investment. An appropriate strategy in the business environment has the propensity to push an organization from a

* Corresponding author: Osagie Osifo

straggling situation into one in control such that the corporate organization's outputs in form of good/services becomes the industry standard.

The central key strategy engaged by corporate firms in an attempt to improve their performance is diversification. The performance of corporate firms are boosted by diversification because the existing internal and external resources are leveraged on, in order to support other ventures, thus complementing the general performance of the corporate firm. Diversification helps corporate firms build the needed exigency for enhancing shareholders value by using prior assets (Thomson *et al*., 2004). As documented by Ansoff (1957), diversification is manifested in diverse forms which can assume market penetration, market development and product development. Foreign diversification can be situated under market penetration owing to the fact that deposit money banks are taking their business to other areas.

Competition has increased in the banking sector due to the deregulation and liberalization witnessed in a number of countries in the last twenty years by encouraging non-banking players to join the industry (Mulwa&Kosgei, 2016). Deposit money banks have responded to the competition pressure by raising their involvement in modern intermediation services such as investment banking and insurance and delving into other domains (real estate, oil and gas financing) that were prior tagged as risky (Gamra & Plihon, 2011). In addition, deposit money banks have significantly expanded their outlets in domains that were prior viewed as un productive. Since universal banking system is not appealing any longer in the sub-Sahara region, owing to turbulent operating environment most deposit money banks have to resort to corporate diversification. Deposit money banks now operates in shores outside their original domicile in order to extend their services to other climes and by so doing having wider coverage and increasing their returns.

Corporate diversification and performance of deposit money banks has been largely explored from diverse methodologies such as correlation, anova, ordinary least squares simple and multiple regression analysis, panel regression analysis, data envelopment analysis and Hirschman Herfindahl index (Ojo, 2011; Ugwuanyi, & Ugwu, 2012; Turkmen & Yigit, 2012; Brighi & Venturelli, 2013; Chen; Wei, Zhang, & Shi, 2013; Meysam & Shavazipour, 2013; Mulwa, Tarus & Kosgei, 2015; Berg, 2016; Krivokapic, Njegomir &Stojic, 2017). These methods are largely part of conventional techniques. Unfortunately, these approaches have their drawbacks and demerits in that they are sensitive to outliers, focuses on the mean of the dependent variables, the test statistics might be unreliable when data is not normally distributed (Feng et al., 2014). The drawback of data envelopment analysis can also include that it converges slowly to absolute efficiency i.e it is only suitable for relative efficiency and the problem of computation in regards to large decision-making units (Charnes, Cooper & Rhodes, 1978). Thus, this study therefore intends to make use of system generalized method of moments (system-GMM) to analyse the dynamic panel data owing to its superiority in terms of efficiency, correction of endogeneity problem, measurement biases and omitted variables. The system GMM estimator is known and expected to produce less biased and more precise estimates.

The central purpose of this study is to examine the effect of foreign diversification on performance of quoted deposit money banks in selected sub-Sahara African countries. In the light of the above, the hypothesis below will be tested in this study.

(i). Foreign diversification does not significantly impact on performance of quoted deposit money banks in selected Sub-Sahara African countries.

Following this introduction, section two deals with the conceptual issues and review o fempirical literature on foreign diversification. Section three reviews data and methodology, while Section four gives an overview of empirical analysis and Section five will be conclusion and recommendation.

2. Literature Review

Foreign diversification occurs when a firm operates in a market outside her national boundaries. Capar and Kotabe (2013), opine that foreign diversification is a growth strategy that has major influence on the firm's performance. This effect according to Ansoff (1957) is a growth strategy.

Buhner (1987) maintained that foreign diversification gives prospective market gains which afford corporate organizations avenues for increased growth. Diminution of risk works through diversification owing to the co-movements in return between diverse markets are not perfect; these unsynchronized movements between different markets mitigate volatilities in an internationally diversified portfolio. According to modern portfolio theory, a total risk is sub-divided into diversified and undiversified risk. A well-balanced portfolio is one where the diversifiable risk is reduced as much as possible. The most accepted argument has been developed on theoretical assumptions that firm takes advantage of the benefits of internationalization in foreign markets (Hymer, 1976; Caves, 2007). Firms with well-developed strong competencies in local markets can exploit the benefits of international market and consequently it is argued that the higher the level of internationalization of a firm, the higher would be the exploitation of tangible and intangible resources that are expected to boost productivity (Hymer, 1976).

In a study by Doaei and Shavazipour (2013) on manufacturing quoted companies in Malaysia stock exchange. The data of 102 firms were collected spanning 2006 to 2010 from the stock exchange in Malaysia. Six output variables and four input variables were selected using DEA methodology. By applying the input-oriented BCC model, the efficiency scores of 102 selected firms listed in Bursa Malaysia were calculated over the given period. As a result, only six DMUs (DMU 9, 12, 58, 59, 61 and 62) were efficient in all years. The result also showed that increasing in the product diversification and international diversification can leave a positive effect on efficiency and raise the corporation's efficiency score. Then, the improvement strategy has been suggested by slack analysis. Further analysis on the Malmquist productivity Index indicate that Bursa Malaysian experienced on average 88% productivity loss from 2006 to 2010. Decomposition of the MIP is described that a negative shift in frontier technology (about 88%) is the only source of productivity loss and the overall 15.44% improvement in its technical efficiency could not rectify these huge productivity regressions.

Brighi and Venturelli (2013) examine the effects of revenue and geographic diversification on bank performance of Italian banks for the period 2006-2011. A panel regression econometric method was used to analyze the data. The central results suggest that revenue and geographical diversification play a role in determining bank performance. Their findings have implication for the diverse stakeholders (regulators, bank managers, investors and supervisors) in regards to banks' stability and performance.

Jouida, Bouzgarrou and Hellara (2017) in their study investigated the effects of activity and geographic diversification on performance: evidence from French financial institutions. The study examined 244 French financial institutions and observed a negative relationship between diversification and performance. Hence, this association is significantly positive when firms indulge in dual diversification policy.

Yildirim and Efthyvoulou (2018) analyze the effect of geographic diversification on bank value by using a data set sample period between 2004-2013. The system GMM estimator was used for the analysis. Their findings revealed that the value impact of international diversification depends on a bank's home country: higher levels of diversification are associated with changes in valuations only for banks originating from emerging countries.

2.1. Theoretical Considerations

This study is hinged on market power theory and the debate for market power surfaced from Porter (1980) opinion of positioning corporate firms and entities in their different

environments by means of strategies sets that differentiates a firm's position from the rivals in business environment. In stifling competition, diversification is an indispensable strategy (Barney, 1991; 2002), it gives corporate firm the avenue to build market power, hencegranting it access to conglomerate powers. Firms are able to advance their competitive power in the market by venturing into other markets through diversification which includes foreign diversification. This is not because of their particular position in that market but because of their positions in their individual markets (Gribbin, 1976). This clout in the foremost market spurs the firm to penetrate new markets through grasping policies supported by its location, funds and power in its contemporary market. Firms can annex market power through diversification in three ways: cross subsidization by means of earnings from one market to shore upvoracious pricing in another; mutual forbearance of rigorous competition among competitors; and reciprocal buying among units of a multi-business firm which forecloses small competition (Montgomery, 1994). With this approach, firms are able to overcome competition thereby earning profits above the average market profits. As such, market power theory hypothesis a positive relationship between diversification and firm performance.

3. Methodology and Model Specification

This study used secondary data sourced and computed from the various audited financial statements of sampled deposit money banks (corporate diversification variables) in the selected countries over the period 2007 – 2017. A total of fifty (50) deposit money banks across eleven (11) Sub-Sahara African countries were used in this study (see appendix one). The choice of the eleven countries is based on their vibrant stock exchanges and compliant to voluntary sustainability report guidelines of the selected bourses.
This study employedpanel unit root analysis, co-integration test and the system- GMM. The panel unit root is to ascertain the stationarity and normality of the data in the variables in the specified model. Rationalization for the test of stationarity is to guarantee that the data are consistent for the system-GMM application. Thesystem Generalized Method of Moments became essential to solve the drawbacks of endogeneity of independent variables with dependent variable, omitted variables, measurement biases and heterogeneity problems associated with cross-country data.

3.1 Model Specification

The two models are anchored on the theoretical framework of market power theory (MPT) as earlier stated. In order to examine the impact of foreign diversification on performance of quoted deposit money banks, the model was adapted from Olarewaju, Migiro and Sibanda (2017) by incorporating a market base performance measure (Tobin Q).

The functional forms of the models are stated below;

$$NIM_{it-1} = f[FD, IND, SD, BSIZE, BAGE] \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots .. (1)$$

$$TOBINQ_{it-1} = f[FD, IND, SD, BSIZE, BAGE] \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots ..... (2)$$

The econometric forms of the models are stated below as;

$$NIM_{it-1} = \beta_0 + \beta_2 FD_{it} + \beta_1 IND_{it} + \beta_3 SD_{it} + \beta_4 SIZE_{it} + \beta_5 BAGE_{it} + U_t \dots \dots \dots \dots \ (3)$$

$$TOBINQ_{it-1} = \beta_0 + \beta_1 FD_{it} + \beta_2 IND_{it} + \beta_3 SD_{it} + \beta_4 SIZE_{it} + \beta_5 BAGE_{it} + U_t \dots . (4)$$

Where:
FD = Foreign diversification measured as Ln [1 + number of foreign subsidiaries]
IND = Income diversification is measured as the ratio of net interest income minus other operating income to total operating income deducted from one (1)

SD = Subsidiary diversification measured as Ln [1 + number of foreign subsidiaries + domestic subsidiaries]
BSIZE = Size of the Bank measured as Log (market value). Where market value is share price x number of shares outstanding
BAGE = Age of the Bank is measured as the number of years from the day the firm was established till 2017.

$$NIM = \frac{(Investement\ Income - Interest\ Expenses)}{Average\ Earning\ Assets}$$

TobinQ = Tobin Q is measured as the summation of market capitalization and total liabilities minus the net cash flow to total asset
Where *i*represent countries in all sample and *t* represents the scope or period of study.
β_0 - β_5 are parameters to be estimated and U_t is the error term.

4. Analysis of Result

From the Table of unit roots tests above, the levels variables (except SD-subsidiary diversification) are all significant in terms of the test statistics at either the 1 percent levels based on the LLC, IPS and ADF-Fisher tests. Only the Breitung test reports non-significant tests values for all the variables in levels. This shows that for all the variables (except SD) the null hypothesis of the stationarity cannot be rejected in levels, suggesting that the variables among the firms do not follow a defined pattern of movement over any given period.

Table 1: Panel Unit root test result

	Homogeneous Unit Root Process				**Heterogeneous Unit Root Process**			
	Level		**1st Diff**		**Level**		**1st Diff**	
Variables	**LLC**	**Breitung**	**LLC**	**Breitung**	**IPS**	**ADF-Fisher**	**IPS**	**ADF-Fisher**
NIM	-29.5**	-1.17	-22.6**	-6.03**	-8.19**	203.2**	-9.39**	264.9**
Tobin_Q	-2.39**	-0.94	13.96**	-4.32**	-2.39**	148.3**	-7.84**	247.3**
IND	-6.75**	-1.08	-15.4**	-3.22**	-2.42**	151.2**	-7.56**	247.9**
FD	-13.8**	-1.13	-7.49**	-5.01**	-2.18**	51.1**	59.9**	97.9**
SD	-0.99	-0.51	-7.95**	-4.18**	1.75	51.7	-3.27**	109.6**
SIZE	-8.11**	-1.02	-6.48**	-3.00**	-0.89	117.5	-2.96**	166.6**

Note: * and ** indicate significance at 5 and 1 percent respectively.
Source: Author's computations

The variables are apparently not time dependent. However, the result also shows that for the first difference variables, all the test statistics are significant, thereby leading to the rejection of the null hypothesis of no unit roots in the first differences. These results strongly indicate that most of the variables are stationary both in level and at first differences. This finding is supported by both the homogenous and heterogeneous panel unit root tests. Since the variables are also stationary after first difference, we then proceed to establish their long run relationship below.

Table 2: Cointegration Test Results

Pedroni Residual Cointegration Test					Kao Residual Test
	Statistic	**Weighted Statistics**		**Statistics**	
NIM Equation					
Panel v	-15.66**	-11.62**	Group rho	9.11**	3.49**
Panel rho	20.34**	14.72**	Group PP	-12.18**	
Panel PP	-3.32**	-7.38**	Group ADF	-7.01**	
Panel ADF	-4.38**	-5.34**			
Tobin Q Equation					
Panel v	5.12**	-9.01**	Group rho	12.06**	-3.07**
Panel rho	2.62**	7.34**	Group PP	-11.52**	
Panel PP	-8.37**	-9.21**	Group ADF	-0.57**	
Panel ADF	3.55**	-3.19**			

Note: * and ** indicate significance at 5 and 1 percent respectively.
Source: Author's computations, 2018

From the tests results, it can be seen that the tests based on Pedroni residual all report values that are significant at the 1 percent level for both the grouped and ungrouped tests. All test processes, including rho, PP and ADF are significant for both the within and between tests (at the 1 percent level). Thus, the null hypothesis of no co-integration is rejected for the combination of the variables, with each of the dependent variables.

Table 3: Sys-GMM Results for NIM

Variable	***1***	***2***	***3***	***4***	***5***
NIM_{t-1}	0.378** (0.000)	0.318** (0.000)	0.329** (0.002)	0.361** (0.000)	0.377** (0.000)
Foreign diversification	-	-4.892 (0.097)	-	-7.772** (0.000)	-6.550** ().000)
Income diversification	1.323** (0.000)	-	-	1.310** (0.000)	1.180** (0.000)
Subsidiary diversification	-	-	4.773* (0.033)	5.257* (0.036)	6.069** (0.003)
SIZE	-2.721 (0.117)	-9.369 (0.271)	-6.723** (0.002)	-	-2.532 (0.183)
BAGE	-0.142 (0.483)	-0.253* (0.026)	-0.149 (0.209)	-	-0.182 (0.101)
Overidentifyingrestriction (Hansen J-prob)	0.172	0.354	0.402	0.238	0.194
Arrelano-Bond AR(1)	-1.69	-1.96*	-1.60	-1.99*	-1.49
Arrelano-Bond AR(2)	-0.24	0.44	0.27	-0.17	-0.01
No. of observations	540	540	540	540	540

Note: * and ** indicate significance at 5 and 1 percent respectively. T-probabilities in parentheses below each coefficient
Source: Author's computations, 2018

The result of the estimates for net interest margin (NIM) as an indicator of bank performance are reported in Table 3. The results also have impressive diagnostic indicators, with all the Hansen-J statistic probabilities in the region that suggest appropriate selection of instruments used for the GMM estimation. The Arrelano-Bond AR statistic for the first and second lags both show that the estimates are free from serial correlation for the panel variables in levels. The coefficient of the lagged dependent variable has the expected positive sign, which suggests long run equilibrium for NIM among the banks in the sample. The coefficient of the lagged dependent variable hovers around 0.31 – 0.37 percent, which is relatively low and indicates that adjustment to long run equilibrium is slow. On the other hand, the results show that only the NIM (efficiency of fund investment by banks) has a positive lagged coefficient in the GMM estimates among the performance indicators, suggesting that only NIM adjusts to equilibrium level in the long term based on the effects of diversification and other factors.

The result shows that the coefficient of foreign diversification is negative for each of the estimates in the result. The coefficients also pass the significance tests at the 1 percent level, indicating that foreign diversification has significant debilitating effect on efficiency of funds investment among the banks in the African region. Increased foreign diversification reduces NIM for banks. Apparently, with higher foreign diversification, there appears to be losses in terms of efficiency of fund use as the banks grow wider. Like the result for the ROA estimates, the negative effect of foreign diversification on NIM intensifies when other aspects of diversification are taken into cognizance in the model.

Income diversification is also positive on NIM for each of the estimation structure. The coefficients are all high, and indicate that with increased income diversification, banks tend to enjoy better interest margins. The effect is relatively similar even when other diversification aspects are controlled in the model. This shows that it does not matter the other forms of diversification a bank involves in, income diversification tends to always improve NIM for the banks (which is a similar result to that of ROA). The coefficient of subsidiary diversification also passes the significance test at the 1 percent level for each of the estimation outputs, suggesting that higher subsidiary diversification leads to improvements in NIM by banks. The positive effects are higher when other diversifications are included in the estimates. Thus, the dichotomy of the effects of diversification on NIM runs in the line of foreign or domestic diversification. The two domestic diversification variables have significant positive impacts on NIM but the foreign diversification variable has a negative effect on NIM. The coefficients of size and age are mainly insignificant in the results (especially the full estimates), suggesting that neither bank size not age has significant impact on the capacity of banks to invest funds more efficiently

Table 4: Sys-GMM Results for Tobin's Q

Variable	**1**	**2**	**3**	**4**	**5**
TOBIN_Q_{t-1}	-0.031** (0.000)	-0.014** (0.000)	-0.066** (0.000)	-0.095** (0.000)	-0.055** (0.000)
Foreign diversification		-0.808** (0.000)		1.031** (0.000)	-2.325** (0.000)
Income diversification	-0.044** (0.002)			-0.424** (0.000)	0.447** (0.000)
Subsidiary diversification			-0.941** (0.000)	-0.675** (0.002)	-9.423** (0.002)
SIZE	1.667** (0.001)	2.169** (0.003)	2.205** (0.001)		2.418** (0.001)

BAGE	-0.156** (0.000)	-0.194** (0.000)	-0.189** (0.000)		-2.028** (0.004)
Overidentifying restriction (Hansen J-prob)	0.387	0.461	0.424	0.491	0.302
Arrelano-Bond AR(1)	-2.03*	-1.94*	-2.00*	-1.83	-1.91*
Arrelano-Bond AR(2)	0.73	-0.74	-0.80	0.92	-0.77
No. of observations	540	540	540	540	540

Note: * and ** indicate significance at 5 and 1 percent respectively. T-probabilities in parentheses below each coefficient.
Source: Author's computations, 2018

This measure of bank performance in the analysis is Tobin's Q which relates to the performance in terms of the stock market. The diagnostic tests in the results are also impressive based on the Hansen J-test and the Arrelano-Bond AR tests. The coefficient of the over-identifying restriction test statistic for the GMM estimates possess the expected values (i.e. greater than 0.1), indicating that the instruments used in the estimation are valid. The Arrelano and Bonds first and second order serial correlation tests also possess the expected outcomes. The tests show that the first order statistic is statistically significant and has the expected negative sign. The second order statistic is not significant (in line with *apriori*expectation), suggesting that the model error terms are serial uncorrelated in levels. This provides additional support for the instrument's validity test indicated by the Hansen J-statistic.

From the result, the coefficient of foreign diversification is essentially negative for the results with control or without control for other diversification factors. This implies that foreign diversification actually leads to reduction of the banks' Tobin Q value across the countries. This result is actually surprising since increased foreign participation in the foreign sector should boost investors' confidence among the banks. What the results reveal however is that with increased foreign participation, banks tend loose competitive advantage in terms of improving market value. Again, using Net interest margin (NIM) and Tobin Q as performance indicator, foreign diversification showed a significant discounted relationship with the aforementioned dependent variables. These findings are in line with the studies of Sammehetal (2017), Jouida and Hellara (2017), Estes (2014) and Berger and Ofek (1995). The implication of these mixed findings is that with increased foreign participation, quoted deposit money banks tend loose competitive advantage in terms of improving their respective market values across selected Sub-Sahara African countries in the sample. This can also give credence to the fact that majority of the stock exchanges apart from Johannesburg stock exchange and Nigeria stock exchange are still in their infantile stages in regards to volume and value of trade that takes place in their respective floors owing to the depth and breadth of their markets.

Income diversification has a unique pattern of effects on firms' performance in terms of Tobins Q. On its own, the effect is negative but with other diversification, the effect is positive (with no control for size and age) and positive (with control for size and age). This implies that income diversification will only have positive impact on Tobin Q when the banks also have foreign and subsidiary diversification and for older and larger banks. Since income diversification tends to improve the performance of the banks in the stock market through expanding financial capacities of the banks, other forms of expansion are likely to make these effects more stable.

The coefficient of subsidiary diversification is also negative all through the different estimates and significant at the 1 percent level. This shows that subsidiary diversification also tends to reduce Tobins Q. Again, this does not seem to agree with apriori expectations since more subsidiaries should improve the value of the banks through expansion of asset

base. However, these results reveal that for banks in Africa, subsidiary diversification would tend to depreciate the banks' market value. The coefficient of bank size was significant in each of the estimates, suggesting that larger banks have better higher market value than smaller banks. On the other hand, older banks do not have higher market value than younger counterparts as demonstrated by the negative coefficients of the BAGE variable.

Foreign diversification does not significantly impact on performance of quoted deposit money banks in selected Sub-Sahara African countries.

From the results of the GMM estimates, the coefficient of foreign diversification passed the significance test in each estimation at the 1 percent level since the associated probabilities with the individual t-values are all less than 0.01. Based on these results, the null hypothesis is rejected in this case and a significant impact is demonstrated from foreign diversification of the banks on their performance. The direction of the impact is however not linear as shown in the estimates.

5. Concluding Remarks and Recommendations

Foreign diversification of deposit money banks has been embraced by most banks and has taken the center stage of most economies in the world. This is so because it helps in building a virile, efficient and robust banking system which can spark the performance of the individual banks and lead to the overall growth of the various national economies. In order to gain extensively from the gains of foreign diversification, regulatory authorities of SSA countries should put in place different institutional reforms that will help in carrying out banking activities within the SSA regions with little or no stringent rules that can help deposit money banks to operate in the different financial markets.

The regulatory agencies within each of the countries in the region should also consider providing enabling environment for encouraging intra-regional foreign diversification of banks. The study has suggested that banks tend to lose certain competitive efficiency when they involve in foreign diversification, this can be reduced when environments are conducive for region-based banks to interact with financial markets of other countries within the region.

Furthermore, the impact of foreign diversification was negative in all the estimation results. This suggests that most banks are yet to adopt credible foreign diversification strategies that will yield positive performance outcomes. Some of the banks are likely to be operating with toxic assets of foreign enterprises and as a result, unable to perform financially. It is therefore necessary for these banks to engage in proper environmental scanning and assets monitoring in order to ensure that, their investments go into proper channels in the foreign domain.

This study is limited by focusing on just one method of data analysis (System GMM). Further studies on corporate diversification and banks performance should utilize other econometric techniques like Panel Vector Auto regressive (PVAR) and Panel Vector Error Correction Model (PVECM) to examine the effect of the relationship so that the outcome will be more robust and encompassing.

References

Ansoff, H. I. 1957. Strategies for diversification. *Harvard Business Review*, 35, pp.113-124.

Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17 (1), pp. 99-120

Barney, J. 2002. *Gaining and sustaining competitive advantage*. Second edition, Prentice Hall.

Berg, J.V. 2016. Corporate diversification and firm performance: The effect of the global financial crisis on diversification in India. Being a master's thesis submitted to the department of business administration, University of Groningen.

Berger, P. G. and Ofek, E. 1995.Diversification's effect on firm value. *Journal of Financial Economics*, 37 (1), pp. 39–65.
Brighi, P. and Venturelli, V. 2013. How do income diversification, firm size and capital ratio affect performance? Evidence for bank holding companies. *Applied Financial Economics*, 24 (21), pp. 1375-1392
Buhner, R. 1987. Assessing international diversification of west German corporations. *Strategic Management Journal*, 8(1), 25-37
Capar, N. and Kotabe, M. 2013. The relationship between international diversification and performance in service firms. *Journal of International Business Studies*, 34 (4), pp.345-355
Caves, R.E. 1971. International Corporations: The Industrial economics of foreign investment. *Economica*, 38 (February), pp. 1–27.
Charnes, A., Cooper, W. and Rhodes, E. 1978. Measuring the efficiency of decision making units. *European Journal of Operational Research,* 2, pp. 429-444
Chen, Y., Wei, X., Zhang, L. and Shi, Y. 2013.Sectoral diversification and the banks' return and risk: evidence from Chinese listed commercial banks. *Procedia Computer Science*, 18, pp. 1737-1746.
Doaei, M. and Shavazipour, B. 2013. Corporate diversification's effects on efficiency and productivity: case study of manufacturing firms listed in Bursa Malaysia. *International Journal of Business and Development Studies*, 5 (1), pp. 77-96.
Estes, K. 2014. Diversification and community bank performance during a financial crisis. *International Journal of Finance & Banking Studies,* 3 (4), pp. 1-40.
Feng, C.; Wang, H.; Lu, N.; Chen, T.; He, H.; Lu, Y. and Tu, X. 2014.Log-transformation and its implications for data analysis. *Shanghai Archives Psychiatry*, 26(2), pp. 105–109
Gamra, S.B. and Plihon, D. 2011. *Revenue diversification in emerging banks: Implications for financial performance*. CEPN working papers.
Gribbin, J.D. 1976.The conglomerate merger, *Applied Economics*, 8, 19-35.
Hymer, S. H. 1976. *The international operations of national firms; A case study of foreign investment*. Cambridge, Mass: MIT Press.
Jouida, S. and Hellara, S. 2017. Diversification, capital structure, and performance: A simultaneous equation approach. *Manage Decision Economics,* 2, pp. 1–14.
Jouida, S., Bouzgarrou, H. and Hellara, S. 2017. The effects of activity and geographic diversification on performance: Evidence from French financial institutions. *Research in International Business and Finance, Elsevier,* 39, pp. 920-939.
Krivokapic, R., Njegomir, V. and Stojic, D. 2017. Effects of corporate diversification on firm performance: evidence from the Serbian insurance industry. *Economic Research-EkonomskaIstraživanja*, 30 (1), pp. 1-13.
Montgomery, C. A. 1994. Corporate diversification. *Journal of Economic Perspectives,* 8 (3), pp. 163-178.
Mulwa, J.M., Tarus, D. and Kosgei, D. 2015. Commercial bank diversification: A theoretical survey. *International Journal of Research in Management & Business Studies*, 2 (1), pp. 27-32.
Mulwa, J.M and Kosgei, D. 2016. Commercial bank diversification and financial performance: the moderating role of risk. *Journal of Finance and Investment Analysis*, 5 (2,3), pp. 28-43.
Ojo, O. 2009.Corporate diversification and firm performance. *Manager: Current Economic Crisis*, 9, pp. 39-51
Ojo, O. 2011. An appraisal of the practice of corporate diversification in selected Nigerian banks. *Management science letters*, 1 (3), 295-306.
Olarewaju, O.M., Migiro, S.O. and Sibanda, M. 2017. Operational diversification and financial performance of sub-Saharan Africa commercial banks: Static and dynamic approach. *Economica*, 13 (5), pp. 84-106.

Thomson, A.A., Gamble, J.E. and Strickland, A.J. 2004.*Crafting and Executing Strategy: The Quest for Competitive Advantage - Concepts and Cases*. McGraw-Hill/Irwin.
Turkmen, S.Y. and Yigit, I., 2012. Diversification in banking and its effect on bank performance: Evidence from Turkey. *American International Journal of Contemporary Research*, 2 (12), pp. 110-119
Ugwuanyi, G.O. and Ugwu, J.N. 2012.The effect of corporate diversification on the profitability of the financial services sector in Nigeria.*International Scholarly and Scientific Research & Innovation,* 6 (7), pp. 78 – 83.
Yildirim, C. and Efthyvoulou, G. 2018. Bank value and geographic diversification: Regional vs Global. *Journal of Financial Stability*, 36, pp. 225 – 245.

Bio-note

Osifo Osagie is a lecturer with the department of Banking and Finance in the prestigious University of Benin, Nigeria. He holds B. Sc in Banking and Finance, M.Sc in Finance and Ph.D in Finance all from University of Benin. He has published in reputable journals both in Nigeria and international.
Evbayiro-Osagie Esther Ikavbo is currently the head of department of Banking and Finance, University of Benin, Benin City. She holds a B.Sc in Business Administration (First class honours), M. Sc in Finance and Ph.D in Financial Management all from University of Benin. She has attended numerous academic conferences; she has published in learned academic journals both foreign and local.

APPENDIX 1: Sample of Selected Banks in SSA

S/N	Company	COUNTRY
1	First National Bank Botswana	Botswana
2	Barclays Bank Botswana	Botswana
3	Stand Chartered Botswana	Botswana
4	Lethego holdings	Botwana
5	Ecobank Transnational Inc	Ghana
6	Standard Chartered Bank Ghana	Ghana
7	Ghana Commercial Bank	Ghana
8	Cal Bank	Ghana
9	Societe General Ghana	Ghana
10	Hfc Bank Ghana	Ghana
11	Equity Group Holdings	Kenya
12	Kenya Commercial Bank	Kenya
13	Standard Chartered Bank Kenya	Kenya
14	Barclays Bank Of Kenya	Kenya
15	Diamond Trust Bank Kenya	Kenya
16	Cfc Stanbic Of Kenya	Kenya
17	Nic Bank	Kenya
18	Cooperative Bank of Kenya	Kenya
19	National Bank Of Kenya	Kenya
20	Standard Bank Malawi	Malawi
21	First Merchant Bank	Malawi
22	Nbs Bank Malawi	Malawi
23	National Bank of Malawi	Malawi
24	SBM Holdings	Mauritius
25	Fnb Namibia Holdings	Namibia
26	Guaranty Trust Bank	Nigeria
27	Zenith Bank	Nigeria
28	Access Bank	Nigeria
29	United Bank For Africa	Nigeria
30	Stanbic Ibtc Holding	Nigeria
31	First Bank Holding	Nigeria
32	Fidelity Bank	Nigeria
33	Sterling Bank	Nigeria
34	First City Monumental Bank	Nigeria
35	Diamond Bank	Nigeria
36	Wema Bank	Nigeria
37	Union Bank	Nigeria
38	Standard Bank Group	South Africa
39	Firstrand	South Africa
40	Barclays Africa Group (Absa Bank)	South Africa
41	Nedbank Group	South Africa
42	Capitec Bank Holdings	South Africa
43	Stanbic Bank Uganda	Uganda
44	Development Finance Uganda	Uganda
45	Bank of Baroda	Uganda
46	Standard Chartered Bank Zambia	Zambia
47	Investrust Bank	Zambia
48	Zambia National Commercial Bank	Zambia
49	Cbz Holdings	Zimbabwe
50	Fbc Holdings	Zimbabwe

Source: Author's compilation, 2018.

EVOLUTION OF FAMILY BUSINESSES – A 3D THEORETICAL APPROACH

Júlia Tobak*, András Nábrádi
Department of Business Management, Faculty of Economics and Business Administration University of Debrecen, Debrecen, Hungary
tobak.julia@econ.unideb.hu
nabradi.andras@econ.unideb.hu

Abstract: *According to international literature there are many researches about family businesses. Examining and evaluating these kinds of businesses is a complex task because it is hard to take into account every influencing factor which have an impact on the operation of family businesses. The purpose of this study is to present a new theoretical method and model which is applicable to measure the development of family businesses from three dimensions: (1) family, (2) business and (3) ownership. The new theoretical model is suitable for carrying out such cross-sectoral and international comparative statistical analyses. The three attributes of family businesses may be measured, evaluated and analyzed separately and/or in combination. It is suitable for doing aggregated analysis of one or more companies. The (1) family dimension presents wich generation/generations operates the business. The dimension of (2) business shows the level of separation of tasks between family and non-family members and gives an answer how the management and the ownership functions are separated. The (3) ownership dimension shows the ownership state of examined businesses and can clarify the stage of the ownership structure. The simultaneous or separate examination of dimensions can assist to family businesses to measure their own status. The TONA model is applicable to measure the evolution of family businesses and can show the differences between sectors or countries in an illustrative way.*

Keywords: family businesses, new theoretical method, evaluating dimensions, cross-sectoral analysis, international comparative analysis, TONA model

JEL Classification: *C51, D21*

1. Introduction

On Fortune's list of the world's 50 largest businesses, among such corporations of global scale and reputation as, for example, Apple, HP, Amazon, AXA, Allianz, the Bank of China, Daimler, Toyota, Honda, Ford Motor, Royal Dutch Shell, Exxon Mobil, Samsung, and GE, there are some that are in family ownership. These companies include Wal-Mart, Volkswagen, Berkshire Hathaway, Ford and Exor, which operate under family control (Datashown, 2016). One of the oldest American companies is in the hands of the Zildjian family, cymbal-makers originally from Turkey, which is already at the 16th generational transition. Approximately one-third of the 500 companies on the American S&P stock market index are also family businesses. What might be the world's oldest family business is the 1300-year-old Houshi hotel and spa in Japan, which has been operating for 46 generations (vs.hu, 2015).

The registered headquarters of the world's top family businesses are located in the G20 countries (with the exception of Switzerland), in the United States of America, Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, South Korea, Switzerland, Denmark and the Benelux countries.

* Corresponding author: Júlia Tobak

From among the newly industrialized BRICS countries, there is hardly any information available on family businesses in Russia and the South African Republic. The PwC Network (PricewaterhouseCoopers) surveyed the situation of Russian private and family businesses in 2014-2015 (PwC, 2014). The annual turnover of more than half of the 57 businesses with a strong market position which were examined exceeded USD 101 billion. The survey typically included young companies with a history of only 20 years, with only a handful of them being 50 years old. It may also follow from the above that the first generation is still present in 95% of them, and there was no third- or fourth-generation company in the sample (PwC, 2014). On the basis of their distribution among different industries, the majority of them are active in manufacturing and commerce. The businesses surveyed are present, among other fields, in diversified industrial products, agriculture and the logistics sector. It also emerges from the survey that only 26% of the respondent companies have considered the option of transferring the business within the family (PwC, 2014).

On the basis of the information available on the website of FABASA (The Family Business Association of South Africa), the list of Nsehe (2014) on the 10 leading companies in Africa, as well as the 2016-2017 survey conducted by PwC (2017), it can be concluded that South African family businesses constitute the backbone of the African economy. The list of leading family businesses in Africa includes companies with annual revenues of USD 50 million or more, with the share capital controlled by family members in at least the second generation, and the family controlling at least 30% of the company's voting. The businesses on the top 10 list are active in the luxury goods market, and in construction, agriculture and banking.

Family businesses operating in different regions of the world have to face a variety of economic, political, social and cultural challenges.

The facts and figures are summarised on the basis of the 2017 survey conducted by Ernst and Young (EY, 2017) for the individual regions, in which the characteristics of the TOP 500 family businesses (average age, GDP produced, employee percentage) are presented. Based on a distribution according to sectors, most of the world's top 500 family businesses are active in the secondary sector, with the fewest in the primary sector.

On the basis of the available data, the top 25 family businesses in the global ranking generated an average of nearly USD 101 billion in 2015.

According to the Motion For A Resolution By The European Parliament (2015), family businesses contribute to economic stability; in some EU Member States they account for a large share of the total turnover of all businesses and thus make a significant contribution to job retention, creation and growth and to the economic success of the country concerned. They are engaged in transnational activities, "a significant share of family businesses in Europe have a transnational dimension and carry out their activities in different Member States".

They make a major contribution to the competitiveness of Europe, and play a significant role in the private sector, as they account for the largest proportion of job opportunities. They are flexible and able to adapt quickly to changes in the eco-social environment. Their equity ratio is significantly higher than in case of non-family businesses. 87% of family businesses are convinced that maintaining control of the business is one of the key factors of success.

The motion highlights its recommendations concerning the challenges faced by family businesses, such as the issues of education and taxation, which are important from the point of view of business continuity. It also includes a recommendation for inheritance law, which is an issue belonging to the competence of Member States, and emphasises the dangers inherent in excessive bureaucracy.

The presence of family-owned enterprises has a significant impact on the operation of the economy as a whole. There is a growing body of research published in the international literature related to the operation of family businesses; however, no research findings are known to provide an international and cross-sectoral aggregated analysis of family-owned

enterprises. The aim of this paper is to present the TONA model (TONA is an acronym from the initials of the authors' name - Tobak, Nábradi), which is suitable for carrying out such cross-sectoral and international comparative statistical analyses.

2. Literature review

The family, as an institutional system, has been the basic unit of society since prehistoric times.

Family businesses are a popular form of enterprise throughout the world. There are numerous definitions of family businesses, but there is no standardized, universally accepted one. We can find, however, some common elements in all definitions that need to be taken into consideration and examined to determine whether an organization is a family business or not (Miller et al., 2007; Cano-Rubio et al., 2017; Csákné, 2013; Tobak et al., 2018). Some of the generally accepted elements used in the definition of family businesses concern ownership, management, control, generations, and the intention to pass the business down as an inheritance within the family (Ramadani and HOY, 2015; De Massis et al., 2012; Nagy, 2007). The family business is an organization in which the control and management tasks are generally provided by multiple members of the same family – even across multiple generations (Miller et al. 2007).

A family business is an enterprise in which the majority ownership and/or majority control belongs to the same family, and at least one family member actively works in the business.

In the case of traditional businesses, we can only talk about the relationship of ownership and business, while in case of family enterprises, we can speak of the relationship/combination of family, business and ownership. These three concepts have a determining role in the definition of family businesses. The so-called "three-circle model" plays a key role from the point of view of our research project (Tagiuri and Davis, 1982; Matsuhashi, 2013).

Gersick et al. (1996) drew up their model based on an examination of the life cycles of businesses. Their model depicts family businesses in the three dimensions already discussed (family, business and ownership), and also makes it possible to conduct analyses according to the three dimensions.

On the basis of their approach, family businesses can be of the following 4 types:

- first-generation businesses owned and managed by the founder;
- fast growing, established businesses owned by siblings;
- complex enterprises owned by a consortia of mature cousins;
- businesses preparing for generational succession, controlled by a family preparing to hand the business over (Csákné, 2013; Tobak et al., 2018; Nábrádi et al., 2016).

3. Methodological approach

The purpose of this paper is to present a theoretical model. Taking the work of Gersick et al. (1996) as a basis, the depiction according to the three dimensions has been developed further in the interest of elaborating a newer method suitable for cross-sectoral and international comparative analyses. The TONA model makes it possible to analyse family-owned businesses along the family – business – ownership dimensions (Figure 1).

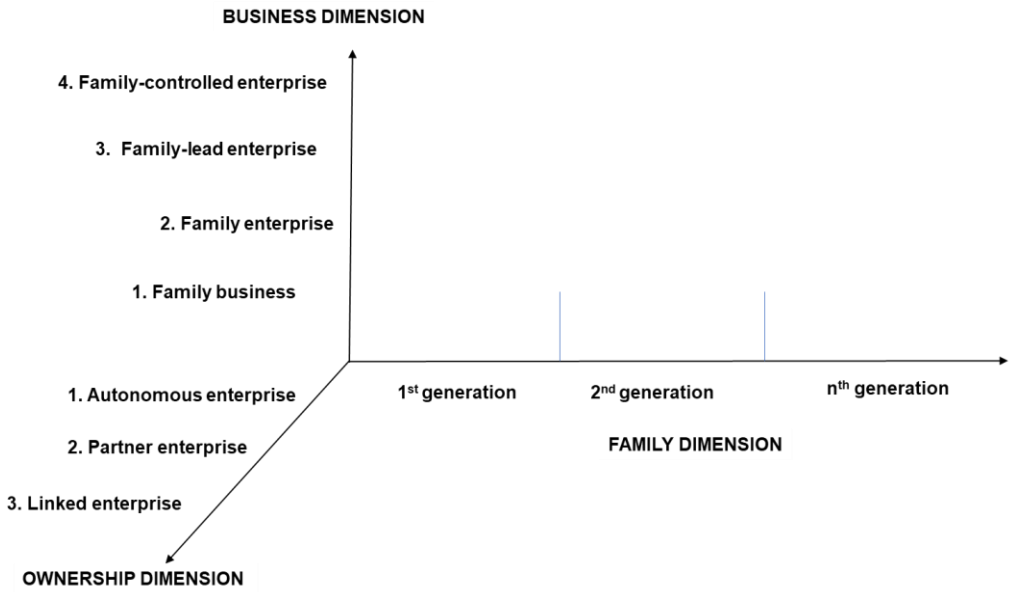

Figure 1: TONA model
Source: Authors' own editing (2018)

The TONA model allows attributes of family businesses to be measured, evaluated and analysed separately and/or in combination. The model is suitable for making an aggregated analysis of one or more companies. The simultaneous or separate examination of the development of dimensions can assist family businesses in measuring their own status and helps to compile a nationally relevant and comparable database. With this method it would be possible to make a cross-sectoral and international comparative statistical analysis of family-owned enterprises.
The TONA model is applicable to measuring the evolution of family businesses and can show the differences between sectors or countries in an illustrative way.
In order to conduct comparative analyses, it is necessary to survey the members of the family business sector. For the analysis and joint depiction of all three dimensions, we must examine which life cycle of maturity/development the businesses are in.

3.1. Family

In the model set up by Gersick et al. (1996), the stages of family development can be described by four separate phases building upon each other.
The (1) family dimension is defined by the sequential number of the generation operating the business at that point. If the aim is to carry out cross-sectoral or international comparative, aggregated analyses, it is sufficient to answer the question:

"Which generation is currently operating the family business?"

The TONA model is also suitable for determining and expressing in a quantitative way, as accurately as possible, where the family business currently stands in the process of generational succession.
However, it should be added as a general remark that the generational succession should only be expressed as a percentage when individual analyses are carried out.

3.2 Business

As proposed by Gersick et al. (1996), the business axis can be divided into 3 stages. The start-up, expansion/formalisation and maturity stages can be interpreted independently from the form of the business. When drawing up the development stages in the business dimension of the TONA model, the development lifestyle stages formulated by the were taken into consideration. In putting together the content of the dimension Family Business Network (FBN-H, 2017), an important aspect was to emphasize that the business operated on family foundations, and definitely complies with the definition describing family businesses.

The dimension of (2) business shows the level of separation of tasks between family and non-family members. That dimension gives an answer to the question of how the management and the ownership functions are separated. The development of today's family businesses can be divided into four stages (FBN-H, 2017). A business may be placed in the various stages of development on the basis of the ownership shares of the family members, as well as what is known about their participation in the operational, tactical and strategic activities; the individual stages are separated on the basis of these characteristics. In the course of establishing the characteristics of the individual stages, properties referring to the size of the business are also included (European Commission, 2005) (Table 1).

Table 1: The characteristics of the development stages of the family company according to business dimension

Number and name of the stage	Present generations	Percentage of family ownership (%)	Company size	Decision making of family members	Management	TONA value of the stages *
1. Family business	1st	100%	micro and small-sized	operational, tactical, strategic	family	1/4=0,25
2. Family enterprise	1st and 2nd	51%	micro and SMEs	operational, tactical, strategic	family and external	2/4=0,5
3. Family-lead enterprise	(1st), 2nd, 3rd	51%	micro, SMEs and large	mainly strategic, (less operational and tactical)	mainly external	3/4=0,75
4. Family-controlled enterprise	(1st, 2nd), 3rd, nth (at least 2-3 generations are working together)	51%	micro, SMEs and large	strategic	external	4/4=1

*B=business (current number of the stage/4)
Source: Authors' own work

3.3 Ownership

In the interpretation of the classic model, the (3) ownership axis separates 3 categories. In defining the development statuses, Gersick et al. (1996) placed family and other relationships at the centre, and therefore the categories of controlling owner, sibling partnership and cousin consortium were formulated in their model.

The stages expressing the dimension were changed to align with the purpose of the paper. It was an important consideration on the part of the authors that it should be easy to measure and delimit the stages of ownership, and the pertinent information should be accessible potentially on the basis of other databases. The European Commission published the categories describing ownership shares in the SME Handbook (European Commission, 2005).

The definition of SMEs distinguishes three categories of enterprises, each of which corresponds to a type of relationship that may connect one enterprise with another. The distinction is necessary to obtain a clear picture of the ownership status of the business. This dimension shows the ownership state of examined businesses and can clarify the stage of the ownership structure. It can show the type of the family enterprises. The three categories that can express the ownership characteristics are the autonomous, the partner and the linked types of companies.

In the case of this dimension, once again, objective measurability was an important consideration, and therefore an index number was assigned to each category to describe it (Table 2).

Table 2: The ownership dimension

Name of the stage	**Capital share in other enterprises**	**Number of the stage**	**TONA value** *O=Ownership* current number of the stage/3 (number of stages)
Autonomous	0-25%	1	1/3=0,33
Partner	25-50%	2	2/3=0,67
Linked	>50%	3	3/3=1

Source: Authors' own work

For the assessment of these three ownership categories, it is necessary to find out about the ownership of any other enterprise that the family business may have a capital share in. If that other enterprise is also owned by another family member, both enterprises need to be examined in aggregate.

In case of questions of ownership, it is also important to consider control in the legal sense of the word. It is on the basis of control that we can decide whether the given business is to be considered as a linked company. It is not only the company's capital or participation that need to be examined, but also the control exercised over the other business.

4. Theoretical cases

The interpretation in the TONA model can be applied for the analysis of the dimensions separately and also in aggregate. There are some combinations of cases the interpretation of which is not possible. For example, on the basis of the definitions as described, a first-generation family business cannot be considered a family-led or family-controlled enterprise, and in this case the principle of development life cycles will be applicable. Figure 2 shows a few fictitious cases. The fictitious cases may describe an individual enterprise, but are also suitable for the comparison of the family businesses of the primary, secondary and tertiary sectors in such a way that the averages of the values of the businesses analyses are used.

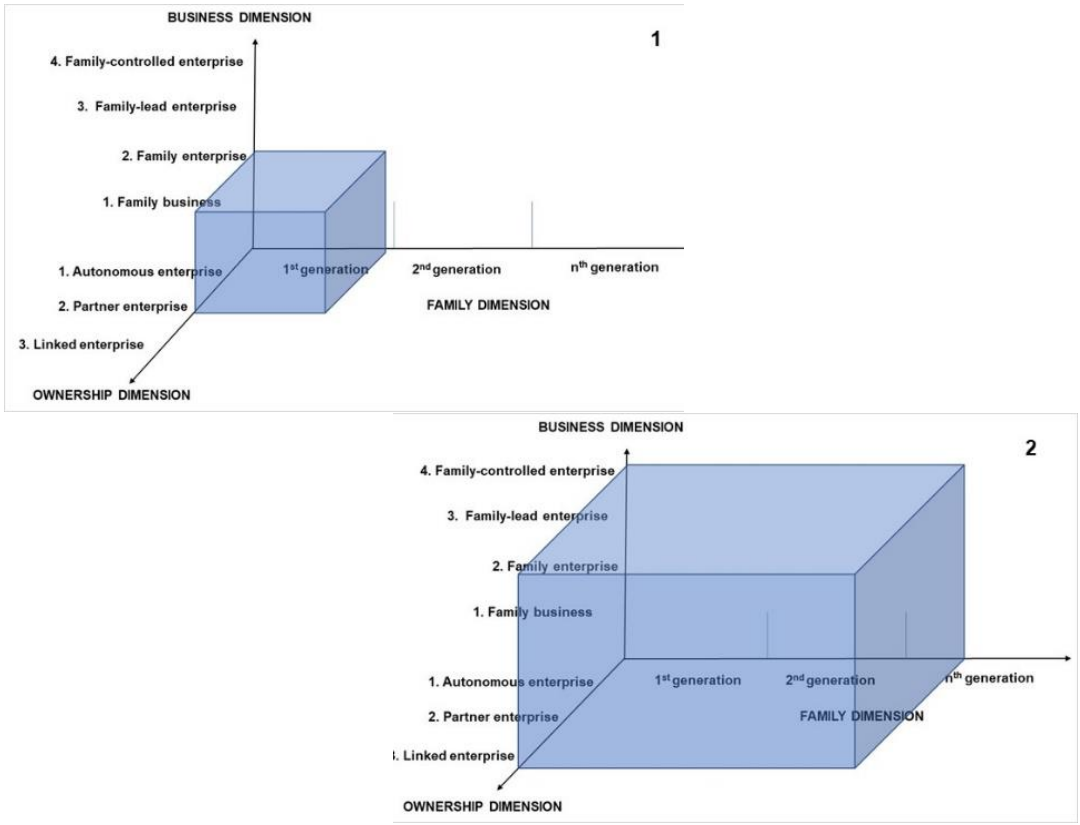

Figure 2: Examples to illustrate the TONA model
Source: Authors' own editing

The aggregated TONA value can show the volume of the rectangular and express the state of the examined business or businesses (individual family businesses, company groups, sectors, industries or nations) in an illustrative and objective way.
In Table 3, two fictitious, theoretical cases are presenting the interpretation and explanation of the TONA value.

Table 3: The explanation of the fictitious examples

Case no.	Description	TONA values of the dimensions			
		Family (F)	**Business (B)**	**Ownership (O)**	**Aggregated TONA value** *Volume of the rectangle* **(F*B*O)**
1.	First-generation family enterprise operating in the form of a partner company	0.8	2/4=0,5	2/3=0,67	0,268
2.	n^{th}-generation linked company, which can already be placed in the category of family-controlled enterprises	N	4/4=1	3/3=1	1n

Source: Authors' own editing based on fictitious cases (Figure 2.)

5. 1. Conclusions

The paper proposes a methodology for the assessment of the development/maturity life cycles of family-owned enterprises. The method, which is suitable for carrying out comparative statistical analyses, allows us to make an individual or aggregated interpretation of the three dimensions. The family-business-ownership dimensions express the current condition in an objective, quantitative way, which is applicable to individual family businesses, company groups, sectors, industries or entire nations. With the help of the model, cross-sectoral and international comparative statistical analyses may also be conducted.

The family dimension of the methodology, together with the fine-tuning, may help individual family enterprises in assessing where exactly they stand in the process of generational succession. Knowledge of this may be beneficial in thinking over/elaborating the strategy of generational succession.

When conducting international comparative analyses, it may be worthwhile and also enlightening to examine and/or ask the question whether the enterprise is to be considered as a conglomerate. Presumably, this may be typical in the case of family businesses launched several generations ago, which are characterised by familial relationships which are so extensive they make it possible for them to be active in several sectors.

Further research needs to be conducted to test the usability of the TONA model in practice. Before commencing the practical testing of the theoretical model, it is necessary to engage in primary and secondary research, to prepare smaller analyses and case studies, as well as to obtain feedback in connection with the model, which will allow the refining of the method, and a more accurate and more detailed definition of the factors determining the dimensions.

Acknowledgement

The authors express their gratitude to the Faculty of Economics and Business Administration of the University of Debrecen. This work was supported by EFOP3.6.3-VEKOP-16-2017-00007 — “Young researchers for talent”—Supporting careers in research activities in higher education program.

References

Cano-Rubio, M., Fuentes-Lombardo, G., Vallejo-Martos, M.C., 2017. Influence of the lack of a standard definition of “family business” on research into their international strategies. *European Research on Management and Business Economics* 23 (2017), pp. 132–146. DOI:10.1016/j.iedeen.2016.10.002

Csákné Filep J., 2013. Családi vállalkozások – fókuszban az utódlás [Family enterprises – Focus on succession]. *Doctoral dissertation*. Corvinus University of Budapest

De Massis, A., Sharma, P., Chua, H. J., Chrisman, J. J., Kotlar, J., 2012. Family business studies: An annotated bibliography. *Cheltenham: Edward Elgar Publishing*

European Parliament, 2015. Report on family businesses in Europe. (2014/2210(INI). Available at: http://www.europarl.europa.eu/sides/getDoc.do?type=REPORT&reference=A8-2015-0223&format=XML&language=HU. Date of downloading: 4 January 2018.

European Commission, 2005. *The new SME definition. User guide and model declaration*. Enterprise and Industry Publication

EY, 2017. *Family Business Yearbook 2017*. Available at: https://familybusiness.ey-vx.com/insights/family-business-yearbook-2017.aspx. Date of downloading: 15 January 2018

Family Business Network (FBN-H), 2017. *The stages of development of family businesses*. Working material.
Gersick, K. E., Hampton M. M., Ivan Lansberg, Davis, J. A. 1996. Generation to Generation: Life Cycles of the Family Business, *Harvard Business School Press*.
Matsuhashi, K., 2013. An introduction to the challenges & rewards of family owned businesses. On-line: http://www.slideshare.net/kmatsu81/family-business-101. Date of downloading: 10/02/2016.
Miller, D., Breton-Miller, I., Lester, R. H., Canella, A. A. Jr., 2007. Are family firms really superior performers? *Journal of Corporate Finance,* 13, pp. 829-858. DOI:10.1016/j.jcorpfin.2007.03.004.
Nábrádi A., Bárány L., Tobak J., 2016. Generációváltás a családi tulajdonú vállalkozásokban: Problémák, konfliktusok, kihívások, elméleti és gyakorlati megközelítés. [Generational succession in family-owned businesses: Problems, conflicts, challenges, theoretical and practical approaches]. *Gazdálkodás* 5, pp. 427-461.
Nagy A., 2007. Analysis of the Expected Income of several family types. *Abstract - Applied Studies In Agribusiness And Commerce* 1 (1), pp. 49-51.
Nsehe, M., 2014. *The 10 Leading Family Businesses in Africa*. Available at: https://www.forbes.com/sites/mfonobongnsehe/2014/01/08/the-10-leading-family-businesses-in-africa/#6558e22e7c4a. Date of downloading: 22 January 2018
PwC, 2014. *Private and family business in Russia: challenges and growth drivers for today and tomorrow*. Available at: http://en.smb.gov.ru/files/images/PFBS_report_RUS_final.pdf. Date of downloading: 20 January 2018
PwC, 2017. *Family Business Survey. New vines from strong roots*. South African edition 2016/2017. Available at: https://www.pwc.co.za/en/assets/pdf/family-business-survey-2016.pdf. Date of downloading: 22 January 2018
Ramadani, V., Hoy, F., 2015. Context and Uniqueness of Family Businesses. *Family Businesses in Transition Economies*, 9–37. DOI:10.1007/978-3-319-14209-8_2
Tagiuri, R., Davis, J. A., 1982. Bivalent Attributes of the Family Firm. *Family Business Review*, 9 (2), pp. 199- 208. DOI:10.1111/j.1741-6248.1996.00199.x
The 50 largest corporations by revenue and industry, 2016. https://www.datashown.com/blog/2017/1/4/the-50-largest-corporations-by-revenue-and-industry. Date of downloading: 26 January 2018
Tobak, J, Nagy, A., Pető, K., Fenyves, V., Nábrádi, A., 2018. The main factors determining effective operation in case of a family business. *International Journal of Entrepreneurial Behaviour and Research.* 24 (6), pp. 1065-1074
vs.hu, 2015. Család? Vállalkozás? A legtöbben egyszerre csinálják [Family? Business? Most do it simultaneously]. Available at: https://vs.hu/gazdasag/osszes/csalad-vallalkozas-a-legtobben-egyszerre-csinaljak-0417#!s2. Date of downloading: 5 February 2016

Bio-notes

Júlia Tobak, completed her PhD studies at the *Faculty of Economics and Business Administration University of Debrecen*. The main research field of her is the examination of the operation of businesses. As a young reseracher she focuses on the analysis and the strategic decisions of family owned entreprsises. She is participating the education of business economics, entrepreneurship, introduction of businesses and projectmanagement.

András Nábrádi is a Professor, CSc, PhD, Habil. of economics in the *Faculty of Economics and Business, University of Debrecen, Hungary.* The main directions of the research fields are related to the study of strategic management, problems of family owned business,

sectorial economy, risk management and nowadays on collaborative platform-based economy. Member of the Public Body of the Hungarian Academy of Sciences (HAS), Chair of the Ag. economics Committee of the Agricultural Division of the HAS, in Debrecen Executive Board member of the International MBA Network 'AGRIMBA' (2000-2015) Elected president of European Society of Agronomy (2010-2012), Elected president of the Hajdú-Bihar County Division of Hungarian Association of Economists (2014). Editorial Board Member of Delhi Business Review (India), Economics of Agriculture (Serbia), The Annals of the University of Oradea Economic Sciences (Romania), Economic and Regional Studies (Poland), NUML International Journal of Business & Management (Pakistan) Deputy editor of: Applied Studies of Agribusiness and Commerce APSTRACT (Hungary, Debrecen). Total number of his publications is 528, total number of citations is 1066, Hirsch- Index is 13.

DOES ETHNIC AFFILIATION AFFECT THE CHOICE TO BE SELF-EMPLOYED? CASE STUDY ON THE LABOR MARKET IN ISRAEL

Iyad Snunu*, Nicoleta Sîrghi
Doctoral School of Economics, Faculty of Economics and Business Administration, West University of Timisoara, Timișoara, Romania
eyadsnunu@gmail.com
nicoleta.sirghi@e-uvt.ro

Abstract: *The aim of the paper is to empirically examine the variables that influence the choice of economic status, with emphasis on the differences between Arabs and Jews in Israel regarding this economic choice. Self-employed workers - business owners or entrepreneurs - are the force that contributes to the progress of individuals, companies and countries and are, therefore, an important factor for economic policy makers. The sector of self-employed workers - despite the numbers above - is a tier of significant specific attention in the workforce. However, so far, the self-employed sector has not received the proper attention in the literatur. The results indicate differences in the economies in which Jews and Arabs work as self-employed workers, and it is evident that there are areas that are more typical of self-employed Jews or self-employed. The industries in which the self-employment rate is advantageous or equitable for the self-employed are vehicles (sales and repair), electricity and water supply, banking and insurance. The first two areas do not require higher education, and can be associated with neighborhood / home services that characterize the self-employed in this level of education. In contrast, in education, public administration and construction, Jews had a considerable advantage in the employment rate as self-employed.*

Keywords: labor market, self-employed workers, economics of gender, supply and demand for labor

JEL classification: J15, J16, J21, J10, J11

1. Introduction

Over the years, research in Israel and the world has not explored the self-employed sector as part of the workforce in the economy in depth, and has not extensively and systematically discussed the self-related characteristics e.g., the common areas of self-employment, their income level, and gender, ethnics, national and behavioral aspects. These aspects might characterize self-employed versus paid employees or salaried-working in the economy. The lack of proper attention can be attributed to the relatively low numerical value of the self-employed in the various systems of the economy in most states' economies (Hamilton, 2000).

In Israel, looking at the last three population censuses conducted there raises the following picture; the proportion of self-employed in the workforce did not vary significantly between the three censuses. In 1983, the self-employment rate was 12.9%, in 1995 the self-employment rate was 13.0%, and in 2008, the rate was 13.4%. However, during these years the number of independent women increased from 20,000 in 1983 to about 93,000 in 2008. In addition, the proportion of self-employed women doubled from 15.7% to 29.4%, and their weight among all women participating in the workforce increased from 5.5% to 8.5%.

* Corresponding author: Iyad Snunu

From a macroeconomic perspective, it is noticeable that they have undergone far-reaching political-economic and societal changes, beginning with the 1977 political upheaval and the continuation of the economic stabilization emergency in July 1985, which marked the beginning of a de facto reduction of Israeli government involvement.
Changes in the economic outlook were manifested in a variety of aspects, such as a significant reduction in the flow of government investment and credit to the economy, developing and expanding employment opportunities, and providing greater space for the involvement of private parties in large parts of the economy, which was reflected, among other things, in increasing the number of public sector employees.
The structure of the paper is as follows: Section 2 presented the literature review; Section 3 presented the methodology; Section 4 presented the results of the regressions; and the conclusions and future research are given in Section 5.

2. Literature review

Based on prior works (e.g., Clark and Drinkwater, 2010; Blanchflower, 2004; Heim, 2015; Minola et al., 2016; Lombard 2001), and data available for the study, we examined twelve variables as have a probability of influencing the choice to be self-employed: nationality, gender, age, education, marital status, number of children, apartment ownership, occupation, industry, area of residence, country of birth and year of emigration to Israel.
Both the positive factors (Pull Factors) and the negative factors (Push Factors) are weighty motives that influence the decision of national, ethnic and religious groups and minorities to work as self-employed and business entrepreneurs (Clark and Drinkwater, 2010). The positive factors relate to the various personal resources held by the national, ethnic and religious group member, such as: culture, level of education, professional experience, etc. The negative factors are related to barriers to absorption and integration into the labor market and lack of job and employment opportunities.
These barriers stem from a policy of discrimination and deprivation, intentional or unintentional, on the part of the authorities at both the national and regional and local levels, the lack of proficiency in the majority, which is the dominant language in the state, and the lack of proficiency in dealing with various governmental, public and private bureaucracy mechanisms (Clark and Drinkwater, 2010; Waldinger and Aldrich, 1990) therefore, owning a business provides the minority with the opportunity for self-certification and career development in the quest for economic and social progress (Glazer and Moynihan, 1970) and success (McManus, 2001; Fairlie, 2007).
Discussion of the issue of self-employment among ethnic minorities reveals an inconclusive situation: Many studies in the literature have documented a tendency for minority people to choose self-employment as a way to get higher returns for their human capital (Portes and Jensen 1989; Waldinger et al. 1990; Le 1999; Clarck and Drinkwater 2000; Fairlie 2007). However, minority members may be in a state of lack of financial resources and social capital needed for self-employment (Aronson, 1991; Hout and Rosen, 2000; Robb and Fairlie, 2007), or in a situation where business owners suffer discrimination from lenders, suppliers, or customers (Coate and Tennyson, 1992; Blanchflower, 2004).
The flexibility of self-employment is very important to women, because despite all the changes and social and economic transformations, even in modern-day Israeli society (as in other Western European and North American societies, which are not characterized by traditionalism and conservatism as before), women still carry most of the burden of household management and raising children. Existing evidence suggests that flexibility is indeed a significant factor in women's choice to work as self-employed (Carr, 1996; Lim, 2015), but not among men seeking employment (Boden, 1999; Dawson et al., 2009), because women seek appropriate balance between continuing to perform family tasks

(household management, childcare) without interruption, and finding a source of income over time, even though independent work is without job security.
Various sectors offer jobs that require the employee to have an appropriate and relevant professional academic education, thus blocking the education brings a person of low and medium education to work as an independent (Kangasharju and Pekkala, 2002). This offsets the correlation between education and independent work (see, for example, Luber et al. 2000; Boden, 1996; Lohmann and Luber, 2004; Arum and Müller, 2004).
Several studies have pointed to age as a factor that influences a person's decision to become independent. Regarding human capital and experience (often related to age), age is often found to be positively related to independent employment (Aronson, 1991; Parker, 2009).
Self-employment tends to be concentrated in sectors such as construction and services. Therefore, in economies where these sectors are relatively large, more self-sufficiency is expected (Aronson, 1991; Arum and Müller, 2004; Parker, 2009).

3. Methodology

This study addresses two research questions: Does ethnicity influence the choice of economic status in Israel? What are the characteristics of the self-employed among Israelis? Analysis of the variables will include reference to education and demographic characteristics among various ethnic groups in Israel. The research will be conducted in the Israeli economy, where the Jewish public is the majority and the Arab public is included in the minority group. Although the minority group in this study does not consist of immigrants, in many ways the situation of the Arabs in the State of Israel is like immigrants in European countries.
Based on the literature review above, we constructed 15 hypotheses as follows:

H_1*: along with the individual's personal characteristics (such as education and gender), there was a relationship between his affiliation with the ethnic (or religious or cultural) group and his choice to be independent and non-salaried*

H_2 *: Women are less likely to be self-employed than men;*

H_3 *: Education has a positive impact on the choice of independent employment;*

H_4 *: Experience and age are positively associated with independent employment;*

H_5 *: The rate of self-employment is higher among married;*

H_6 *: Large number of children may predict independent employment;*

H_7 *: Professional and skilled workers tend to be more independent than unskilled workers in both nationalities;*

H_8 *: Independent employment rate is higher in denser areas of Israel;*

H_9 *: Immigration (for Jews only) is positively related to independent employment;*

H_{10} *: Owning an apartment (as a marker of individual wealth) increases the chances of being independent;*

H_{11} *: There is an interaction between the economic branch and nationality in predicting independent employment;*

H_{12} *: There is an interaction between education level and nationality in predicting independent employment;*

H_{13} *: There is an interaction between marital status and nationality in predicting independent employment;*

H_{14} *: There is an interaction between the number of births and nationality in predicting independent employment;*

H_{15} *: There is an interaction between apartment ownership and nationality in predicting independent employment.*

The data in this work is taken from the 2008 State Census, as it provides the most comprehensive and reliable picture of the population at the "determining point" (the time point referred to by the census). Contrary to studies that sample a small portion of the population, census data is collected on a representative sample that is 20% of the state's population, and therefore inferences based on census data will be more reliable and accurate.

The original data was grouped by CBS into categorical variables, and some of the categories were grouped for the present study. All absentees under 24 or over 70, or absentees whose employment status is unknown, or kibbutz members - were omitted from the analysis. The Logit probability model was used in the study, where the probability that a specific individual would be independent is:

$$\Pr(y_i = 1 \mid x) = \Pr(y_i^* > 0 \mid x_i) = \Pr(\varepsilon_i \le x_i\beta \mid x_i) = F(x_i\beta) = \frac{\exp(x_i\beta)}{1+\exp(x_i\beta)} \quad (1.1)$$

When a latent variable that is linearly related to the values of the following equation (1.2):

$$y_i^* = x_i\beta + \varepsilon_i \quad (1.2)$$

And the latent variable is related to the binary variable by the following equation (1.3.):

$$y_i = \begin{cases} 1 \text{ if } y_i^* > 0 \\ 0 \text{ if } y_i^* \le 0 \end{cases} \quad (1.3)$$

When, the error has a standard logistic distribution $\mathcal{E}$ with zero expectation and variance $\pi/3$.The explained variable receives a value of 1 if the person is independent and 0 if another, anyone who is independent in the original data, is considered independent for the purposes of the analyzes, whether or not they employ other employees. Employees receiving wages were considered salaried $X = (x_1, x_2, \ldots, x_K)$ .To examine the effect of each variable on the employment status, a odds ratio (OR) is used. This measure answers the question: "How much more likely in one group to be independent than in another." Chance in the definition above is the size: Odds $= \frac{p}{1-p}$, Where p = probability of success in the binomial model.

A logistic regression model basically predicts the log-odds ratio with a dependent variable. Therefore, the estimates obtained for the OR are basically estimates of the odds of success (independent), when their dummy variable receives a value of 1, against the reference group. The sample includes 272,823 employees (84.8%) versus 48,833 self-employed (15.2%). The proportion of Arabs who participated in the observation was 11.6%, and the rest, 88.4%, were Jewish. The proportion of self-employed among Arabs is 16.1% and 15.1% among Jews. 100% of the Arabs in the sample were natives of Israel, and among Jews the distribution of country of origin was: 68.7% born in Israel, 14.7% born in the former USSR, 3.3% born in America and Oceania, 3.2% born in Morocco, 3.1% born in Asian countries, 2.6% born in Africa, 1.4% were born in Romania and 2.9% were born in the remaining European countries. Among Jews, immigrant rates were as follows: 5.4% immigrated in 1960 or before, 4.9% in 1961–1971, 3% in 1972–1979, 2.8% in 1980–1989, 6.6% in 1990-1991, 8.6% after 1992 and the rest were born in Israel.

Table 1 shows that among Jews, the distribution between men and women is equal (about 50% each gender), among Arabs, about three-quarters of the sample are men and about a quarter are women. In addition, among the Arabs, the young groups (25-49) constitute the bulk, 86.6%, while the above groups constitute only 68.3% among the Jews, while the older groups (65-69) constitute 31.7% compared to only 13.4% among the Arabs. One can see that the Arabs have a significant underrepresentation in the "other" family situation (including divorced, divorced and widowed), 2.3% among Arabs versus 9.8% among Jews, and at lower levels of education (primary and secondary) Arabs reach 65.8% versus 45.3% among

Jews. Only, and as the academic ladder rises, the gap is reversed for the benefit of the Jews. Most of the Jews (48.5%) are in the Central and Tel Aviv area, while most of the Arabs (52.3%) are in the north, 17.8% are in Jerusalem and 16.4% in Haifa. In the rest of the country (ie in the south, central, Tel Aviv and Judea and Samaria), Arabs are at a very low percentage: 5.8%, 6.7%, 1% and 0% respectively. The occupation category found that 36.8% of Arabs work in industry and building, compared to only 13.1% among Jews, and while about 24.1% of Jews work as officials and administrators, only 9.9% of Arabs are employed in this category.

Table 1: Descriptive statistics

Arabs	**Jews**	**Occupation**		**Arabs**	**Jews**	**Gender**
10.30%	6%	Non-professional workers		75.10%	49.90%	Male
9.20%	17.70%	Academic profession		24.90%	50.10%	Female
15.20%	17.90%	Free profession/ technician		**Arabs**	**Jews**	**Age**
2.90%	7.30%	Manager		41.20%	29.90%	25–34
7%	16.80%	Employee		45.40%	38.40%	35–49
16.70%	19.60%	Agent/salesman		13.40%	31.70%	50–69
1.90%	1.59%	A skilled agricultural worker		**Arabs**	**Jews**	**Marital Status**
36.80%	13.10%	Industry and building		13.30%	14.80%	Single
Arabs	**Jews**	**Economic sector**		84.40%	75.50%	Married
2.50%	2.10%	Agriculture		2.30%	9.80%	Other
12.80%	14.30%	Industry		**Arabs**	**Jews**	**Educational level**
0.40%	0.80%	Electricity and water		33.50%	8.40%	Elementary school
15.40%	3%	Construction		32.30%	36.90%	Secondary school
15%	11.80%	Vehicle		29.40%	40.60%	BA degree
4.50%	3%	Hospitality and restaurants		4.10%	12.50%	MA degree
8.30%	6.70%	Transportation and communication		0.70%	1.60%	PhD
1.20%	4.30%	Banking and insurance		**Arabs**	**Jews**	**Area of living**
7.40%	15.30%	Real Estate and Rentals		6.70%	28.30%	Center
3.90%	5.70%	Public administration		17.80%	8.70%	Jerusalem
16.50%	14.80%	Education		1%	20.20%	Tel-Aviv
7.80%	11.30%	Health and welfare		16.40%	10.90%	Haifa
3.30%	5.50%	Community and service		5.80%	15%	South
0.70%	1.20%	Household		52.30%	11.90%	North
0.20%	0.10%	Foreign organizations		0%	4.90%	Yehuda an Shomron

Source: own processing

Table 2, which reflects the percentage of self-employed and the percentage of employees both among Arabs and among Jews in a cross-section of educational level, shows that

among individuals without education and among individuals with a secondary education and among individuals with a graduate degree, there is a small gap between the percentage of Arab self-employed and the percentage of Jewish self-employed (17% and 18.8%, respectively, among non-educated individuals, and 18% and 16%, respectively, of those with a high school education, 13.1% and 14.2%, respectively, of graduates). On the other hand, the gaps are widening when it comes to higher education, i.e. graduate and doctorate (PhD), so the percentage of Arab self-employed persons with a degree is 15.2% compared to 12.8% among Jews, and among PhDs, the gap is 5.9% (20.2 % Of independent Arabs hold a doctorate, compared to 14.3% of independent Jews who have a Ph.D.

Table 2: Percentage of self-employed / salaried employees by education level

	Arabs		**Jews**	
	Salaried employees **[%]**	Self-employed **[%]**	Salaried employees **[%]**	Self employed **[%]**
Without education	81.2	18.8	83	17
Secondary-school education	84	16	82	18
Degree	85.8	14.2	86.9	13.1
Qualified degree	87.2	12.8	84.5	15.2
Ph.D.	85.7	14.3	79.8	20.2

Source: own processing

Table 3 below shows the distribution of the number of births (live births only) among Arab and Jewish women.

Table 3: Distribution of the number of births among Arab and Jewish working women

General	**Jewish women**	**Arab women**	**Number of births**
18%	17.5%	24.7%	0
37.9%	38.6%	27%	1-2
36.2%	36.2%	36.3%	3-4
8%	7.7%	12%	+5

Source: own processing

In general, the majority of Israeli families (74.1%) include between one and four births, but when examining in-depth the number of births in the family and the differences between Arabs and Jews, we can find that the proportion of Arab families without births as a whole or between one and two births is lower among Arabs. (24.7% and 27%, respectively, compared with 17.5% and 38.6% among Jews). In the three to four births category we can see that the data are almost identical in both populations, but in the category of five births and above we can see that a gap has opened for the Arabs: 12% among the independent Arabs versus only 7.7% among the independent Jews.

4. Results

For a preliminary examination of the effect of nationality on self-employment, a simple logistic regression model was fitted with a single fee variable for Arab nationality, with the dependent variable being employment status (independent defined as "success" in the binomial model). Estimates of model parameters are presented in the table 4:

Table 4: Parameter estimates in Model 1

Estimator of Standard Deviation	
-1.73*** (0.005)	Intercept
0.082*** (0.015)	Arabs (Dummy)

The dependent variable is the employee's employment status (self-employed = 1 ;else =0)
*, **, *** - significance at 5%, 1%, 0.1%, respectively.
Source: own processing

In Model 1, the Odds Ratio of Arab versus Jewish is = 1.085, which means that the Arab's chance of being self-employed is 1.085 times (i.e. 8.5% greater) than the chances of a Jew being self-employed but, because there are differences in the distribution of salaried and self-employed. In order to extend Model 1, a multiple logistic regression model with dummy variables was adjusted for the different levels of the following demographic variables, in addition to nationality: gender, age, marital status, education, apartment ownership, area of residence and number of births, hereinafter referred to as Model 2.
In order to examine the effect of occupational and economic branch variables, three additional models were adapted- Model 3, which includes Model 2 in addition to the occupational variable; Model 4, which includes Model 2 in addition to the economic branch variable. To extend the knowledge of the occupational and economic branch variables and to examine the effect of migration variables and country of origin, another model was adapted: Model 5, which includes Model 2 and four other variables: economic branch, occupation, country of immigration and year of immigration. Model 4 show that the odds of an Arab relative to the Jew being cut by 5 percentage points (OR = EXP (-0.051) = 0.95028 and thus the probability = 1 - 0.95028 = 0.4972 ≈ 5%).
The above findings can be understood with the help of the variation in the economic sectors between the Arabs and the Jews, and as mentioned, there are such differences and there are economic sectors that characterize the employment of Arab individuals and other economic sectors that characterize the employment of the Jewish individuals.
The coefficients of the sex variable (1 = male) in the four models are significant at 99% significance, and their Odds Ratio values are in the range of 1.6372 (Model 5) to 2.5702 (Model 2), that is, a man's chance of being relatively independent of a woman's, With the other variables being fixed, by about 64% by model 5 to about 157% by model 2).
The regression results show that the younger age groups (over 35 and under 49) and the older age groups (over 50 and under 69) had positive and significant coefficients at a significance level of 99%, in all four models, so for ages 35-49, OR values Ranged from 1.8889 (in Model 2) to 2.0503 (in Model 5), meaning that belonging to this age group were more likely to be independent in the range of about 89% to about 105%, and for ages 50-69, values were in the range of 2.2864 - 2.6353, which means that belonging to this age group is more likely to be independent in the range of about 129% to about 164%.
Also, the regression results show that the married and separated and / or widows had positive and significant coefficients at the 99% significance level in all four models, so for the married OR values ranged from 1.3526 (model 2) to 1.5053 (model 5), so marriages are more likely to be independent in the range of about 35% to about 56%, and for the individual and / or widowed values the values were in the range of 1.293 to 1.3485, meaning that this population is more likely to be independent in the range of about 28% to about 39%, and thus in fact accept that the chance of becoming independent increases as the age progresses.
The findings show that the estimates of the living areas were negative and significant at 99% significance without exception. The above finding means that all individuals who do not live in the center of the country are less likely to be independent.

Results shows that on the one hand, Arabs are more likely to be self-employed in some industries, mainly the industrial, electricity and water sectors, the automotive, transport and transport industries, and the banking and insurance industry, and on the other, construction, hospitality and restaurants, public administration, education, health and welfare, Foreign Households and Organizations - Jews are more likely to be independent than Arabs, with the largest gap in prospects observed in the foreign organizations. Also, in the real estate and rental sector, the chances of Arabs and Jews appear to be almost independent.

Therefore, it can be said that the effect of education on the chance of Arabs being independent is higher than the effect on the chance of Jews being independent, but among educated, the chance of Arabs of being independent is less than the chance of Jews. The proportion of self-employed among Arabs with secondary education, a graduate degree and a doctoral degree is greater than their proportion among Jews with similar education.

In the interaction between nationality and marital status, we received only 95% significant estimates in Model 8 for marriages and separated / divorced we got a 99% significance level, with the family status estimates being significant at 99% significance level.

In the present study, the education variable had more levels, and it can be seen that the nationality variable moderates this relationship, and among educated Arabs the chance of becoming independent is higher compared to Jews of the same level of education. The limited presence of business corporations, government offices, and public companies in Arab localities may be conducive to pushing educated Arabs into independent employment. Under these restrictions, it can be stated that H_3 (the hypothesis examines whether education has a positive effect on the choice of independent employment) has been affirmed and education has a positive effect on the choice of independent employment (the effect of education on Jews is greater than its effect on Arabs).

The age group was a significant explanatory variable in all models, with the parameters in the large age group (50–69) tending to be larger than the middle age group parameters (34–49). This finding is consistent with the longitudinal data provided by Svirsky and Ophir (2014), which indicate a positive relationship between age and employment rate, which increased between 1983 and 2008. That is, it can be determined that H_4 (the hypothesis tests whether experience and age are positively related to independent employment) has been confirmed and it can be determined that experience and age are positively associated with independent employment.

With regard to H_5 (which tests whether the rate of independent employment is higher among married people), the models predicted that married people were more likely to be independent, but models 6–11, which included the interaction of nationality × marital status, predicted married Arabs were less likely to be independent than married Jews.

Regarding H_6 (hypothesized that the number of births is positively associated with the likelihood of being self-employed), no definitive direction was found that affects the results in terms of both significance and direction of effect, and therefore the hypothesis cannot be corroborated. Indeed, in the study, we found support for the hypothesis that professional and skilled workers tend to be more independent than unskilled workers in both nationalities (as H_7 tests).

In the present study there is no consistent finding regarding the effect of the residential area, which means that the eighth hypothesis H_8 cannot be corroborated (a hypothesis examining whether the employment rate is higher in denser areas of Israel). It is found that in the center of the country the chance of being independent for Arabs and Jews is greater, but in the literature the largest rate of independence is actually in Tel Aviv. This bias may be due to differences in the residential distributions of both sectors, and these parameter estimates cannot be interpreted.

Regarding the ninth hypothesis test H_9 (which deals with Jewish immigration only and examines whether immigration is negatively related to independent employment), we find that, contrary to the findings of Leshem (2009), models that included immigration variables

(country of origin, year of emigration) predicted less likely immigrants to self-employment. . This finding may be explained by the mediation of a generation variable in the country over the strength of the relationship between other variables and independent employment (for example, people born to families who are in more generations in the country are more likely to own land or real estate).

Contrary to (Banerjee and Newman, 1993) who argued that the degree of individual wealth affects choice to be independent, as wealthy people have easier access to the capital market, in the present study we found that owning a home (a marker of wealth) reduces the chance of the Israeli be independent, so H_{10} can be rejected.

To examine the interaction between the economic branch and the nation, namely Hypothesis number (H_{11}), we consider the odds in a model that describes the absolute chance of an Arab being independent versus the absolute chance of a Jew being independent and we find that Arabs are more likely to be self-employed in certain industries, mainly in manufacturing, electricity and water, automotive, transport and transport, and banking and insurance, and Jews are more likely to be self-employed than Arabs in industries: construction, hospitality and restaurant, public administration, education, health and welfare, Community and services, households and foreign organizations, and in the real estate and rental sector, the prospects of Arabs and Jews appear to be almost identical. Therefore, (H_{11}) has been confirmed. For the education variable ($H_{12)}$, there was a significant interaction between the education and the nationality variable. However, on the other hand, some of the education variables themselves were not significant (a master's degree variable and a doctoral variable), so the results must be taken very carefully.

Also, and because there are significant differences between the common distributions of education variables and employment status in both sectors (for example, underrepresentation of Arabs in the Ph.D. group); it is difficult to interpret estimates of the education variable. Therefore, it can be argued that H_{12} was confirmed. The interaction between nationality and marital status ($H_{13)}$, is significant for married status at 95% significance and for marital status and divorced and / or widowed at 99%, with estimated variables married and divorced and / or widowed by themselves, the significance level is 99% significant. It appears that the influence of "married" marital status on the chance of being independent among Arabs is higher than the effect of "married" marital status on the prospect of being independent among Jews.

We compared the odds of being self-employed and not a salaried employee of the Arab individual who owns an apartment with the odds of the Jewish individual having an apartment, and the regression results are why we reject the hypothesis

we have almost equaled the odds of the Arab individual with the apartment and the Jewish individual with the apartment in the prospects of being independent and non-salaried, which is why we reject (H_{15}).

5. Conclusions

In the present study, we have assumed that the extent to which an individual is influenced by his or her personal data (education, gender, race and ethnicity, etc.), the culture in which he grows, is related to variables that influence his or her decision and choice of employment status. And so, these characteristics pose a research challenge to many social policy scholars. The study was conducted in the Israeli economy, where the Arab public is the minority group and the Jewish public is the majority. In the study, we used the 2008 Census data, since the Census provides the most comprehensive and reliable picture of a particular population at the "determining point" (the time point to which the census refers). Contrary to studies that sample a small portion of the population, census data is collected on a representative sample that is 20% of the state's population, and therefore inferences based

on census data will be more reliable and accurate. Census data is used by the Central Bureau of Statistics (CBS) in the official analyzes it conducts.

The results indicate differences in the economies in which Jews and Arabs work as self-employed workers, and it is evident that there are areas that are more typical of self-employed Jews or self-employed. The industries in which the self-employment rate is advantageous or equitable for the self-employed are vehicles (sales and repair), electricity and water supply, banking and insurance. It can be hypothesized that the first two areas do not require higher education, and can be associated with neighborhood / home services that characterize the self-employed in this level of education. In contrast, in education, public administration and construction, Jews had a considerable advantage in the employment rate as self-employed. There are four main limitations to the study: there was no distinction between self-employed with a small number of employees and self-employed with a large number of workers; in the present study, we did not consider intergenerational transition as a factor affecting choice to be independent; failure to address the spouse's employment status; excluding variables that may explain an individual's decision to be independent and not salaried to the models built.

References

Aronson, R. L., 1991. *Self-employment: A labor market perspective*. Ithaca, NY: ILR Press.

Arum, R., and Müller, W., 2004. The Reemergence of Self-Employment: Comparative Findings and Empirical Propositions. The Reemergence of Self-Employment. A Comparative Study of Self-Employment Dynamics and Social Inequality. *Princeton Oxford,* pp. 426-454.

Banerjee, A. V., and Newman, A. F., 1993. Occupational choice and the process of development. *Journal of Political Economy*, 101 (2), pp. 274-298.

Blanchflower, D. G., 2004. Self-employment: More may not be better (No. w10286). *National Bureau of Economic Research*.

Boden Jr, R. J., 1996. Gender and self-employment selection: An empirical assessment. *The Journal of Socio-Economics*, 25 (6), pp. 671-682.

Boden Jr, R. J., 1999. Flexible working hours, family responsibilities, and female self-employment: Gender differences in self-employment selection. *American Journal of Economics and Sociology*, 58 (1), pp. 71-83.

Carr, D., 1996. Two paths to self-employment? Women's and men's self-employment in the United States, 1980. *Work and occupations*, 23 (1), pp. 26-53.

Clark, K., and Drinkwater, S., 2010. Recent trends in minority ethnic entrepreneurship in Britain. *International Small Business Journal*, 28 (2), pp. 136-146.

Coate, S., and Tennyson, S., 1992. Labor market discrimination, imperfect information and self employment. *Oxford Economic Papers*, 44 (2), pp. 272-288.

Dawson, C., Henley, A., and Latreille, P., 2014. Individual motives for choosing self-employment in the UK: Does region matter? *Regional Studies*, 48 (5), pp. 804-822.

Fairlie, R. W., 2007. Entrepreneurship among disadvantaged groups: Women, minorities and the less educated. pp. 437-75 in Simon Parker (ed.), *The Life Cycle of Entrepreneurial Ventures. International*

Glazer, N., and Moynihan, D. P., 1970. *Beyond the Melting Pot: The Negroes, Puerto Ricans, Jews, Italians, and Irish of New York City (Vol. 63).* Cambridge, MA: MIT Press.

Hamilton, B. H., 2000. Does entrepreneurship pay? An empirical analysis of the returns to self-employment. *Journal of Political Economy*, 108 (3), pp. 604-631.

Heim, B. T., 2015. Understanding the decline in self-employment among individuals nearing retirement. *Small Business Economics*, 45 (3), pp. 561-580.

Hout, M., and H. Rosen., 2000. Self-employment, family background, and race. *Journal of Human Resources* 35 (4), pp. 670-92.

Kangasharju, A., and Pekkala, S., 2002. The role of education in self–employment success in Finland. *Growth and Change*, 33 (2), pp. 216-237.
Leshem, A., 2009. Integration of Immigrants from the former Soviet Union, 1990–2005: Multidisciplinary Infrastructure Study. *Jerusalem: Absorption Div., JDC Israel. [Hebrew]*.
Lim, K., 2015. *Self-Employment, Workplace Flexibility, and Maternal Labor Supply: A Life-Cycle Model. Manuscript*, University of Michigan.
Lombard, K. V., 2001. Female self-employment and demand for flexible, nonstandard work schedules. *Economic Inquiry*, 39 (2), pp. 214-237.
Lohmann, H., and Luber, S., 2004. Trends in self-employment in Germany: different types, different developments. *The Reemergence of Self-Employment. A comparative study of self-employment dynamics and social inequality*, pp. 36-74.
McManus, P. A., 2001. Women's participation in self-employment in western industrialized nations. *International Journal of Sociology,* 31 (2), pp. 70-97.
Minola, T., Criaco, G., and Obschonka, M., 2016. Age, culture, and self-employment motivation. *Small Business Economics*, 46 (2), pp. 187-213.
Parker, S. C., 2009. *The economics of entrepreneurship*. Cambridge University Press.
Portes, A., and Jensen, L., 1989. The enclave and the entrants: Patterns of ethnic enterprise in Miami before and after Mariel. *American Sociological Review*, 54, pp. 929-949.
Waldinger, R. D., Aldrich, H., and Ward, R., 1990. *Ethnic entrepreneurs: Immigrant business in industrial societies* (Vol. 1). Sage Publications, Inc.
Robb, A. M., and Fairlie, R. W., 2007. Access to financial capital among US businesses: The case of African American firms. *The Annals of the American Academy of Political and Social Science*, 613 (1), pp. 47-72.

Bio-note

*Iyad Snunu***,** is PhD Student, second year of study, Doctoral School of Economics at the Faculty of Economics and Business Administration, West University of Timişoara, Romania. The thesis title is: „Labour Market and Self – Employment. The Case of Israel.
*Nicoleta Sîrghi***,** is Professor PhD habil. of Economics at the Faculty of Economics and Business Administration, West University of Timisoara, Romania. The current research field is related to study the market structures with applications in economics. She reviewed articles submitted to ISI and BDI journals. She has published 9 books and over 90 articles in ISI and BDI journals.

TALENT MANAGEMENT: A SYSTEMATIC REVIEW

Maha Lutfi Al- Dalahmeh
Károly Ihrig Doctoral School of Management and Business, University of Debrecen, Debrecen, Hungary
Mahalutfi87@gmail.com

Abstract: *Talent Management (TM) has become one of the important strategic topics for managers in global organizations and businesses in general. Despite the importance of talent management, researches in the area are still few, mainly conceptual research. The purpose of this article is to enhance the readers understanding of the domain of talent management concept perspectives, importance and the main practices. At the same time giving a general idea about the connection with other HRM functions, based on secondary data and researches in the areas of talent management. To achieve the aim of this article, the existing body of studies was reviewed, which were chosen based on the relevance to the talent management issue. Also, the articles which were published recently in this field were adopted.*

Keywords: Human Resources Management, Attraction, Development, Workforce planning.

JEL Classification: O15

1. Introduction

In recent years the concept of talent management is distinguished as fairly new and it has attracted the interest of most of the researchers (Lewis and Heckman, 2006), so the organizations are required to distinguish between their employees according to their performances (Kontoghiorghes, 2016; Mensah, 2015). Human capital is the mixture of skills, experiences, knowledge, motivation, and capabilities of the employees. Because of that, it is important to recognize how to manage and control the talented employee, to invest in their skills, experience, knowledge and to enhance productivity and performance of organization (Burbach and Royle, 2010; Máté et al., 2016).

Most booming businesses recognized years ago that the most efficient practices of talent management are directly associated with the organizations culture and strategy (Gamama et al., 2018). In the current business environment, there is a high demand for talented employees in organizations (Cappelli, 2008). Although most of the organizations apply the practices of talent management there are a lot of mysterious issues that need to be cleared (Van Zyl et al., 2017).

The business environment has gone through many changes in different aspects such as the nature of work and the new forms of work (Bozionelos and Wang, 2006), which come from new knowledge innovation, new skills and increasing competition between firms (Garrow and Hirsh, 2008).

The organizations focused on their intangible assets like knowledge and talented employees because the business environment is characterized by uncertainty, complexity, and unpredictability (Chuai et al., 2008; Dajnoki and Héder, 2017). By keeping an eye on successful organizations one can observe that the organization which is hiring, managing and retaining high performed and talented employees have a high level of organizational success, which explains the increasing demand and competition for skilled employees on a global level (McDonnell et al., 2017).

It's become obvious that the essential asset of a successful organization is human capital because it plays a fundamental role in the competitiveness and growth of the organization (Lockwood, 2006) that, put the human resources management on the front line and a strategic business partner in the organization (Collings et al., 2019). So as a result, human resources management (HRM) and human resources (HR) practices have become important, thus, they are trying to find a strong framework and develop the efficiency of their practices (Collings and Mellahi, 2009).
Based on the reviewed literature which was chosen based on the relevance to the talent management issue, the article concentrated on clarifying what is the main perspectives which define talent management, why it is important to adopt talent management and what is the most common applied practices. Due to that, a synopsis will be provided to readers about the best practices and how they are defined in literature.

2. Literature Review

2.1 Talent management definitions

Opinions differ about the definition of talent management, but it is recognized that the idea of the concept of talent management has appeared in the research published by Mckinsey studies "talent war" (Michaels et al., 2001). Then it was developed to be published as a book in 2001 (Nilsson and Ellström, 2012). So it is not a new concept as maintained before, but the researches are still few (Brbach and Royle, 2010) and recently it has become a vital part of business human resource strategies and has lately had a growing interest in the area of human resources management researches (Capelli, 2008).
On the other hand, there is no agreement about the definition of talent, and there are no specific and clear conceptual borders of talent management either (Collings and Mellahi, 2009). In the literature though, the concept in general is still not well-defined according to the process and decision alternatives (Gallardo et al., 2013). Though the idea emerges to be closely connected to concepts that include human resource management, workforce planning, and employability (Lewis and Heckman, 2006). Having reviewed the literature, there are three main perspectives of the definition of talent management (Lewis and Heckman, 2006):
In the first perspective of talent management it is considered as a set of function and practices which are the typical practices and functions of human resources management (Mucha, 2004). According to this perspective it is related to the same function of HRM practices such as planning, training, development and retaining (Iles et al., 2010; Schiemann, 2014). For example, Creelman (2004) defines TM as a process of recruitment, development and maintaining talents which is close to the traditional definition of HRM.
The second perspective says that the organization is designing talent pools of employees who are called exclusive people, people who can make a vital change into the future and current performance of the firms (Rothwell, 2011). The firms can hunt these people through practices associated with workforce planning and development, thus the practices are related to employees (McCauley and Wakefield, 2006).
The third perspective assumed that talent management is related to specific positions which are called key positions in firms or Exclusive position (Anlesinya et al., 2019). This perspective is considered as an approach that begins with identifying crucial jobs for those positions that need highly performed and talented people (Tarique and Schuler, 2010; Sparrow et al., 2014).
According to Ready and Conger (2007), talent management is the process of planning human resources to meet up with the demands of the organization under the terms of employing talented personnel. To achieve that goal an effective reward system existence is obligatory (Ready and Conger, 2007).

Maximizing profits is an essential aim for each organization all over the world along with minimizing the costs (Allen, 2004). From this point, we can consider TM as an important tool to minimize the cost of hiring new employees by keeping talented employees in the staff and improve their skills, hence, the talented employees turn out to be a core asset in any organization (Nalbantian and Guzzo, 2009).
TM in general, aims at workforce planning, attracting talented employees, developing these employees and retaining these employees (Rothwell, 2011).
Lewis and Heckman (2006) say that talent management has prospected from three different angles. The first one declares that TM is a human resources management department which makes all employees stand on the same side of the ship with no differences between them even when it comes to talents (Snell, 2007). The second one demands to build talented pools by means of securing current talented personnel and developing them (Creelman, 2004). The third one focuses on separate employees` performance where evaluation plans are set to identify and keep class A and B employees and expel grade C employees (Rothwell, 2011).
Also, it is defined as “The sum of peoples” capabilities, experiences, competencies, attitudes, and behaviour that can be turned into organizational performance” by Pillay et al. (2008). Another definition of talent management is: “a new business science that blends workforce planning, acquisition, development, mobility, and measurement into a strategic discipline" (Stevens, 2008). Also, it is commonly agreed that talent management directly engages workforce planning, recruitment, human capital development, and diversity (Iles et al., 2010).
Another definition is that talent management is about positive things, doing things for your best people, investing in developing them, building their potential and assisting people to make the best use of their strengths (Garrow and Hirsh, 2008).
Based on previous efforts afforded in defining talent management, a certain definition for talent management is concluded like this: it is an integrated process that contains several specified procedures that contribute overwhelmingly in the success of the organization and these procedures are workforce planning, talented employee’s acquirement, developing and training these talented employees, and sustaining them as assets of the organization (Iles et al., 2010).

2.2 The Importance of Talent Management

Since a competitive advantage is essential for any organization (Gelens et al.,2013), and according to the fact that talented employees are considered as an essential asset of any organization (Li and Devos, 2008), the need for talented employees rises because of the contribution of their knowledge and experience on the performance of the organization (Schuler et al., 2011). Moreover, an organization`s performance directly affects business result which affects the profit and productivity of that organization (Hills, 2009).
Retaining talented employees will affect the organization from various aspects, these aspects may include the costs of recruiting talented employees, in addition to the time, effort, and costs needed to develop these talents according to the needs of the organization. (Rothwell, 2011). Also, either in the cases of uncertainty or the cases of flourishing, the need for talented employees arises from the depths of the ocean of failure (Brown and Tannock, 2009).
The importance also comes from the definition where Talent management is defined as a systematic attraction, identification, development, engagement, retention, and deployment of those individuals who possess a high potential that creates a particular value to an organization (Krishnan and Scullion, 2017).
Talent management plays a key role in affecting the entire organization (Stevens, 2008). Talent management has a great impact on the performance of the organization by

minimizing the costs of the hiring process (Boon et al.,2011); it also increases the productivity of the firm in addition to the profitability and output (Collings and Mellahi, 2009). When the organization is applying TM, it creates tremendous opportunities for competitive advantages (Schuler et al., 2011). Also, the organization`s position in its industry is determined by its ability to retain, engage, and develop talents which turned TM into a factor of failure or success for an organization (Luna-Arocas and Morley, 2015).

2.3 Talent Management practices

As mentioned previously, talent management shares several similarities with human resources management, moreover, they share some of the same practices that are applied in both departments that eventually lead to the success of the organization (Schuler et al., 2011). Organizational talents nowadays require management and improvements due to the uncertainty of environments such as enduring skills shortages and employee demands for work-life balance (Lewis and Heckman, 2006). Mastery of management appears in the organizations` abilities to enhance strategies, policies, and programs for attracting, developing, and retaining talented employees (Snell, 2007).

That can be achieved by determining what the organization needs of either current capabilities or envisioned talents required (Ready, 2007). To apply talent management professionally, the human resources department needs the assistance of the top management of that organization to be highly effective and fruitful starting from workforce planning until talent retention and passing attracting talented employees and developing them (Cappelli, 2008; Shrimali and Gidwani,2012).

2.3.1 Talented workforce planning

In business, it is often stated that the highest value of an organisation is provided by the employees working there (Héder et al., 2018). According to workforce planning, it must be comprehended by the managers that their HR tasks and the process of attracting, recruiting, developing and retaining efforts are directly connected to the main goals of the organization (Creelman, 2004), which leads managers to afford extra effort to achieve their duties upon realizing the importance of their role for the sake of the whole organization`s excellence (Schweyer, 2010). The roles of talented workforce planning conclude envisioning future business and environmental demands to meet with the HR requirements obliged by these circumstances (Creelman, 2004).

The Activities of talented Workforce Planning (Schweyer, 2010):

- Talent Inventory: this includes the current talents operating in the organization and their roles.
- Workforce Forecast: this anticipates the potential needs for talents.
- Action Plans: the procedures from the moment an employee is hired until the stage of compensation.
- Control and Evaluation: it allows the HR department to monitor the process of workforce planning using closed-loop feedback.

To conclude, talented workforce-planning aims at allocating specific employees with specific talents to specified jobs at the correct time with the convenient skills required to fulfill these jobs (Dries, 2013). So, talent management is how the organization implements its strategic workforce plan. It is also the mechanism by which the organization adjusts its talent supply, based on changing business needs and the organization needs as well (Morgan and Jardin, 2010). Furthermore, it is considered as one of the analytic, forecasting, and planning procedures (Sheehan and Anderson, 2015), that is connected to talent management activities to ensure an organization has the right people in the right places at the right time and at the right price to implement its business strategy (Tucker et al., 2005).

2.3.2 Talent Attraction

One of the most important practices of talent management is to attract talented employees and mastering that practice (Pruis, 2011). The study of Shrimali and Giwani (2012) states that the reputation of an organization is an important factor in attracting key employees. The study of Lyria et al. (2017) clarified the factors (monetary and non-monetary) which made people get attracted to a certain organization. These factors affected individuals` choices concerning the work opportunity in an organization and the selection of an organization, as well (Jenkins, 2009).

Factors like work-life balance, competitive payment, and challenging work are some of the significant factors to attract employees (Pruis, 2011). Organizations should follow specific procedures to attract talented employees (Lockwood, 2006), through establishing a clear strategy to attract talented employees from outside the organization and improve the skills of the other talented employees inside the organization (Chuai et al., 2008).

Talent attraction also depends on the branding of how organization is represented in the market, i.e. people are excited about working for the organization and companies can be selective in the approach culture of the organization (Moczydłowska, 2012). According to Collings and Mellahi (2009), all talented employees in different sectors are looking for an organization that offers exciting challenges, great development opportunities and meaningful work in a successful organization, where great leaders can lead them (Csordás, 2020). Whilst substantial payment is a significant attractor, talented individuals appear more attracted by the prospect of meaningful work in an open, trusting and performance-oriented culture, rather than by salary alone (Lewis and Heckman, 2006; Dajnoki and Kun, 2016).

The quality of an organization is the quality of the workforce it possesses. The best way to have talent at the top is to have talent at the bottom; their development needs career inspirations, strengths and weaknesses, abilities, likes and dislikes. It is easier, therefore, to determine what motivates whom and this helps a lot in the job enrichment process (Iles et al., 2010; Héder and Dajnoki, 2017a).

2.3.3 Talent Development

According to Hills (2009), it was assumed that there would have been five retirees for every new employee; therefore, organizations can get ahead of the lack of talents by empowering and encouraging their current talents (Héder and Dajnoki, 2017b). Talent development can go through several stages, such as developing subordinates, managers, and certification.

Each organization in the world has its own talent development policy (Cheloha and Swain, 2005), because there are no common standards which should be applied in all organizations (Lehmann, 2009). There are some mutual concepts on how to deal with employees that exceed the expectations in performance which allows the company to have a long-term vision to change its recruiting policy from “hiring people to fill up chairs” to “hiring people and developing them to serve future opportunities and needs” (Gandz, 2006).

According to Pruis (2011), a company would hire highly qualified and talented employees that were not needed at the moment they were hired (Lockwood and Nancy, 2006), but they had the potential for imminent strategic demands or that they had required future skills which will grant the company the advantage of acquiring a variety of talents (Khilji et al., 2015). On the other hand, these organizations would not keep in mind the factor, which can cause mediocre performance amongst the other employees (Schweyer, 2010).

Moreover, organizations in general do not hire professional and talented employees only, they also hire employees that are below the level (Chuai et al., 2008). Besides, these highly qualified and talented employees will have to be standardized according to the standards of the organization (Pillay et al., 2008). One of the main purposes of talent management is to classify employees in categories according to their skills (Thomas,2009), to determine who are highly qualified and who are the poor performers (Hills, 2009). Upon identifying poor performers, the talent management process must be able to take actions to specify whether

the employee is unskilled which will urge the need to train him (McDonnel et al.,2017), or that poor performers will be identified and then moved to other positions where they would show their inner skills (Blass, 2007).

4. Conclusions

By looking at the high level of interest in the concept of talent management over recent years, it is somewhat unacceptable that it stays relatively not well-defined and lacks the theoretical framework. This paper is based on the current body of the literature finds from a theoretical point of view. The area of talent management is in its initial phase and a significant level of theoretical development is needed.

The contribution of this paper is two-folded; to develop a clear and short definition of talent management from different perspectives as mentioned above. The first perspective defined it as typical practices and functions of human resources management. However, the second one assumed to design talent pools for exclusive employees, who could make a vital change in the whole performance. Finally, the last perspective focuses on the key positions which need highly talented employees. Thus, practitioners and managers could have a better chance to understand by which perspective they could define talent management, and how they could use it to improve performance.

In addition, practitioners and managers have the potential to determine, according to the three main practices mentioned in this paper, which one is more proper to be applied and has a direct effect on employees' performance and loyalty, as well. By applying that managers can develop and improve the strategy of the firm.

Aforementioned, talent management has a strong effect on maintaining employees and performance, thus managers should pay attention to have systematic programs for developing and training talented employees. To convert their implicit knowledge and skills to explicit knowledge, which could be shared with all the staff.

This is generally accepted in the reviewed literature, from which we can draw the conclusion that the importance of talent management lies in helping the firm to reduce the cost of hiring new employees through retaining talented employees and developing them by specific training programs

Hoping that the proposed framework provides a foundation for future researches that seek to deepen the effects of implementing talent management practices.

Acknowledgement

The publication is supported by the EU-funded Hungarian grant EFOP-3.6.3.-VEKOP-16-2017-00007, for the project entitled “From Talent to Young Researchers” – Supporting the Career-developing Activities of Researchers in Higher Education.

References

Allen, D.G., Shore, L.M. and Griffeth, R.W., 2003. The role of perceived organizational support and supportive human resource practices in the turnover process. *Journal of management*, 29 (1), pp. 99-118.

Anlesinya, A., Dartey-Baah, K., and Amponsah-Tawiah, K., 2019. Strategic talent management scholarship: a review of current foci and future directions. *Industrial and Commercial Training*, 51 (5), pp. 299–314.

Blass, E., 2007. *Talent Management: Maximising talent for business performance: Executive Summary*. Chartered Management Institute.

Boon, C., Den Hartog, D.N., Boselie, P. and Paauwe, J., 2011. The relationship between perceptions of HR practices and employee outcomes: examining the role of person–organisation and person–job fit. *The International Journal of Human Resource Management*, 22 (1), pp.138-162.
Bozionelos, N. and Wang, L., 2006. The relationship of mentoring and network resources with career success in the Chinese organizational environment. *The International Journal of Human Resource Management*, 17 (9), pp. 1531-1546.
Brbach, R. and Royle, T., 2010. Talent on demand? Talent management in the German and Irish subsidiaries of a US multinational corporation. *Personnel Review*, 39(4), pp.414-431.
Brown, P. and Tannock, S., 2009. Education, meritocracy and the global war for talent. *Journal of Education Policy*, 24 (4), pp. 377-392.
Cappelli, P., 2008. Talent management for the twenty-first century. *Harvard business review*, 86 (3), pp. 74-81.
Cheloha, R. and Swain, J., 2005. Talent management system key to effective succession planning. *Canadian HR Reporter*, 18 (17), pp.5-7
Chuai, X., Preece, D. and Iles, P., 2008. Is talent management just "old wine in new bottles"? The case of multinational companies in Beijing. *Management Research News*, 31 (12), pp. 901-911.
Collings, D.G. and Mellahi, K., 2009. Strategic talent management: A review and research agenda. *Human resource management review*, 19 (4), pp. 304-313.
Collings, D.G., Mellahi, K. and Cascio, W.F., 2019. Global talent management and performance in multinational enterprises: A multilevel perspective. *Journal of Management*, 45 (2), pp. 540-566.
Creelman, D., 2004. Return on investment in talent management: Measures you can put to work right now. *Human Capital Institute*, 2121.
Csordás, A., 2020. Diversifying Effect of Digital Competence. *AGRIS on-line Papers in Economics and Informatics*, 12 (1), pp. 3-13.
Dajnoki, K., Kun, A.I. 2016. Frissdiplomások foglalkoztatásának jellemzői az agrárgazdaságban. *Gazdálkodás* 60. évf.: IV. szám pp. 289-304.
Dajnoki, K., Héder, M., 2017. „Új szelek fújnak" – a HR válasza a globalizáció és a változás kihívásaira. *Hadtudomány*, 27(E-issue), pp. 84-93. DOI 10.17047/HAD TUD.2017.27. E.8.
Dries, N., 2013. Talent management, from phenomenon to theory. *Human Resource Management Review*, 23 (4), pp. 267-271.
Gallardo-Gallardo, E., Dries, N., and González-Cruz, T.F., 2013. What is the meaning of 'talent'in the world of work? *Human Resource Management Review*, 23(4), pp.290-300.
Gamama, Y., Bazza, M.I. and Imam, Y.B.K., 2018. Talent Management and Organisational Performance in Public Sector: A Review. *Journal of Management Sciences*, 18 (1), pp. 56-65.
Gandz, J., 2006. Talent development: the architecture of a talent pipeline that works. *Ivey Business Journal*, 70 (3), pp.1-4.
Garrow, V. and Hirsh, W., 2008. Talent management: Issues of focus and fit. *Public Personnel Management*, 37(4), pp. 389-402.
Gelens, J., Dries, N., Hofmans, J. and Pepermans, R., 2013. The role of perceived organizational justice in shaping the outcomes of talent management: A research agenda. *Human Resource Management Review*, 23 (4), pp. 341-353.
Héder, M., Dajnoki, K., 2017. The Characteristics of International and Hungarian Talent Shortage. *Annals of The University of Oradea Economic Science*,1 (1st Issue) pp. 621-636.
Héder, M., Dajnoki, K., 2017a. Connection of Talent and Career Management – Differences and Similarities. *Network Intelligence Studies*, 5 (I 9), pp. 57-66.
Héder, M., Szabó, Sz., Dajnoki, K., 2018. Effect of Labour Market Changes on HR Functions. Anali Ekonomski Fakulteta U Subotici / *The Annals of The Faculty of Economics Subotica*, 54 (39/2018) pp. 123-138.

Hills, A., 2009. Succession planning–or smart talent management? *Industrial and commercial Training*, 41 (1), pp.3-8.
Iles, P., Chuai, X. and Preece, D., 2010. Talent management and HRM in multinational companies in Beijing: Definitions, differences and drivers. *Journal of World Business*, 45 (2), pp.179-189.
Jenkins, A.K., 2009. Keeping the talent: Understanding the needs of engineers and scientists in the defense acquisition workforce*. Defense AR Journal*, 16 (1), pp. 164-170.
Khilji, S.E., Tarique, I. and Schuler, R.S., 2015. Incorporating the macro view in global talent management. *Human Resource Management Review*, 25 (3), pp. 236-248.
Kontoghiorghes, C., 2016. Linking high performance organizational culture and talent management: satisfaction/motivation and organizational commitment as mediators. *The International Journal of Human Resource Management*, 27 (16), pp. 1833–1853.
Krishnan, T.N. and Scullion, H., 2017. Talent management and dynamic view of talent in small and medium enterprises. *Human Resource Management Review*, 27(3), pp.431-441.
Lehmann, S., 2009. Motivating talents in Thai and Malaysian service firms. *Human Resource Development International*, 12 (2), pp. 155-169.
Lewis, R.E. and Heckman, R.J., 2006. Talent management: A critical review. *Human resource management review*, 16 (2), pp. 139-154.
Li, F.F, and Devos, P., 2008. Talent management: art or science? The invisible mechanism between talent and talent factory. *Journal of World Business*, 47 (2), pp. 159-179.
Lockwood, N.R., 2006. Talent management: Driver for organizational success. *HR Magazine*, 51 (6), pp. 1-11.
Luna–Arocas, R. and Morley, M.J., 2015. Talent management, talent mindset competency and job performance: the mediating role of job satisfaction. *European Journal of International Management*, 9 (1), pp.28-51.
Lyria, R. K., Namusonge, G. S., & Karanja, K. (2017). Role of Talent Management on Organisation Performance in Companies Listed in Nairobi Securities Exchange in Kenya. *Journal of Human Resource and Leadership*, 1 (3), pp. 1-17.
Máté, D., Darabos, É., Dajnoki, K. 2016. The Impact of Human Capital on Labour Productivity Regarding the ET-2020 Targets. *Network Intelligence Studies* IV(1) pp. 61-67.
McCauley, C. and Wakefield, M., 2006. Talent management in the 21st century: Help your company find, develop, and keep its strongest workers. *The Journal for Quality and Participation*, 29 (4), pp. 4-10.
McDonnell, A., Collings, D.G., Mellahi, K. and Schuler, R., 2017. Talent management: a systematic review and future prospects. *European Journal of International Management*, 11 (1), pp. 86-128.
Mensah, J.K., 2015. A “coalesced framework” of talent management and employee performance: For further research and practice. *International Journal of Productivity and Performance Management*, 64 (4), pp. 544-566.
Michaels, E., Handfield-Jones, H. and Axelrod, B., 2001. *The war for talent*. 1st Ed., London: Harvard Business Press
Morgan, H. and Jardin, D., 2010. Integrated talent management. *OD PRACTITIONER*, 42(4), pp.24-35.
Mucha, R.T., 2004. The Art and Science of Talent Management. *Organization Development Journal*, 22 (4), pp. 96-100.
Nalbantian, H.R. and Guzzo, R.A., 2009. Making mobility matter. *Harvard Business Review*, 87 (3), pp.76-84.
Nilsson, S. and Ellström, P.E., 2012. Employability and talent management: challenges for HRD practices. *European Journal of Training and Development*, 36 (1), pp.26-45.
Pillay, P., Subban, M., and Qwabe, B, 2008. Talent management. *Journal of Public Administration*, 43 (Special issue 1), pp. 308-323.

Pruis, E., 2011. The five key principles for talent development. *Industrial and Commercial Training*, 43 (4), pp.206-216.
Ready, D.A. and Conger, J.A., 2007. Make your company a talent factory. *Harvard Business Review*, 85 (6), pp. 68.
Rothwell, W.J., 2011. Replacement planning: A starting point for succession planning and talent management. *International Journal of Training and Development*, 15 (1), pp. 87-99.
Schiemann, W.A., 2014. From talent management to talent optimization. *Journal of World Business*, 49 (2), pp. 281-288.
Schuler, R.S., Jackson, S.E. and Tarique, I., 2011. Global talent management and global talent challenges: Strategic opportunities for IHRM. *Journal of World Business*, 46 (4), pp. 506-516.
Schweyer, A., 2010. *Talent management systems: Best practices in technology solutions for recruitment, retention and workforce planning*. 1st Ed., London: John Wiley & Sons.
Sheehan, M. and Anderson, V., 2015. Talent management and organizational diversity: A call for research. *Human Resource Development Quarterly*, 26 (4), pp.349-358.
Shrimali, H., and Gidwani, B. 2012. Role of talent management in sustainable competitive advantage: Rising to meet business challenge. *Pacific Business Review International*, 4 (3), pp. 29-33.
Snell, A., 2007. Strategic talent management, Human Resource Management: The relationship of mentoring and network resources with career success in the Chinese organizational environment*, Int. J. of Human Resource Management,* 17 (9), pp. 1531–1546.
Sparrow, P., Scullion, H. and Tarique, I., 2014. Multiple lenses on talent management: Definitions and contours of the field*. Contemporary issues in International Context,* Cambridge University Press.
Stevens, H.P., 2008. Total quality management now applies to managing talent. *The Journal for Quality and Participation*, 31 (2), pp.15-22.
Tarique, I. and Schuler, R.S., 2010. Global talent management: Literature review, integrative framework, and suggestions for further research. *Journal of World Business*, 45 (2), pp.122-133.
Thomas, K., 2009. Talent strategies for innovation. *Economist Intelligence Unit Supported by the Government of Ontario*, September, pp.1-10.
Tucker, E., Kao, T. and Verma, N., 2005. Next-generation talent management. *Business Credit*, 107, pp. 20-27.
Van Zyl, E.S., Mathafena, R.B. and Ras, J., 2017. The development of a talent management framework for the private sector. *SA Journal of Human Resource Management*, 15 (1), pp. 1-19.

Bio-note

Dalahmeh Maha, is a *PhD student in Károly Ihrig Doctoral School of Management and Business University of Debrecen.* Her main research interests refer to talent management and organisational behaviour.

INNOVATION FOR GROWTH: EVIDENCE FROM CEE EUROZONE CANDIDATES

Otilia Georgiana Floroiu
Doctoral School of Social Sciences, Stefan cel Mare University of Suceava, Suceava, Romania
otilia.floroiu@yahoo.com

Abstract: *This paper analyzes the European innovation framework focusing on four Eurozone candidates: Romania, Poland, Hungary, and Czech Republic. In the last decades, almost two-thirds of Europe's economic growth has been driven by innovation. This idea is supported by impressive scientific findings concerning the correlation between innovation and economic growth. We believe that better innovation performance stimulates economic convergence and in the long term, facilitates the candidates' transition towards Euro currency adoption. The countries in the study demonstrate a low innovative performance pattern, as our SWOT analysis will show. First, the gross domestic expenditure on research and development levels are far below the Union average. Secondly, there is a lack of cooperation between the academic and business sector, leading to a decreasing number of skilled personnel in the innovation industries. Lastly, these countries are suffering from an incoherent strategy aimed at reducing the productivity gap between domestic and foreign-owned firms. In order for these CEE Eurozone candidates to improve their European Innovation Score and their competitiveness, we recommend increasing investments in R&D, infrastructure, education, healthcare, clean energy and shifting towards higher value-added activities. We are also suggesting supporting digital innovation hubs, the creation of new companies, and facilitating access to finance for small and medium-sized businesses.*

Keywords: innovation, Eurozone, growth, CEE countries, economic convergence.

JEL classification: O11, O30, O43.

1. Introduction

Currently, the EU is in the construction phase of the Economic and Monetary Union (EMU). There are 8 EU members out of a total of 27 that don't take part in the Euro area: Bulgaria, Croatia, Czechia, Denmark, Hungary, Poland, Romania, Sweden. In order to adopt the euro currency, candidate countries must meet the Maastricht criteria designed to harmonize the national legislation with EU law and to ensure economic convergence. Adopting the euro currency is an obligation for the mentioned states (except for Denmark), however the timing depends on the national authorities. One method of postponing the transition is to avoid participation in the ERM II (Exchange Rate Mechanism), even though all the other criteria has been successfully met, as in Sweden's case. Bulgaria, Czech Republic, Poland and Hungary initially presented very ambitious time targets after joining the EU, although the Maastricht criteria was far from being met. We can see that over the years, despite the fact that their convergence positions greatly improved, the states have adopted a prudent attitude and have consistently postponed the euro adoption. Denmark is a special case as it benefits from an opt-out clause that allows them to choose between adopting the euro currency or not, but so far has proven to be reluctant to this idea given the public resistance. Economic convergence in the EMU requires the alignment of individual economic performances and therefore allows emerging economies to catch-up with developed ones, or at least reduce the existing gap. Recent evidence shows that new products and services on the market provide the highest returns and financial literature supports the premises that

innovation generates economic growth. In return, economic growth will improve the real convergence performance of the countries and will reduce the heterogeneity degree of the eurozone. The countries selected for this comparative study are the four CEE EMU candidates: Romania, Poland, Hungary and Czechia. CEE innovative process is unique so governments should adapt innovation and technology imports to their economy's specifics.

2. Literature review

Innovation is a major driver of the economic progress as it generates benefits not only for consumers and businesses, but also for the economy as a whole. Innovation implies developing new ideas and technologies that lead to quality improvements for goods and services, or an increase in production efficiency.

Fundamentally, there are two methods (Rosenberg, 2004) of expanding the economic output: either by increasing the input of resources used in production, or by finding new means of production using a limited input of resources.

Even though innovation is hard to define when referring to this concept, economists (Broughel et al., 2019) usually consider a cost reduction, progress in quality, or expanding the variety of goods, services, or production methods. Innovation is considered to be an activity that produces new functions and products (Schumpeter in McDaniel, 2002) and is divided into 5 steps: introducing a new product, introducing a new method of production, opening new markets, finding more suitable sources for raw materials, and establishing a new organization within the industry.

We can analyze the concept of innovation from different perspectives (Gerguri et. Al, 2010): for the clients it means higher quality products and services, resulting in higher standards of living; for businesses it represents sustainable growth and development that lead to higher returns; for employees it translates into new, more interesting jobs that are better paid because they require extra mental efforts. Lastly, for the economy, innovation represents an increase in productivity and prosperity for all involved parties.

Innovation means more than just coming up with the newest technology. It is a phenomenon that can improve living conditions and help with community consolidation. Innovation can be technological, but also social, and the interaction between these two types can help vulnerable groups of people in ways that we could only dream of in the past (Ranchordás, 2015).

The innovative potential of an economy is influenced both by macroeconomic and microeconomic factors (Gurbiel, 2002) such as: GDP per capita, R&D expenditures, international trade, competitiveness, technological gap, level of profit recorded by foreign companies in a country.

The European Central Bank's (ECB) interest in innovation is linked to its main objective of maintaining price stability. The financing conditions in the economy are influenced by the interest rates set by ECB, which in turn influence the general demand for goods and services in the long term. Achieving this goal depends on the long-term growth potential of the economy and, as several studies demonstrate, this is influenced by the innovative process. In order to increase innovation efficiency, the effects must diffuse throughout the entire economy and reach various industry sectors.

Diffusion of new technologies resulting from innovation can act as a powerful tool to reduce the gap in the global economy by helping countries facing difficulties to improve their living standards faster (Fagerberg et al.2010). Both in developing and developed nations, innovation is a major driver for growth and therefore it is imperative to get a better theoretical and empirical understanding of this phenomenon.

Throughout time, financial literature has shown a great interest towards studying the existing ties between innovation and economic growth. The studies will be presented based on their findings on whether there is a correlation between innovation and economic growth.

Solow's model (1956) managed to capture the existence of a long-term relationship between the two variables using neoclassical hypotheses such as perfect competition, maximization theory, and absence of externalities. Nadiri (1993, pp.9) uses a Cobb-Douglass function to emphasize the connection between innovation, turnover and productivity increase.
Ulku's analysis (2004, pp. 13) is based on 20 OECD members and 10 non-OECD members and uses the panel model presented by Romer (1986, pp. 1014). In conclusion, the research shows that between 1981-1997, innovation has had a positive effect on GDP per capita both for developed and developing economies.
According to Pece et al. (2015, pp. 466) innovation and investments in R&D and technology are responsible for driving competitiveness, progress, as well as a sustainable economic growth rate. The variables used to represent innovation in the multiple regression models applied on CEE countries are number of patent applications, number of trademarks, and R&D expenditures. The results show the existence of a positive relationship between economic growth and innovation.
Kelly's (2018, pp. 25) research shows that periods of time with high numbers of patent applications are followed by high productivity cycles.
The bidirectional causality between innovation and economic growth is demonstrated by Pradhan et al. (2016, pp. 5) and analyzed by Maradana et al. (2017, pp. 9) in a complex study focused on 19 European countries during 1989 and 2014, using the Granger Causality test. The study showed that in Denmark, Finland, Ireland, The Netherlands, Norway, Poland, and Spain per capita economic growth determines innovation. In Romania, a bidirectional causality between innovation and economic growth is manifested, whereas in Sweden and Greece, per capita economic growth does not influence innovation. The authors recommend that in order to promote per capita economic growth, the economists must pay more attention towards innovation policy strategies. Given the bidirectional causality, governments should also consider the fact that through a GDP per capita increase, the innovation process will be stimulated. It is advisable that the role of the government should also focus on hosting innovation and integrating it in the per capita economic growth.
The impact of innovation on economic growth on the Nigerian market is examined by Iyoboyi & Na-Allah (2014, pp.45) between 1970-2011 using the OLS dynamic method of research that shows the existence of a balanced long-term relationship between the dependent variable (economic growth) and the most significant variable of interest (innovation).
The technology spillover effect (Cameron, 1998) reduces the cost of competitors and leads to imperfect patents and movement of skilled labor force to other companies. The failure of companies to acquire all the social gains generated by innovation can lead to the widening of the performance gap. The replacement effects generated by innovation imply that new ideas will make the current production methods outdated.
Petrariu et al. (2013, pp. 20) analyzes the case of 15 states: Estonia, Latvia, Lithuania, Poland, Germany, Czechia, Slovakia, Romania, Hungary, Moldova, Bulgaria, Croatia, Macedonia, and Serbia between 1996 and 2010. The researchers reached the conclusion that an economically developed state will invest more in research and this will lead to an innovation increase. R&D expenditures and the number of patents have a negative impact on economy growth due to the existence of a catch-up process. Through innovation, countries can reduce the existing gap between emerging and developed economies.
Pessoa (2007, pp. 14) chose Sweden and Ireland for his research and concluded that there is no strong relation between R&D spending and economic growth. The recommendations mention including other markers for innovation in the research, not only R&D expenditures.
Inekwe (2014, pp. 15) developed a study focused on 66 developing economies between 2000 and 2009. The countries were divided into two groups: upper-middle-income economies and lower-middle-income economies. The study concludes that R&D investments have a significant impact on economic growth in developing countries. There is

a positive impact on economic growth in upper-middle-income countries, whereas in countries with low income the impact is insignificant.
Tuna et al. (2015, pp. 506) ran the Johansen Cointegration test and Granger Causality test on data collected from Turkey between 1990 and 2013. The results showed that there is no evidence of a long-term connection between real R&D expenses and the economic growth series. This could be due to the fact that Turkey is considered to be a developing country, where significant investments into R&D have been made in the past decades. However, the benefits won't be visible in the economy for the next 20 to 35 years.
Silaghi et al. (2014, pp. 110) used a dynamic panel model to explore the existing relationship between public and private R&D spending and economic growth. The findings showed that an increase of 1% in private R&D spending will result in a 0,2% increase in economic growth, concluding that the relation is not significant.
Another research paper that focused on emerging countries was carried out by Vuckovic (2016, pp. 2) during 1991 and 2013. Results show that there is no statistical relationship between economic growth (GDP growth rate) and innovation (number of patent applications per million population). Another finding of the study investigates the negative impact that foreign direct investments have on the number of patent applications. Multinational companies, who represent the main foreign direct investors in the economy, reduce the number of patent applications by transferring know-how in the emerging economies.
Countries that fail at implementing sensible innovative policies are at risk of experiencing the reality of global innovative arbitrage (Thierer, 2016). The innovation process wanders the same way capital moves around the world, in search of the highest returns. The innovationists can, and many actually do so, move to states or continents that pride themselves on supporting entrepreneurial activity in a legal and regulatory environment.
A good example (Andreessen, 2014) to support the above mentioned is what happened to Amazon in the US, at the end of 2013. The company was interested in using drones for faster package delivery, but before the testing phase began it encountered strict policies imposed by the Federal Aviation Administration and decided to move its R&D and operational testing to UK and Canada.
There are several authors (Ford, 2015 and Wallach, 2015) that underrate the innovation effects on technology and focus on the disruptive effects linked to changes in the technological environments.

3. Innovation in Europe: a comparison across four CEE Eurozone candidates

Even though Europe has a great innovative potential, the growth process is still laborious. The slow innovation diffusion intensifies the existing difference in productivity between the most and the least productive companies.
The European Innovation Scoreboard (EIS) offers a comparative analysis of the performance in Research & Development (R&D) and emphasizes the strengths and threats faced by the national innovation systems.
According to the 2019 EIS Report, EU innovation performance has grown on average by 8.8% since 2011, as a result of the strong performance of 25 member states, while Romania decreased by 10.7% in the same period. The fastest-growing performers are Lithuania, Greece, Latvia, Malta, Estonia, and the Netherlands. The report also shows that the convergence process, which allows lower performing countries to grow at a faster rate than higher performing countries, has speeded up in the EU in 2018.
According to EIS 2019, it was the fourth consecutive year of growth in Europe. Based on performance, the innovation categories are innovation leaders, strong innovators, moderate innovators, and modest innovators.

Poor results are registered in Bulgaria (48.72) and Romania (34.13), where performances were below 50% of the European average. Sweden is the 2019 EU innovation leader (147.74 out of a maximum of 150), followed by Finland, Denmark, and the Netherlands.

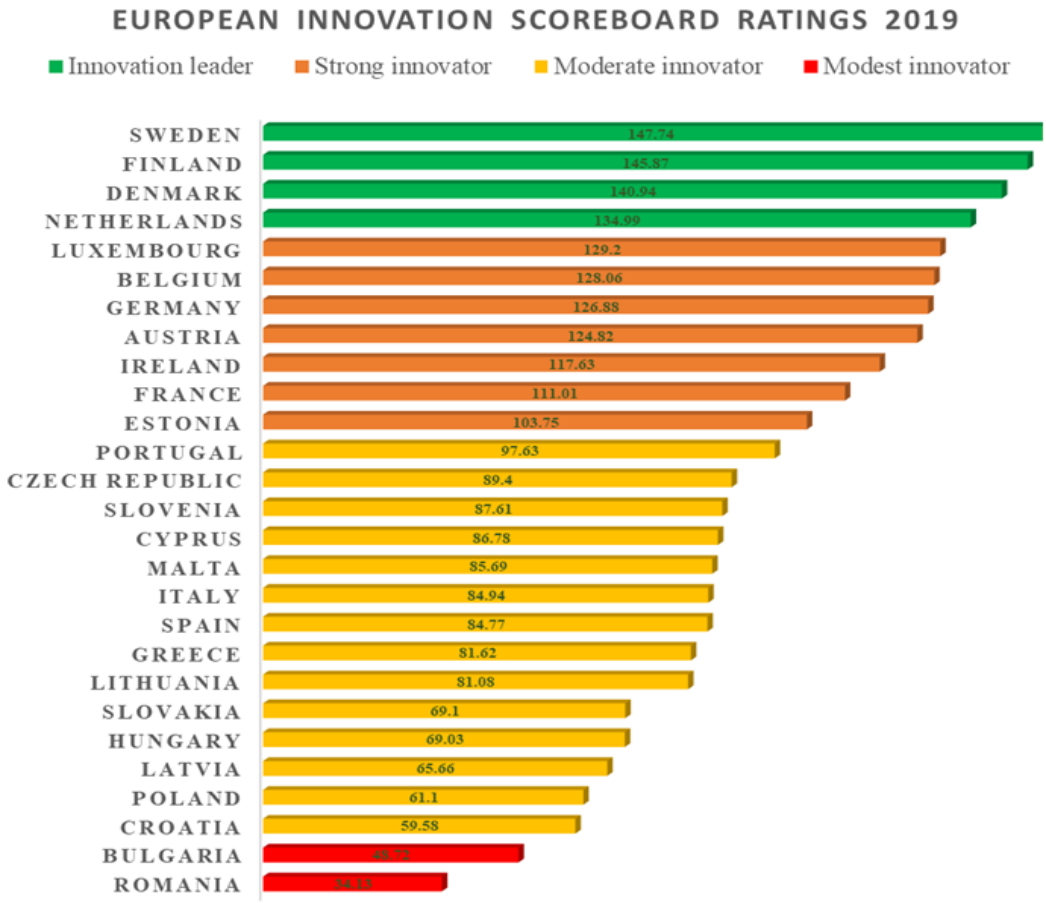

Figure 1: European Innovation Scoreboard Ratings 2019
Source: Own computation based on European Commission data.

The four countries selected for the comparative study are all CEE EMU candidates: Romania (rank 28), Poland (rank 25), Hungary (rank 23) and Czechia (rank 14). With the exception of Romania, all the other countries are moderate innovators. The same hierarchy is followed by the R&D expenditure as a percentage of GDP. The increase between 2014 and 2018 registered in Romania (target 2%), Poland (target 1.7 %), and Hungary (target 1.8%) is not enough, as the countries are still far from reaching the imposed target. Czechia has cut back on R&D expenditure, but the 1% target is still achieved.

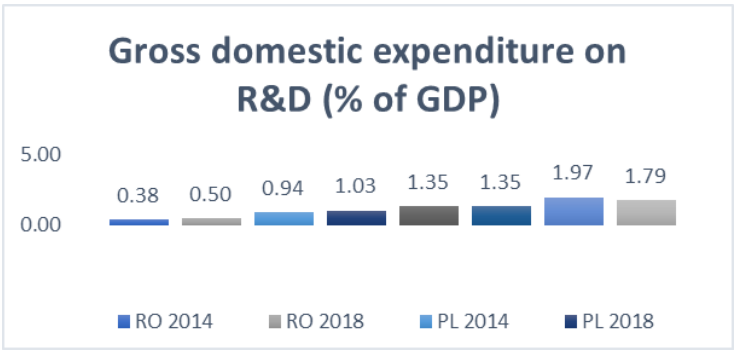

Figure 2: Gross domestic expediture on R&D in Romania, Poland, Hungary and Czechia (% of GDP) in 2014 and 2018
Source: Own computation based on European Commission data.

The performance relative to EU in 2011 analysis shows that, although after 2011 there was a decrease in innovation, all the states except for Romania managed to reach a higher score in 2018 compared 2011.

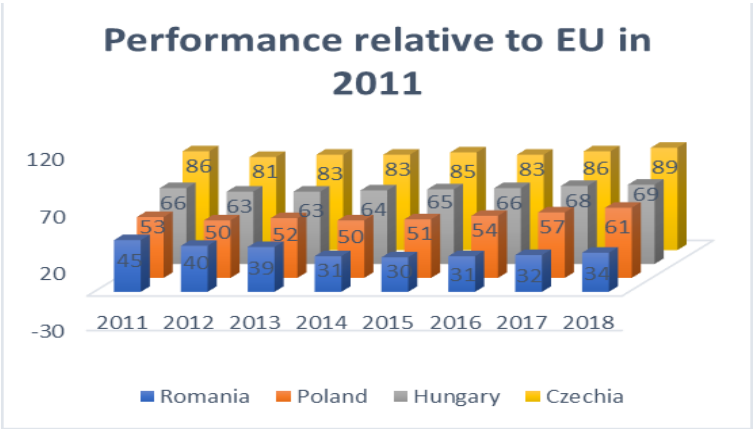

Figure 3: Performance relative to EU in 2011 between 2011-2018 for RO, PL, HU, CZ.
Source: Own computation based on European Commission data.

By analyzing each country's profile, we can better understand the measured results and issue some future recommendations. In order to do so we have created individual SWOT analyses.
The lack of innovation has placed Romania last in the EU and this statistic has worsened since 2010. Public investment in R&D is the lowest in the EU (0.5% of GDP) and public R&D expenditure has declined from 0.32% of GDP in 2011 to 0.21 % of GDP in 2017.
Some innovation deficient areas are number of PhD graduates, opportunity-based entrepreneurship, risk capital expenditure, and available human resources. Strongest innovation markers are broadband penetration and medium and high-tech product exports.

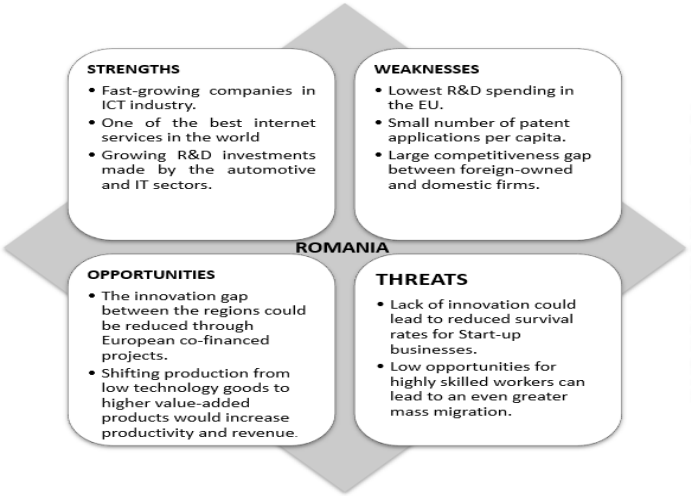

Figure 4: Innovation SWOT analysis for Romania
Source: Own computation based on European Commission data.

Poland's strong economic performance from the past decade has been fueled by the manufacturing and export of relatively low-technology products. The need for investments in technology is pressing, as the population is aging, and the retirement age was reduced. Gross domestic expenditure on R&D level barely reaches half of the European average.
Overall, Poland is currently ranking well under the EU average when it comes to innovation and productivity, much like its Eastern European neighbors. However, recent legal efforts to address these issues along with an increase in financing for the academic community should have a positive effect in the years to come.

Figure 5: Innovation SWOT analysis for Poland
Source: Own computation based on European Commission data.

Innovation has been declining Hungary when compared to other countries in the European Union. Just like Romania, Hungary displays an insignificant entrepreneurial culture with few patent applications and not many innovative businesses shifting towards globalizing.

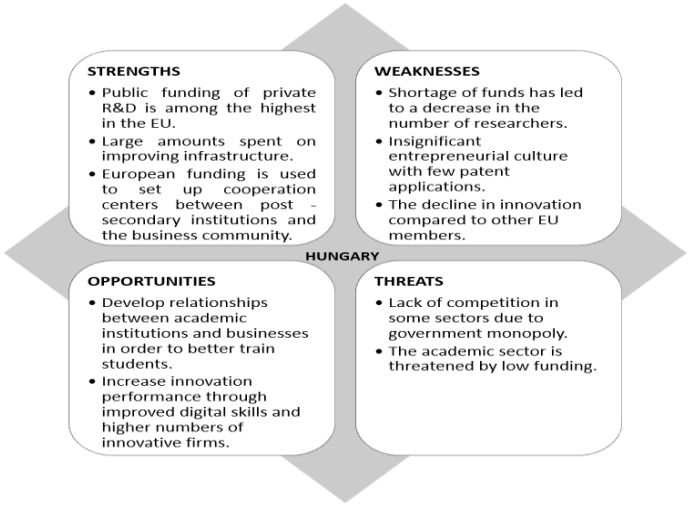

Figure 6: Innovation SWOT analysis for Hungary
Source: Own computation based on European Commission data.

The Czech Republic is performing far better than its Eastern European peers when it comes to innovation and productivity, although there is lots of room for improvement. The economy of the Czech Republic is mainly dominated by manufacturing and further investments in education need to be made in order to prepare the population for technological advancements the future will bring. The country is a moderate innovator, scoring just about average at EU levels despite the significant increase in R&D intensity, mainly funded through European capital.

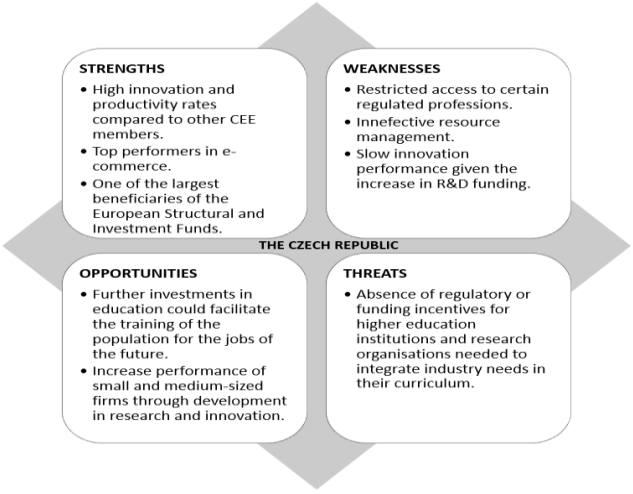

Figure 7: Innovation SWOT analysis for Czech Republic
Source: Own computation based on European Commission data.

4. Conclusions

Innovation is a powerful engine for driving economic growth, while also facilitating the creation of better paid jobs.

The European Innovation Scoreboard provides a comparative analysis of innovation performance for EU states and examines the strengths and weaknesses of national innovation systems. According to EIS 2019, Romania is a modest innovator and remains the EU member state with the lowest innovation score. The ranks for the four countries selected for the comparative study are: Romania (rank 28), Poland (rank 25), Hungary (rank 23) and Czechia (rank 14).

Even though we notice similar patterns causing innovation to stagnate in the four countries analyzed, we also believe that there are plenty of opportunities for development in the years to come, such as supporting creation of Start-ups, providing better access to financing instruments for small and medium-sized businesses, and reducing the innovation gap at a sub-national level. A strength that stands out is the improvement of legislation benefiting companies that engage in R&D activities. The most significant weakness is the lack of a strong relationship between the academic and business communities. The countries are threatened by a large productivity gap between domestic and foreign-owned businesses.

Although this is a highly debated matter, we believe there is a strong correlation between innovation and economic growth, as demonstrated by several studies presented in the Literature review section. We can therefore consider that innovation leads to an increase in GDP per capita and helps countries improve their real convergence. Romania and the other candidates would benefit from increased investments in innovation that would support the economic convergence requested by EMU.

References

Andreessen, M., 2014. *Turn Detroit into Drone Valley*. Politico, Available at: https://www.politico.com/magazine/story/2014/06/turn-detroit-into-drone-valley-107853, [accessed 14.12.2019].

Broughle, J., Thierer, A., 2019. *Technological innovation and economic growth: A brief report on the evidence*. Mercatus Center, George Mason University [online], Available at: https://www.mercatus.org/system/files/brougheltechnological-innovation-mercatus-research-v1.pdf, [accessed 11.11.2019].

Cameron, G., 1998. Innovation and growth: a survey of the empirical evidence. *Working Paper*, Nuffield College, Oxford, pp. 1-34, Available at: https://pdfs.semanticscholar.org/ba6b/ d52fb55d3e6d6f4566c974895220526ac6f0.pdf, [accessed 14.12.2019].

European Commission, 2019. *European Innovation Scoreboard*. Available at: https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en, [accessed 10.10.2019].

Fagerberg, J., Verspagen, B., Srholec, M., 2010. Innovation and Economic Development. *Handbook of the Economics of Innovation* [online], Volume 2, pp. 833-872, North Holland, Available at: www.sciencedirect.com/science/article/pii/S0169721810020046?via%3Dihub.

Ford, M., 2015. *Rise of the Robots: Technology and the Threat of a Jobless Future*. Basic Books, Available at: https://www.uc.pt/feuc/citcoimbra/Martin_Ford-Rise_of_the_Robots.

Gerguri, S., Ramadani, V., 2010. The Impact of Innovation into the Economic Growth. *Munich Personal RePEc Archive* [online], Paper No. 22270, Available at: https://mpra.ub.uni-muenchen.de/id/eprint/22270, [accessed 05.01.2020].

Gurbiel, R., 2002. Impact of innovation and technology transfer on economic growth: The Central and Eastern Europe Experience. *Warsaw School of Economics* [online], pp. 1-18, Available at: https://www.eadi.org/typo3/fileadmin/WG_Documents/Reg_WG/ gurbiel.pdf, [accessed 16.01.2020].

Inekwe, J. N., 2014. The Contribution of R&D Expenditure to Economic Growth in Developing Countries. *Social Indicators Research*, pp. 1-19, Available at: https://www.jstor.org/stable/24721667, [accessed 15.12.2019].
Iyoboyi, M., Na-Allah, A, 2014. Innovation and economic growth: evidence from Nigeria. *EuroEconomica* [online], 33, 1 (1), pp. 1582-8859, Available at: http://journals.univ-danubius.ro/index.php/euroeconomica/article/view/2330/3163, [accessed 14.12.2019].
Kelly, B., Papanikolaou, D., Seru, A., and Taddy M., 2018. Measuring Technological Innovation over the Long Run. *NBER Working Paper* [online], No. 25266, Available at: https://www.nber.org/papers/w25266.pdf, [accessed 02.12.2019].
Maradana, R. P, Pradhan, R. P., Dash, S., Gaurav, K., Jayakumar, M., and Chatterjee, D., 2017. Does innovation promote economic growth? Evidence from European countries. *Journal of Innovation and Entrepreneurship* [online], Springer, 6 (1), pp. 1-23, Available at: http://link.springer.com/10.1186/s13731-016-0061-9.
Nadiri, I.,1993. Innovations and Technological Spillovers. *NBER Working Papers* 4423 [online], National Bureau of Economic Research, Cambridge, MA, Available at: http://www.nber.org/papers/w4423.pdf, [accessed 10.12.2019].
Pece, A.M., Simona, O.E., Salisteanu, F., 2015. Innovation and economic growth: An empirical analysis for CEE countries. *Procedia Economics and Finance* 26 [online], pp. 461 – 467, Available at: https://www.sciencedirect.com/science/article/pii/S2212567115008746.
Pessoa, A., 2007. Innovation and Economic Growth: What is the actual importance of R&D?. *FEP Working Papers* [online], no. 254, pp. 1-17, Available at: https://www.researchgate.net/publication/24111638_Innovation_and_Economic_Growth_What_is_the_actual_importance_of_RD, [accessed 10.11.2019].
Petrariu, I.R., Bumbac, R., Ciobanu, R., 2013. Innovation: a path to competitiveness and economic growth. The case of CEE countries. *Theoretical and Applied Economics* [online], XX, 5 (582), pp. 15-26, Available at: http://store.ectap.ro/articole/857.pdf.
Pradhan, R. P., Arvin, M. B., Hall, J. H., and Nair, M., 2016. Innovation, financial development and economic growth in Eurozone countries. *Applied Economics Letters* [online], 23(16), pp. 1141–1144, Available at: https://repository.up.ac.za/handle/2263/57404.
Ranchordás, S., 2015. Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy. *Minnesota Journal of Law, Science & Technology* [online], Available at: http://wpressutexas.net/cs378h/images/5/57/Does_Sharing_Mean_Caring.pdf.
Romer, P.M., 1986. Increasing Returns and Long-Run Growth. *The Journal of Political Economy* [online], 94, pp. 1002-1037, Available at: http://www.dklevine.com/archive/refs42232.pdf, [accessed 11.11.2019].
Rosenberg, N., 2004. *Innovation and economic growth*. Organization for Economic Co-operation Development. [online] Available at: https://www.oecd.org/cfe/tourism/34267902.pdf, [accessed 05.01.2020].
Schumpeter, J., in McDaniel, B. A., 2002. *Entrepreneurship and Innovation: An Economic Approach*, M.E Sharpe, pp. 57-58, Available at: https://content.taylorfrancis.com/books/download?dac=C2014-0-39866-3&isbn=97813174 71387&format=googlePreviewPdf.
Silaghi, M. I. P., Alexa, D., Jude, C., and Litan, C., 2014. Do Business and Public Sector Research and Development Expenditures Contribute Economic Growth in Central and Eastern European Countries? A Dynamic Panel Estimation. *Economic Discussion Papers 2012-4* [online], pp. 108-119, Available at: https://ideas.repec.org/p/ris/kngedp/2012_004.html, [accessed: 17.12.2019].
Solow, R., 1956. A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics* [online], 70 (1), pp. 65-94, Available at: http://piketty.pse.ens.fr/files/Solow1956.pdf, [accessed 08.11.2019].

Thierer, A., 2016. *Innovation Arbitrage, Technological Civil Disobedience & Spontaneous Deregulation*. Technology Liberation Front, Available at: https://medium.com/tech-liberation/innovation-arbitrage-technological-civil-disobedience-spontaneous-deregu lation-eb90da50f1e2, [accessed 15.01.2020].
Tuna, K., Kayacan, E., Bektas, H., 2015. The Relationship Between Research & Development Expenditures and Economic Growth: The Case of Turkey. Procedia – *Social and Behavioral Sciences* [online], 195, pp. 501 – 507, Available at: https://www.sciencedirect.com/science/article/pii/S1877042815037349?via%3Dihub.
Ulku, H., 2004. R&D, Innovation, and Economic Growth: An Empirical Analysis. *International Monetary Fund Working Papers* [online], WP/04/185, pp. 2-35, Available at: https://www.imf.org/en/Publications/WP/Issues/2016/12/30/R-D-Innovation-and-Economic-Growth-An-Empirical-Analysis-16927, [accessed 11.11.2019].
Vuckovic, M., 2016. The relationship between innovation and economic growth in emerging economies. *Forschungsforum der Osterreichischen Fachhochschulen* [online], Available at: http://ffhoarep.fh-ooe.at/bitstream/123456789/738/1/130_323_Vuckovic_ FullPaper_en_Final.pdf, [accessed 12.11.2019].
Wallach, W., 2015. *A Dangerous Master: How to Keep Technology from Slipping beyond Our Control*. Basic Books.

Bio-note

Otilia Floroiu is a PhD student in fifth year of study at Stefan cel Mare University of Suceava and is currently working on her PhD thesis: “Efficient Strategies for the Euro Currency Adoption in Romania”.

CHARACTERISTICS OF THE GREEN SUPPLY CHAIN COORDINATION: THEORETICAL CONTRIBUTION TO USE THE WHOLESALE PRICING CONTRACT IN THE GREEN SUPPLY CHAIN

Tamas Faludi
Institute of Management, Science Faculty of Economics, University of Miskolc, Miskolc, Hungary
szvft@uni-miskolc.hu

Abstract: *Because of the eco-consciousness and the environmental protection companies become 'green', therefore many green supply chains are realized in the business sphere. Companies of green supply chain take care on the environmental protection. These companies try to decrease the pollution, so they implement some eco-conscious processes. The green supply chains contain these companies. The biggest problem is the coordination of these chains. Nowadays, supply chains have many members, so the cooperation is getting more and more difficult. It could be a potential good solution, if the chain members use the different contract types to coordinate the chain. Contract tries to handle the inequality between the chain members and gives a framework to the cooperation of chain members. This paper introduces the wholesale pricing contract, which can be used in the case of green supply chain and its different settings effectively. The wholesale pricing contract is one of the traditional contract types but it produces different performance in the case of centralized and decentralized setting. Centralized setting has a chain leader – this member operates and coordinates the whole chain and defines common goals for the members. In decentralized setting the members define their own goals and they act in accordance with their own interest. A simulation with numerical example is also included to represent the difference between the two settings.*

Keywords: Supply Chain Coordination, Contract Types, Green Supply Chain Management, Wholesale Pricing.

JEL classification: D21, L11, L14, M10.

1. Eco-consciousness and the supply chains in the 21st century

The eco-consciousness is an expanding subject both in the civil and the business sphere. Nowadays, this is a very important issue, because humanity has to stop or at least decrease the pollution of the Earth.

Companies can implement eco-conscious processes for example into the manufacturing or the distributing system. But it does not matter how much the cost of the implementation of these processes. Some companies would not like to – or simply just cannot – carry extra costs. However, more and more companies have the willingness to invest in favour of the environmental protection. These investments make the companies to be green. Not only the companies can be green, but also the supply chains – if a supply chain or network contains only green companies, it is called green supply chain.

In the 21st century, the numbers of green supply chains are increasing and the growing trend within the chain is realized as well. Many other partners (suppliers, logistics companies, etc.) join to the chains, so the coordination is getting more difficult.

Therefore this paper is based on the coordination of green supply chain with the help of one of the most popular contract type – the wholesale pricing contract. A numerical example represents the efficiency of this type.

2. Characteristics of green supply chains

The first concept of green supply chain and the question of eco-consciousness were appeared in the ’60s and the ’70s. In later years the conception of eco-consciousness was the mixture of the early conception of supply chain management and the environmental management. Both disciplines converged to each other and when the inverse logistics was appeared on the scene, they have been merged (Miskolcziné, 2017).

Due to the merger and development of the supply chain management and the environmental management, in the beginning of the 2000s, it was called environmentally conscious supply chain management (ESCM) by Zsidisin and Siferd (2001). The goals of the ESCM were to create some measures to defend the environment. According to Beamon’s (2005) theory, this approach was not enough – all of the products and processes of the companies must have environmental feature as far as possible; it does not matter if the effects of these are indirect or direct.

In the year of 2008, Carter and Rogers had a publication about the sustainable supply chain management (SSCM). It was the second step of the evolution of green supply chains. According to Carter and Rogers, the sustainable supply chain management also prefers the profitability; therefore, the profitability has to be combined with the social and the environmental criteria. Harms (2011) defined the helping areas to the implementation of Carter and Rogers’ theory (Figure 1).

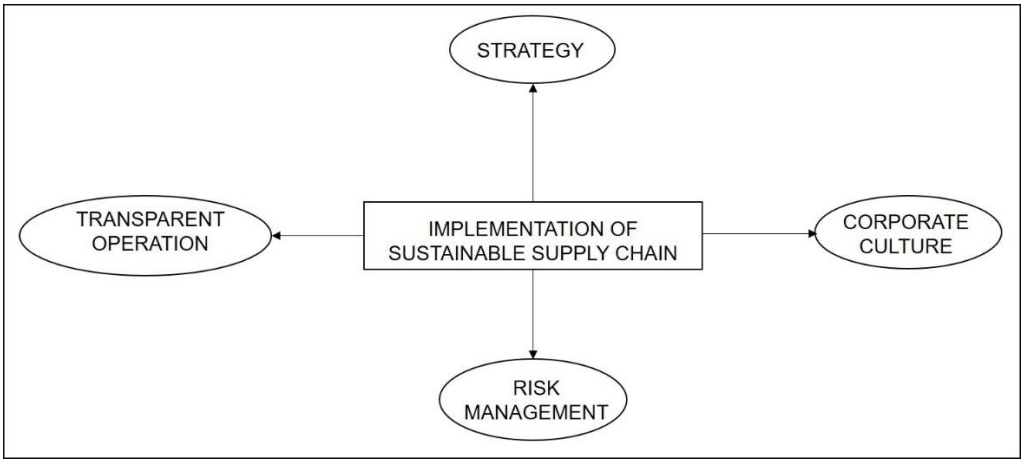

Figure 1: Conditions of the sustainable supply chain
Source: Own construction by Harms (2011)

The eco-consciousness management had a widespread name which is also used nowadays – it is called green supply chain management. Miskolcziné (2017) distinguishes two main approaches:

- one defines the methodologies, tools to reach the eco-conscious goals;
- second defines the processes and activities of the green supply chain management (Miskolcziné, 2017).

So, it means that first of all company has to define the eco-conscious goals. To reach these goals, the methodologies and tools has to be also determined. These methodologies and tools must be used in some basic business processes and activities. Consequently, this process is the condition of the green supply chain management (Figure 2).

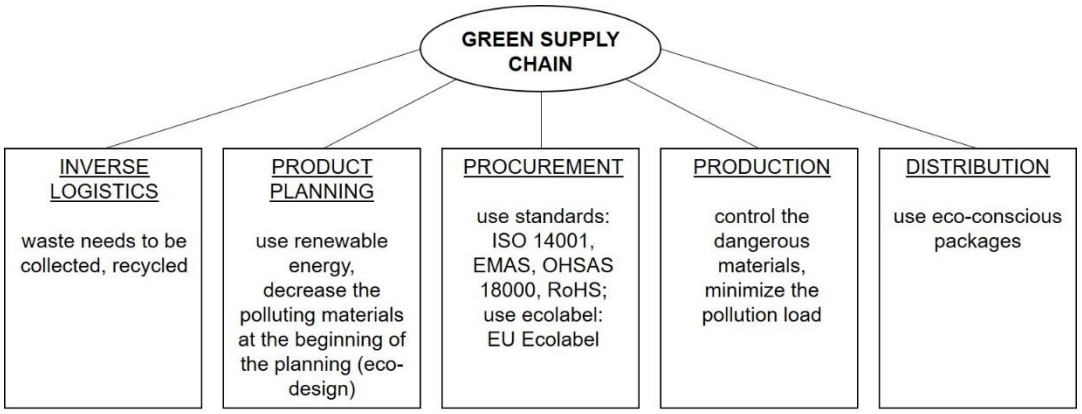

Figure 2: Conditions of the green supply chain
Source: own construction by Miskolcziné (2017) & Kovács et al. (2018) & Bándi (2014)

In the case of green supply chains, the processes of the logistics, the product planning, the procurement, the production and distribution need to be eco-friendly, too. There are many 'green' choices to use to these areas, for example the totally recycling processes, the ecolabels, and the eco-conscious packages.
The closing of chain is the first step to be green the chain (Figure 3). The goal of the closed-loop chain is to collect and recycle things which are defined worthless by the costumers or the partners – for example defective products, packages, or some components. After the recycling, the company can resell them (Guide & van Wassenhove, 2008).

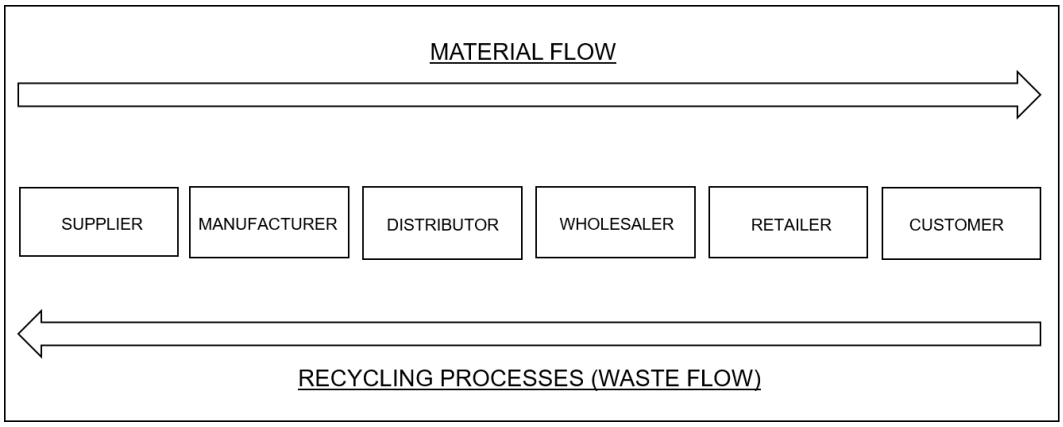

Figure 3: The closed-loop supply chain
Source: Own construction by Gaur et al. (2017)

The closed-loop supply chain needs the chain members to integrate the recycling processes into their corporate operations. At the end of the chain, the customer also has the responsibility for the closed-loop chain. One possible solution, if customer reuses the products.
The distributors can recycle the used packages. With this process, they help to close the chain.
The retailers' and the wholesalers' recycling process can be combined with the 'milk-run'. Milk-run is an optimization process, used by the supply chain management. The goal is to

reduce the shipping charges by using a delivery schedule. The order of the stations is determined. If they unload the package at the station, they can load and deliver the wastes (for example some recyclable bottles) as well. With this process the company can reduce the unit cost of the transportation – the vehicle will be never empty, and the wastes will be recycled.
The wastes of the manufacturers can be remanufactured. For example, plastic wastes can be prepared in granule form again, if the company grinds the plastic wastes, and the company reuses it or sell to a partner to further manufacturing processes. Unfortunately, this could not be a choice for every company. If the company is not able to reuse or resell the wastes, it can use the landfill to handle their wastes.
Thus, if companies use some recycling process, the pollution can be reduced and the profit can be realized at the same time.

3. Supply chain coordination by contracts – literature review

Coordination of the supply chains is getting a very important research topic regarding to both of the green and the traditional supply chains. The new trend is the expanding of supply chains. The cause of this phenomenon is the increasing number of the cooperating partners within the chains.
Supply chain management suggests two groups to coordinate the chain – hard factory and soft factors can be used. The hard factors, especially the contracts are included by much recent researches.
As a hard factor, contracts can coordinate the supply chain, because contracts try to handle the inequality between the chain members, it derives from the different levels of dominance which is appeared in the chain. If a chain member is more dominant than the others, it can provide better conditions in favour of itself – but it can be the source of many conflicts. Contracts try to cease the differences and decrease the number of the conflicts. Contracts provide a framework for cooperation; they show how partners share risks and benefits under uncertain supply or demand (Coltman, et al., 2009).
Several authors analyse the coordination-power of different types, make numerical examples to determine the advantages and disadvantages of using. There are traditional contracts – for example the wholesale pricing contract, but some authors try to mix for example some traditional contracts to create some hybrid or extremely complex types, because these solutions can be relevant to the coordination issue (Katok & Pavlov, 2013; Zhang et al., 2013).
This paper would like to introduce one of the typically contracts which can be used in the case of green supply chains as well. An important question is the settings of supply chains, because it can influence the performance.
Centralized setting is preferred by the literature, because in this case, there is a decision maker, who controls, manages the whole supply chain and maximizes the total profit of the whole supply chain (Giannoccaro, 2018).
In case of decentralized setting, the chain members do not strive for the effective cooperation, because they act in accordance with their own interest. It means that the total profit can be less. Thus, the cooperation, the information-sharing mechanisms and so the effectiveness won't be satisfactory.
According to the researcher's opinions, the centralized setting is preferred in a classic supply chain. The question is the following: is it a correct statement in the case of a green supply chain or not?

4. Numerical example with the wholesale pricing

My analysis is based on the literature reviews, case studies, and some numerical examples and it contains fictive data. The aim of this numerical example is to represent the differences between the two settings of green supply chain. So, this is theoretical contribution with a simulation of a simple green supply chain with two members – the supplier and the manufacturer.

The analysis compares the total profit, the individual profit, the market price, the unit price and the quantity sold in the case of each setting both of centralized and decentralized settings. By the help of these values some conclusions could be drawn in relation of the performance of different settings.

The comparison is based on a simple green supply chain model with two members (Fig. 4).

Figure 4: The simple green supply chain model
Source: own construction

Table 1 summarizes the notations applied in the model.

Table 1: Notations

SYMBOL	DESCRIPTION
i	Constant
u	Constant
P_{market}	market price
P_{unit}	unit price
Q	quantity sold
C_{sup}	cost of supplier
C_{man}	cost of manufacturer
$\sum C$	total cost of the members
$\sum \Pi$	total profit
Π_{SUP}	individual profit (supplier)
Π_{MAN}	individual profit (manufacturer)

Source: own construction

The economic parameters of the calculation are shown by the Table 2.

Table 2: Economic parameters of the calculation

Parameter	Value
i	160
u	2,25
P_{market}	160 – 2,25Q
C_{sup}	55
C_{man}	40

Source: Own construction

The market price (P_{market}) is calculated by the simplified market demand function which contains the market constants (i, u) and the quantity sold (Q). The model's assumption is the members are aware of the information about the market demand.
There are differences between the calculations of factors about each supply chain settings. The Equation (1), (2), and (3) show the total profit, the quantity sold, the unit price, if the partners use wholesale pricing contract in case of centralized supply chain. Model's assumption the members share the total profit equally.
Equation (3) derives from the equal sharing mechanism of the total profit.

$$\mathrm{CEN};\ \sum\Pi = (\mathrm{i} - \mathrm{uQ} - \sum\mathrm{C})\mathrm{Q} = (\mathrm{P_{market}} - \sum\mathrm{C})\mathrm{Q} \tag{1}$$

(2)

$$\frac{\partial \mathrm{CEN};\ \sum\Pi}{\partial \mathrm{CEN};\ \mathrm{Q}} = 0 \quad \rightarrow \mathrm{CEN};\ \mathrm{Q} = \frac{\mathrm{i} - \sum\mathrm{C}}{2\mathrm{u}}$$

$$\mathrm{CEN};\ \Pi_{\mathrm{SUP}} = \mathrm{CEN};\ \Pi_{\mathrm{MAN}} \ \rightarrow\ \mathrm{CEN};\ \mathrm{P_{unit}} = \frac{\mathrm{P_{market}} - \mathrm{C_{man}} + \mathrm{C_{sup}}}{2} \tag{3}$$

Equation (2) is expressed from the Equation (1), because of the profit-maximization criteria – it is based on the market demand. It means if the partial derivative form of the total profit (Equation (1)) is equal to zero, the quantity can be expressed, and the Equation (2) is true.
With the help of the Equation (4) and (5) the individual profits can be determined.

$$\mathrm{CEN};\ \Pi_{\mathrm{SUP}} = \left(\mathrm{P_{unit}} - \mathrm{C_{sup}}\right)\mathrm{Q} = \left(\mathrm{P_{unit}} - \mathrm{C_{sup}}\right)\frac{\mathrm{i} - \sum\mathrm{C}}{2\mathrm{u}} \tag{4}$$

$$\mathrm{CEN};\ \Pi_{\mathrm{MAN}} = (\mathrm{P_{market}} - \mathrm{P_{unit}} - \mathrm{C_{man}})\mathrm{Q} = (\mathrm{P_{market}} - \mathrm{P_{unit}} - \mathrm{C_{man}})\frac{\mathrm{i} - \sum\mathrm{C}}{2\mathrm{u}} \tag{5}$$

It must be also used the Equation (2) to calculate the individual profits, because it needs to know the sold quantity. As the Figure 3 shows, the supplier gets the unit price from the manufacturer as an income, but his profit is decreased by his costs.
In the case of the manufacturer, his income is the market price, the decreasing factors are the unit price – which is paid to the supplier for the ordered quantity – and his own costs.
The factors are influenced by the quantity sold.
The (6), (7), (8), (9) and (10) equations calculate the previously represented values, but in this case the supply chain is decentralized.

$$\mathrm{DEC};\sum\Pi = \frac{3(\mathrm{i} - \sum\mathrm{C})^2}{16\mathrm{u}} \tag{6}$$

$$\frac{\partial \mathrm{DEC};\ \Pi_{\mathrm{MAN}}}{\partial \mathrm{DEC};\mathrm{Q}} = 0 \ \rightarrow\ \mathrm{DEC};\mathrm{Q} = \frac{\mathrm{i} - \mathrm{P_{unit}} - \mathrm{C_{man}}}{2\mathrm{u}} \tag{7}$$

$$\frac{\partial \mathrm{DEC};\ \Pi_{\mathrm{SUP}}}{\partial \mathrm{DEC};\ \mathrm{P_{unit}}} = 0 \quad \rightarrow\ \mathrm{DEC};\ \mathrm{P_{unit}} = \frac{\mathrm{i} - \mathrm{C_{man}} + \mathrm{C_{sup}}}{2} \tag{8}$$

$$\mathrm{DEC};\ \Pi_{\mathrm{SUP}} = \left(\mathrm{P_{unit}} - \mathrm{C_{sup}}\right)\mathrm{Q} = \frac{(\mathrm{i} - \sum\mathrm{C})^2}{8\mathrm{u}} \tag{9}$$

$$\mathrm{DEC};\ \Pi_{\mathrm{MAN}} = (\mathrm{P_{market}} - \mathrm{P_{unit}} - \mathrm{C_{man}})\mathrm{Q} = \frac{(\mathrm{i} - \sum\mathrm{C})^2}{16\mathrm{u}} \tag{10}$$

Equation (7) is expressed by the partial derivative form of the manufacturer's individual profit (10). The manufacturer must maximize his profit by the quantity sold because of the profit-maximizing criteria. Also for this reason Equation (8), the unit price derives from the supplier's profit (Equation (9)). Supplier of the decentralized setting maximizes the profit by the unit price.
The Equation (9) and (10) can be determined, if the constants and the costs – all of which describes the market demand – are used to the calculation.
Table 3 summarizes the results of applying the formulas and data of Table 1.

Table 3: Results

		WHOLESALE PRICING CONTRACT	
		Centralized setting	**Decentralized setting**
Q	100 pcs	14,44	7,22
$\mathbf{P_{market}}$	EUR	127,5	143,75
$\mathbf{P_{unit}}$	EUR	71,25	87,5
$\mathbf{\Pi_{SUP}}$	100 EUR	234,65	234,72
$\mathbf{\Pi_{MAN}}$	100 EUR	234,65	117,36
$\mathbf{\sum\Pi}$	100 EUR	469,44	352,08

Source: Own construction

As shown by the table, the centralized setting gives higher performance than the decentralized setting. The total profit of the whole supply chain is much higher, so the individual profit – in the case of the manufacturer – is also can be higher. Profit of the supplier is almost equally in both settings, there is no big difference between the values. Market and unit prices are also better; less than in the decentralized setting. Because of these prices members and costumers are interested in to buy larger quantity of product.
Results show the advantages of the centralized setting. In the long term, this setting can be profitable to the chain members, and of course to the whole chain.
The difference between the classic and green supply chain is the eco-consciousness. Increasing costs may be caused by the changes based on the eco-consciousness. So these costs can be influence the contracts, they can change the factors, and also the weights of the factors. For example, a green product can be more expensive, and it can influence the market price in the case of both contract types. The prices also can be determined by the quality of the green product and the degree of environmental impact. Therefore, the companies have to clarify the aspects of environmental protection, because green companies prioritise the reducing the environmental impact of their products or services even at the increasing costs.

5. Conclusions

There are no big differences between the behaviour of members whether in the traditional or in the green supply chains. The goal of both members in each case is to maximize the profit and reduce the costs at the same time. But the members of green supply chain have willingness to make investments and incur additional expenses to have eco-friendly processes. Many companies have saved capital to make the eco-consciousness investments. These companies are not price-sensitive ones. The quality of the product is more important than its price. However, in the traditional supply chain the price and the quality usually have the same importance, the same weights. Thanks to the centralized setting the cooperation helps to improve the quality of the green products. Therefore, centralized setting is recommended to the green supply chain as well.

In the case of decentralized setting the members' acting in their own interests, so there is only a minimal level of cooperation. It causes the problem – for example – if one member uses eco-consciousness manufacturing processes but other members do not. It is in the way of the existing of green supply chain. Another problem when the information is not available about the demand.
Therefore, the effective solution is the centralized setting whether the chain is green or not, but in the case of green supply chains the centralized setting is more important than in other cases. The numerical example shows the value-differences between the settings in proportion to the decentralized setting (Table 4).

Table 4: Differences between the settings of supply chain

Q	P_{market}	P_{unit}	$\sum\Pi$
CEN 200% > DEC	CEN 89% < DEC	CEN 81% < DEC	CEN 133% > DEC

Source: own construction

As Table 4 shows in decentralized setting companies can sell 50% less quantity of products – or double the quantity of products can be sold in the centralized supply chain, because the profit maximizing variable is the quantity sold – based on the market demand – in the centralized setting. The prices are lower in centralized setting than decentralized setting, because the profit maximizing variable is the unit price in the decentralized setting – 11% and 19% less are the market and the unit price. Thus, the total profit can be higher in the case of centralized supply chain.
In the case of green supply chain, the quality and the quantity of products are more emphasized and the prices are not strong influencing factors. Based on the results decentralized setting is appropriate for the green companies and the green supply chain as well. But decentralized setting is not high-level cooperation system, therefore members lose many information and with this the quality and the eco-friendliness of green products can be reduced which leads into dissatisfaction.
Basically, the centralized setting is recommended to every type of supply chain, including the green companies and green supply chains. With the help of the high-level cooperation, the coordinated strategies companies in the chain can be green easily; therefore, the whole chain can be green more easily.
The wholesale pricing contract can coordinate the chain very well, if the chain operates as a centralized supply chain. The simulation introduces a simple green supply chain model. The calculations include the standard factors; by the help of these factors the performance of the chain can be determined and the different settings become comparable.

6. Final discussion

Nowadays a very important question in both of the green and the traditional supply chain management is how the efficiency of supply chain coordination can be improved. In case of the green supply chain this topic is getting be more relevant, because there are more and more green supply chains. Soft and hard factors can be applied to coordinate the chain. The second group, namely the contracts can be a good solution according to the literature. One relatively frequent contract type was analysed in two different settings of supply chain. The difference between the centralized and decentralized green supply chain were demonstrated with the help of a simulation. As the results show the centralized setting of green supply chain becomes more efficient. It is very important to develop a more efficient cooperation – with better communication and trust the right level of cooperation can be reached. If the managers are able to change their attitudes and they prefer the long-term

cooperation, the supply chains can shift from the decentralized setting to the centralized setting.

The model has limitations. It does not quantify relevant values and weights in green supply chains, such as price and quality of products. Further research can be focused on how the different weights influence the company's decision makers – is it worth to be green or not – and also the performance of centralized or decentralized green supply chains, so it is recommended to use these additional variables in order to make the analyses more realistic. The simulation is based on two partners' relation; results can be improved, if the analysed green supply chain has more members.

References

Bándi, Gy., 2014. *Környezetjog*, Budapest: Szent István Társulat.

Beamon, B. M., 2005. Environmental and Sustainability Ethics in Supply Chain Management. *Science and Engineering Ethics,* 11 (2), pp. 221-234.

Carter, C. R., Rogers, D. S., 2008. A framework of sustainable supply chain management: Moving toward new theory. *International Journal of Physical Distribution & Logistics Management,* 38 (5), pp. 360-387, https://doi.org/10.1108/09600030810882816.

Coltman, T., Bru, K., Perm-Ajchariyawong, N., Devinney, T. M., Benito, G. R., 2009. Supply Chain Contract Evolution. *GR, European Management Journal*, 27 (6), pp. 388-401.

Gaur, J., Subramoniam, R., Govindan, K., Huisingh, D., 2017. Closed-loop supply chain management: From conceptual to an action-oriented framework on core acquisition. *Journal of Cleaner Production*, 167 (20), pp. 1415-1424.

Giannoccaro, I., 2018. Centralized vs. decentralized supply chains: The importance of decision maker's cognitive ability and resistance to change. *Industrial Marketing Management*, 73, pp. 59-69., https://doi.org/10.1016/j.indmarman.2018.01.034.

Guide, V. D. R., van Wassenhove, L. N., 2008. The evolution of closed-loop supply chain research. *Faculty & Research Working Paper*, INSEAD, Fontainebleu.

Harms, D., 2011. Environmental Sustainability and Supply Chain Management – A Framework of Cross-Functional Integration and Knowledge Transfer. *Journal of Environmental Sustainability*, 1 (1), pp. 1-23., https://doi.org/10.14448/jes.01.0009.

Katok, E., Pavlov, V., 2013. Fairness in Supply Chain contracts: A laboratory study. *Journal of Operations Management*, 31 (3), pp. 129-137., https://doi.org/10.1016/j.jom.2013.01.001

Kovács, L., Pónusz, M., Kozma, T., 2018. A zöld beszerzés stratégiai jelentősége. *Együttműködési láncok, Hatékonyság és IT, Logisztikai trendek és legjobb gyakorlatok IV*. évf. 1. szám, május, pp. 28-32.

Miskolcziné, G. M., 2017. *Zöld ellátási lánc menedzsment átfogó vizsgálata a hazai közúti gépjárműiparban*, Doktori (PhD) értekezés, Gödöllő: Szent István Egyetem,.

Zhang, Q., Dong, M., Luo, J., Sergerstedt, A., 2013. Supply chain coordination with trade credit and quantity discount incorporating default risk. *International Journal of Production Economics*, 153, pp. 352-360., https://doi.org/10.1016/j.ijpe.2014.03.019.

Zsidisin, G. A., Siferd, S. P., 2001. Environmental purchasing: A framework for theory development. *European Journal of Purchasing & Supply Management* 2001/7, pp. 61-73.

Bio-note

Faludi, is a *PhD student* at the *University of Miskolc, Faculty of Economics, Institute of Management Science* and member of the several research teams developed within the projects implemented by the Faculty. Faludi's research topic is focused on the supply chain coordination, especially the coordination with the help of different contract types.

THE USE OF COLLABORATIVE PLATFORMS IN ROMANIA AND EU: A COMPARATIVE VIEW

Elena Ştiubea
Doctoral School of Economic Sciences, Faculty of Economic Sciences, University of Oradea, Oradea, Romania
elena_stiubea@yahoo.com

Abstract: *The term collaborative economy encompasses various activities that have emerged and developed rapidly in recent years through online collaboration platforms. In this article, we will review what the sharing economy means, what are the positive and negative consequences of such a phenomenon, what are the organizations that support the sharing economy. It can be said that the sharing economy is a reconversion of the traditional economy, which supports a society based on sustainability but, at the same time, must be prepared to respond to the challenges and criticisms brought. In the second part, we examine recent trends in the use of collaboration platforms in Romania and in the European Union (EU-28), focusing on general and more specific features regarding the profile of users, the type of services used and the main advantages and disadvantages of the collaborative economy in relation to traditional trade in goods and services. The data used in this analysis comes mainly from the recently published European Commission survey on the use and provision of services through collaborative platforms, as well as from the corresponding survey previously published in 2016 on the same topic.*

Keywords: sharing; platforms; advantages and disadvantages; type of services; EU, Romania

JEL classification: O35

1. Introduction

The last decade has represented for the present society a transformation from traditional systems to digital systems, supported of course by the worldwide development of the Internet. At the same time, the last decade is marked by significant economic fluctuations, such as the economic crisis of 2008, climate change, due to the contemporary lifestyle, with immense consequences on the environment, but also from the fear of the population for the depletion of certain resources. In addition to technological developments, increasing urbanization has also made it possible to bring together a large number of economic actors to develop joint activities. The concentration of people living in the immediate vicinity of the big urban agglomerations has expanded the opportunities for exchange of activities in the common economy, and the digital progress has facilitated the contact between the remote participants.

2. Theoretical overview

The concept of "sharing economy" is a consequence of the massive and accelerated digitalization of the contemporary society and at the same time it can be an answer to the current problems of the society. As Belk (2014) stated, the sharing economy was born with the emergence and development of the Internet worldwide, but the idea of "collaborative consumption" appeared long before the emergence and development of the Internet. In 1978 Felsin and Spaeth (1978) sought to research common activities and social

consumption. They considered that buying a container of beer in common was more cost-effective than purchasing individual glasses (Felsin and Spaeth, 1978).

In the current context, the definition of this phrase has been made by both academics and practitioners. The first author to discuss the topic of sharing economy was Ray Algar, in 2007, in his article entitled "Collaborative consumption" (Algar 2007) in the Leisure Report newsletter. However, the topic became popular only in 2011, when Botsman and Rogers published their book "What's Mine Is Yours: The Rise of Collaborative Consumption" (Bostman and Rogers, 2010). Koen Frenken, a professor at Utrecht University, defined the collaborative economy, in his 2017 paper entitled "Putting the collaborative economy in perspective", as that economy where: "consumers who grant each other temporary access to used physical assets (capacity inactive), possible for money" (Frenken and Schor, 2017).

A crude definition of sharing economy can be the exchange of goods or services between two or more individuals, facilitated by an online platform. The People Who Share, an organization that advocates for this type of economy defines sharing economy as “A socio-economic ecosystem built around the sharing of human and physical resources. It includes the shared creation, production, distribution, trade and consumption of goods and services by different people and organisations” (Matofska, 2019). Analyzing the last definition, it can be said that people, especially modern consumers, have more practical thinking and are more oriented towards the benefit/satisfaction that a product or service can offer than ownership over them. Sharing economy comes to meet them, offering a fast and cheap way to adapt the demand with the supply of goods and services (Coyle, 2016).

Although, in the last period, the sharing economy has started to become a popular field of research for academics and practitioners (Arcidiacono et al., 2018, Kumar et al., 2018) and a number of definitions have been elaborated, there is not yet a universally accepted definition (Dredge and Gyimóthy, 2015; Görög, 2018). An argument in this regard could be that the sharing economy covers a very wide range of domains that includes many types of platforms or modes of sharing, these differences leading to inconsistencies in the way researchers conceptualize this phenomenon (Habib et al., 2016).

The study of sharing economy by academics was generally unclear and heterogeneous and there was no agreement regarding the terms used when it comes to this economic model. Thus, in the specialized literature referring to the sharing economy we find phrases such as "collaborative consumption" (Botsman and Rogers, 2010), "product service systems" (Mont, 2002) or "access-based consumption" (Bardhi and Eckhardt, 2012). This was also due to the very rapid evolution of the last years, which prevented the emergence of a common terminology.

Sharing economy is spreading globally at an accelerated pace. If at first the sharing economy gained the greatest popularity in developed countries such as USA, UK or Australia, lately developing countries have already started to adopt the new economic model. In addition, countries with a medium-sized economy have great potential to benefit from collaborative practices to attenuate the lack of access to resources. Companies such as Airbnb and Uber have already entered the markets of Latin America, Asia, the Middle East and Africa (Perren and Grauerholz, 2015), while local entrepreneurs have developed businesses to solve problems such as access to education and financing. The sharing economy communities are formed with the explicit purpose of facilitating the economic exchange of goods and services between people and rarely pay special attention to the brand.

Around this phenomenon, a multitude of opinions have been created, some of which come to encourage and praise this economic model, others but express their disagreement and criticize how it influences the market and society. Regardless of the opinions, it is clear that this topic has managed to stir up a succession of polemics.

Among those who support sharing economy are Bostman and Rogers. They bring to the fore the benefits that this economic model has on the underutilized assets. For example, most of

the power drills are used for less than 13 minutes throughout their life cycle (Botsman and Rogers, 2010); when consumers have the opportunity to rent or sell a good / service to other consumers, the impact on the environment can be reduced, while maximizing its use over the life of the product. In short, the sharing economy can result in more sustainable consumer behaviors that benefit individual consumers, businesses and society (Botsman and Rogers, 2010). The benefits of sharing economy on the environment are also noted by Firnkorn and Müller, 2011. In their work "What will be the environmental effects of new free-floating car-sharing systems? The case of car2go in Ulm", they argue that sharing and cooperation allow a more intensive use of assets, offering a better "leverage" of the natural capital that is "trapped" in a particular product. If we refer to the environment, the common economy is promoted as a sustainable solution (Firnkorn and Müller, 2011).

In addition to the benefits offered, the sharing economy also faces significant challenges: from the balance to be found between market experiences and truly non-profit experiences and those from person to person (p2p), to the attempts to avoid new inequalities and socio-economic exclusions; from the innovative impulse to the arrangements and the logic of the business organization to the coexistence and mutual exchange with the existing organizations; from the ability to build new communities and new forms of relationships to the risks related to the formation of possible transnational communities.

Even though the sharing economy is a model that has many advantages and supports a sustainable lifestyle, there are also opinions that do not support this idea.

Edelman et. al. (2015) raise in their work problems related to discrimination, to the right of ownership over the data, the possibility of selling, sharing, evaluation. No institution has real-time information about what generates online platforms, if the rights of each individual are respected, this being criticized by the authors in their work on sharing economy.

Although sharing economy has a high potential, based on sustainability, to lead to economic growth, this phenomenon is framed in contradictory ways. While some researchers applaud this idea, others believe that over time this phenomenon would lead to market destabilization and negative effects on the economic system (Schofield, 2014). Morozov argues that it is a form of "neo-liberalism on steroids" that markets the aspects of previous life beyond the reach of the market (Morozov, 2013). Schofield criticizes the idea of Airbnb and Uber, concepts based on sharing economy, considering that it opens the way to unregulated markets, from person to person, with a strong negative social impact (Schofield, 2014). Another criticism of the sharing economy is that those who benefit from income as a result of participating in the activities included in this category also have another source of income. As a percentage, only 30% are those that are based solely on income from sharing economy activities (Schor et al., 2014). Many activists do this only to increase their income and to afford more expensive goods or services. This only deepens social inequalities from the middle class to those with very low incomes. Another criticism of the sharing economy is the idea that it would "steal" the jobs of people without higher education. Thus, in the field of transport of uber drivers, the majority having higher education are taking over the work of taxi drivers, most of whom have average education. Similarly in the area of accommodation, Airbnb takes over a significant part of the people who previously looked for accommodation in hotels.This leads to restructuring in terms of the workforce required in a hotel, and those who suffer the most are all those with average education or workers, such as cleaning staff (Badulescu and Badulescu, 2012), (Badulescu et al, 2014).

The lack of solid regulations in the field is another reason for criticism of the sharing economy. Even though its ascension at an alert pace and the vast areas in which it was applied were an impediment in the elaboration of regulations in this field, it is not an excuse for the absence of elementary rules. However, its regulation, in particular, in accordance with European Union law, is a real challenge. Critics are also taken in the direction in which the definition of platforms as markets has important legal consequences: the rules for service providers are rejected as having no object (they are immaterial), and the public authorities

are required to apply the regulation only for individual providers. Therefore, only the users are responsible for providing reliable services, as the platforms are not part of the individual-to-individual transactions (p2p) nor are they responsible for breaching the contract or illegal conduct by the parties.
The polemics created around this topic are only part of the multitude of opinions that will follow on this topic.
Despite the criticism, sharing economy includes, for example, transactions through platforms such as Airbnb and BlaBlacar, as well as Uber and TaskRabbit activities. Companies that own such platforms in this market serve as intermediaries between a person providing a service and the person receiving this service (Perren and Grauerholz, 2015). Each actor in this triangle is interdependent and actively involved in the co-production of a unique consumer experience. It is important to note that the roles of companies, sellers and consumers may differ from market types (for example, some require purchases and contact sellers directly, and other buyers and sellers do not have contact; some companies assume responsibility if one product or service fails, others do not). Thereby, collaborative consumer markets are more dynamic, flexible and less institutionalized than traditional markets.
In addition to technology, what has facilitated and propelled the development of the sharing economy is the involvement of companies that facilitate exchange between individuals. Older, established companies, such as Craigslist and eBay, have joined other companies that serve to connect or facilitate exchanges from person to person. These companies are increasing in number, size and profit, which emphasizes the openness of people to new ways of purchasing products or services.
The collaborative economy is characterized by a number of stakeholder groups that can be broadly divided into the following interdependent and overlapping groups described below (Dredge et al., 2016). These groupings are not exclusive for actors may belong to more than one group and move between groups over time. Their interests may also coalesce or conflict depending on the social, economic, political and environmental factors at play. While these groupings are indicative, they are nevertheless useful in conceptualizing the relational setting of the collaborative economy.

3. Trends in the use of collaboration platforms in Romania and in the European Union

The evolution of technology and high-speed networks, as well as the increase of social networks and the increase of EU citizens' access to the Internet, have played a significant role in the development of the collaborative economy, digital platforms and other related applications in recent years.
The question is whether the new trend is accepted and embraced in Romania, as well as in the European Union. At the same time, we aim to follow the advantages and disadvantages of using collaborative services. Another question concerns the type of collaborative services that users use.
The way in which the sharing economy is viewed by citizens at European level, how to use it and at the same time the characteristics of users in Europe are recorded in two studies conducted by the European Commission in 2016 and 2018. The study was conducted on a representative sample of the population of the European Union, the minimum age of the respondents was 15 years, and the number of respondents at EU level was 14050 in 2016 and 26544 in 2018 (European Commission, 2016, 2018). According to the results of these surveys, in 2018, 23% of respondents in Romania stated that they used services offered through collaborative platforms. If we refer to 2016, when the percentage of use of these services was 20%, we can see that the trend is increasing, even if the percentage was only 2%. If we make a comparison between Romania and the EU average (for 2018) of respondents who used these types of services we can see that the percentage is identical, which means that in our country people have begun to become receptive to this new

concept. If we make a comparison between the EU average in 2016 and the one in Romania, we see that in Romania the percentage is higher, respectively 20%, compared to 17% registered at EU level. From this data it can be said first of all that in Romania these platforms have been well known in 2016, while in the same year in countries such as Cyprus (2%), Malta (4%), Czech Republic (7%), Greece (9%) the number of those who used these platforms is very small. Even in developed countries such as the Netherlands, the percentage of people who have used these services is not very high, respectively 12%. Secondly, the fact that people have been looking for alternatives to traditional services may also indicate that Romanians are looking for more easily accessible and advantageous services from an economic point of view, which can be seen in Figure 3. In 2018 Romania was on an upward trend in the use of collaborative platforms, not registering large differences in this period, while if we look at the percentage of other EU countries we can not say the same. In the Netherlands, for example, as mentioned above, the percentage was 12% in 2016, and in 2018 it had a significant increase of 18% reaching 30% of the respondents using collaborative platforms. Significant increases were also in Malta reaching 35% in 2018 or in Belgium 18%. In 2018 in Romania the percentage of users was identical to the EU average, respectively 23%, which means that the services offered by collaborative platforms were neither the least used by Romanians, nor used very much. In EU countries, the percentages in 2018 were between 17% in Portugal and reaching up to 40% in Latvia.

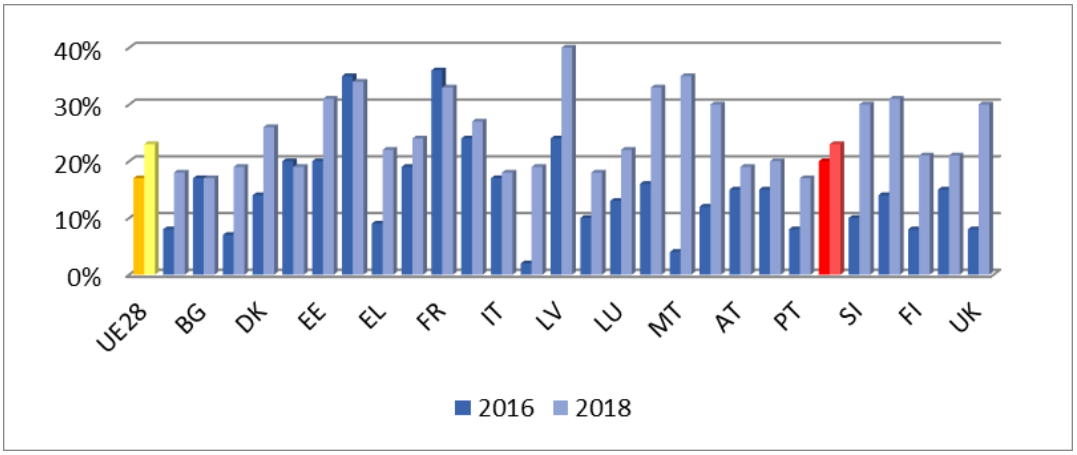

Figure 1: Individuals who use the services of collaborative platforms (percentage of respondents) in 2016 and 2018
Source: European Commission (2016, 2018) Flash Eurobarometer 438 and 467.

3.1. The type of services used through collaborative platforms

If we refer to the type of services offered through collaborative platforms, the most often used among respondents are accommodation services (rentals of apartments, houses, etc.) and transport services (figure 2).

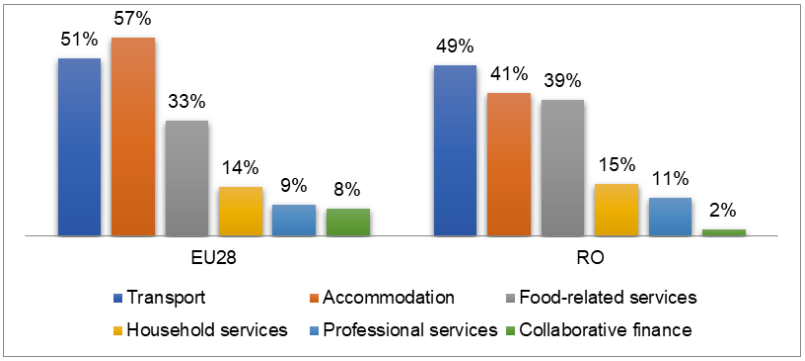

Figure 2: Type of service offered via collaborative platform related to the population that used collaborative services
Source: European Commission (2018), Flash Eurobarometer 467

For example, in Romania in 2018, 49% of users stated that they used transport services, the EU average of the same service being 51%. In the EU, accommodation was used the most, as an alternative service to the traditional ones, a percentage of 57% of the respondents, while in Romania only 41% declared that they used accommodation services. In parallel in the same year, 2018, 33% of food-related services were used in the EU, while in Romania they registered a higher percentage of 39%. Household services also registered a higher percentage in Romania than the EU average. If in the EU the percentage for these services was 14%, in Romania it was 15%. Professional services (IT services, accounting, consulting, etc.) were used by 11% of respondents, while in the EU by 9%. The 9% EU-wide percentage is due to the fact that in some member countries these services have not been used at all. If we refer to the collaborative financing services, it can be seen that both at the EU level and at the Romanian level, the percentages are not very high 8%, respectively 2%. This is due in part to their ignorance of their services, but also to their distrust of such a service.

3.2. The advantages of using collaborative platforms

The advantages given by the collaborative economy are numerous and can be treated as a separate article, but based on the answers given by users in the survey conducted by the European Commission we can make a ranking of the six most important advantages, both in the EU and in Romania (Fig. 3).

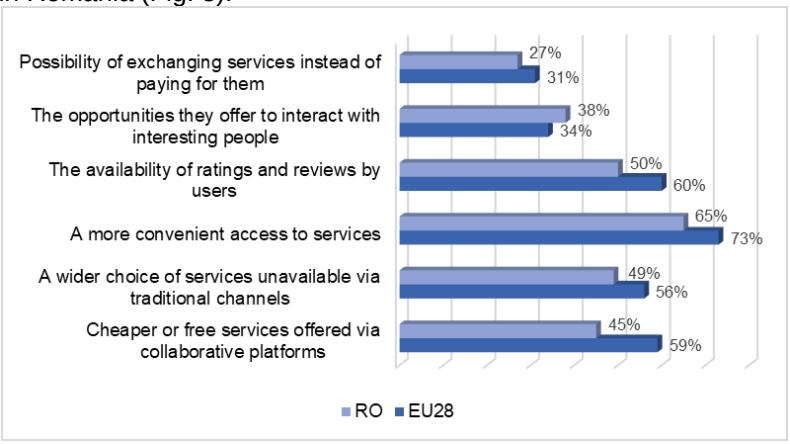

Figure 3: Advantages of using collaborative platforms
Source: European Commission (2018), Flash Eurobarometer 467.

Thus, most of the European users stated that the most important advantage of collaborative platforms compared to the traditional means is the easy and convenient access to them, 73% of the respondents being of the same opinion. The Romanians also considered all this advantage to be in the first place, and the percentage in which they answered is 65%. The next important advantage for both Europeans and Romanians is "the availability of ratings and reviews by users". Thus, 60% of EU respondents considered that this advantage is an important one in choosing a collaborative service and 50% of Romanians relied on the same idea. At EU level, the third most important advantage is that the services offered through collaborative platforms are cheaper, with 59% of respondents saying so. In Romania, however, the third most important advantage is a wider choice of services unavailable via traditional channels, 49% of respondents responding in this regard. In the case of the EU, the advantage considered by the Romanian respondents as being on the third place, at EU level it is considered the fourth with a percentage of 56%, and what the EU considers as the third place advantage, in Romania is on the fourth place as important with a percentage of 45%. The last two advantages correspond to the ranking, both at EU level and Romania, with percentage differences. Thus, the fifth most important advantage is considered to be "the opportunities they offer to interact with interesting people", 34% in the EU and 38% in Romania. On the last place of importance is the advantage with reference to the possibility of exchanging services instead of paying for them, 31% in the EU and 27% in Romania.
It can thus be observed that the order of advantages at EU level is the same as in Romania, with one exception. At the same time, the most important advantage in both situations is the ease with which these services can be accessed, in a world where time is an important element.

3.3. Main disadvantages of using collaborative platforms

The most important six disadvantages given by the collaborative economy, both in the EU and in Romania, are presented in the figure 4.

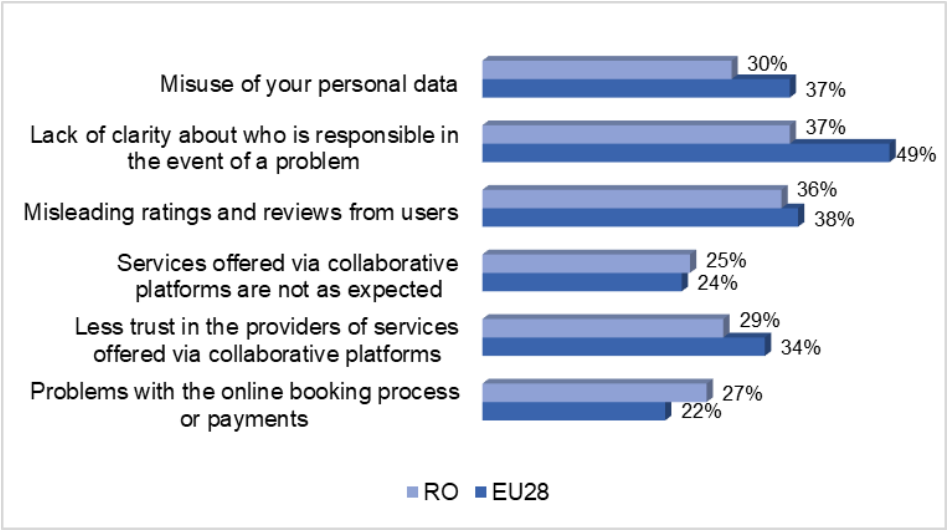

Figure 4: Disadvantages of using collaborative platforms
Source: European Commission (2018). Flash Eurobarometer 467. The use of collaborative platforms

The main disadvantages reported by users of collaborative platforms compared to traditional channels were, in the case of Romania for 2018, lack of clarity about who is responsible in the event of a problem 37%, and in the EU the same disadvantage is considered the most

important, but in a proportion of 49%. A second disadvantage of collaborative platforms is given by misleading ratings and reviews from users. In Romania, 36% of respondents reported this problem, and in the EU 38%. Another problem identified with respondents is the misuse of your personal data. Both Romanians (30%) and EU residents (37%) considered that the misuse of personal data brings disadvantages to the new services based on collaboration. 29% of the Romanian respondents and 34% of the respondents of the member countries stated that they have less trust in the service providers offered via collaborative platforms. This may be due to mistrust in such services, but also to the lack of proper documentation on this topic. Respondents in Romania considered 27% that the fifth disadvantage of using collaborative services is "problems with the online booking process or payments", while in the EU the fifth disadvantage in proportion of 24% is services offered via collaborative platforms are not as expected. The last disadvantage, according to the survey, in Romanian (25%) refers to services offered via collaborative platforms are not as expected. At EU level, problems with the online booking process or payments are considered to be the biggest disadvantage with a percentage of 22%.
We can see that problems similar to those in Romania were registered at the level of the entire EU, but with small differences in ranking and of course in percentages.

4. Conclusion

The "sharing economy" and "collaboration economy" encompass various activities that have emerged and developed rapidly in recent years through online collaboration platforms. A common feature of these activities is the mediation of online collaboration platforms that link users and service providers, in order to use(share) more efficiently natural or human resources.
Romania follows the international trends of increasing the use of collaboration platforms, presenting, according to the relevant survey of the European Commission, an increase in the share of users in the population (from 20% in 2016 to 23% in 2018). As a result, Romania has now reached the EU-28 average of 23% in 2018). Regarding the type of services used, the main sectors of activity in Romania and at EU level are transport and accommodation, the EU average exceeding both in transport (49% Romania, 51% EU) and in accommodation (41% Romania compared to 57% EU).
User perceptions of the advantages and disadvantages of using the services through collaboration platforms seem to converge in Romania and the EU, with the most frequently reported advantages being identified in terms of rating availability, cheaper or free services offered and a wider range of options. The most common disadvantages mentioned are the lack of clarity about who is responsible in the event of a problem, misleading assessments and reviews, misuse of personal data and lack of trust in the service provider.
Of course, there are several motivations and variables that influence the use of online platforms in Romania and at EU level, but being a more theoretical model has its obvious limitations. In addition, a more detailed study of these motivations and not only will be the subject of future studies

References

Arcidiacono, D., Gandini, A., and Pais, I., 2018. Sharing what? The 'sharing economy' in the sociological debate. *The Sociological Review Monographs*, 66 (2), pp. 275–288.
Badulescu, A. and Badulescu, D., 2012. Entrepreneurship and Local Resources. In D. Leslie, 2012. *Tourism Enterprises and the Sustainability Agenda across Europe.* UK: Ashgate Publishing, pp. 151-168.
Badulescu, A., Badulescu, D. and Borma, A., 2014. Enhancing cross-border cooperation through local actors' involvement. The case of tourism cooperation in Bihor (Romania) –

Hajdú-Bihar (Hungary) Euroregion. *Lex Localis - Journal of Local Self-government*, 12 (3), pp. 349-371.
Bardhi, F., and Eckhardt, G., 2012. Access-Based Consumption: The Case of Car Sharing. *Journal of Consumer Research*, 39(4), pp. 881-898.
Belk, R., 2014. You are what you can access: Sharing and collaborative consumption online. *Journal of Business Research*, 67, pp. 1595-1600.
Botsman, R., Rogers, R., 2010. *What's Mine Is Yours: The Rise of Collaborative Consumption*. New York: HarperCollins.
Coyle D., 2016. The Sharing Economy in the UK, [online] Available at: <http://www.sharingeconomyuk.com/perch/resources/210116thesharingeconomyintheuktpdc.docx1111.docx-2.pdf> [Accessed on 27 February 2020].
Dredge, D. and Gyimóthy, S., 2015. The collaborative economy and tourism collaborative economy and tourism: Critical perspectives, questionable claims and silenced voices. *Tourism Recreation Research*, 40 (3), pp. 286–302.
Dredge, D., Gyimo´thy, S., Birkbak, A., Jensen, T. E. and Madsen, A. K., 2016. The impact of regulatory approaches targeting collaborative economy in the tourism accommodation sector: Barcelona, Berlin, Amsterdam and Paris. *Impulse Paper*, 9. Brussels: European Commission.
Edelman, B., Luca, M., and Svirsky, D., 2015. Racial Discrimination in the Sharing Economy: Evidence from a Field Experiment. *HBS Working Paper,* 9 (2), pp. 1-22.
European Commission, 2016. Flash Eurobarometer 438: *The use of collaborative platforms,* [online] Available at: http://ec.europa.eu/COMMFrontOffice/PublicOpinion/index.cfm/ResultDoc/download/DocumentKy/72885 [Accessed on 26 February 2020].
European Commission, 2018. Flash Eurobarometer 467: *The use of collaborative economy,* [online] Available at: https://data.europa.eu/euodp/en/data/dataset/S2184_467_ENG [Accessed on 26 February 2020].
Felson, M. and Speath, J., 1978. Community structure and collaborative consumption. American Behavioral Scientist, 21 (4), pp.614-624, [online] Available at: https://pdfs.semanticscholar.org/fd33/73fa4e7b1a9a65352d1998be01c2021ccddc.pdf?_ga=2.46042406.388251180.1583225654-407571271.1572897768 [Accessed on 03 March 2020]
Firnkorn, J., and Müller, M., 2011. What will be the environmental effects of new free-floating car-sharing systems? The case of car2go in Ulm. *Ecological Economics*, 70 (8), pp. 1519-1528.
Frenken, K., and Schor, J., 2017. Putting the sharing economy into perspective. Environmental Innovation and Societal Transitions, 23, pp. 3–10, [online] Available at: http://doi.org/10.1016/j.eist.2017.01.003 [Accessed on 23 February 2020].
Görög, G. (2018). The definitions of sharing economy: A systematic literature review. *Management*, 13 (2), pp. 175–189. doi:10.26493/1854-4231.13.
Kumar, V., Lahiri, A., and Dogan, O., 2018. A strategic framework for a profitable business model in the sharing economy. *Industrial Marketing Management*, *69*, pp. 147–160.
Perren, R. and Grauerholz, L., 2015. Collaborative Consumption. *International Encyclopedia of the Social & Behavioral Sciences,* (Second Edition), Elsevier, pp. 139-144.
Matofska B., 2019. *Generation Share: The Sharing Economy is saving millions of lives worldwide*, [online] Available at: https://www.thepeoplewhoshare.com/blog/generation-share-sharing-economy-saving-millions-lives-worldwide [Accessed on 07 March].
Morozov, E., 2013. The 'sharing economy' undermines workers' rights, [online] Available at: http://evgenymorozov.tumblr.com/post/64038831400/the-sharing-economyundermines-workers-rights [Accessed 01 March 2020]

Schofield, H., 2014. Short-let apartments spark Paris row as Airbnb thrives, [online] Available at: http://www.bbc.co.uk/news/world-europe-30580295 [Accessed on 28 February 2020].
Statista, 2020. *Number of Airbnb users in the United States from 2016 to 2022.* [online] Available at: https://www.statista.com/statistics/346589/number-of-us-airbnb-users/ [Accessed on 28 February 2020].

Bio-note

Elena Ştiubea, is Ph.D. student at University of Oradea, Faculty of Economics Sciences. Her research interests include general aspects of sharing economy and her main focus for the PhD research is the impact of sharing economy on tourism.

THE IMPACT OF TRIPS ON IPRs PROTECTION IN JORDAN, AS A PRIME EXAMPLE OF A DEVELOPING COUNTRY

Mohammad Abdulmahdi Amin Alfaouri
Faculty of Law and Political Science, University of Debrecen, Debrecen, Hungary
Alfaouri7000@yahoo.com

Abstract: *In the last few decades, the developing countries have witnessed a remarkable increase in the infringement of intellectual property rights thus conventions and treaties were held to reduce these infringements, in particular, the TRIPS Treaty (Trade-Related Aspects of Intellectual Property Rights).This study attempts to explain the causes of intellectual property rights infringements and the efficient means for intellectual property rights protections by taking Jordan as an example. The study finds that TRIPS Treaty, which is the latest international action to enhance the protection level, consumer's ethical attitude, development expenditure, economic policies, weakness of law enforcement, and low-income in developing countries are important factors to explain the level of IP protection. Because of all of these, the infringements became a phenomenon in developing countries that firstly need amendments in their intellectual property laws to apply the criminal sanctions jointly by civil remedies, owing to the fact of the shock value or general deterrence to enhance the commitment to the law and to remit this phenomenon, furthermore, the state will follow up on the cost of prosecution without involving the owners of the rights personally in many cases. On the other hand, literature revealed that the infringements of IPRs became a phenomenon because the TRIPS Treaty prepared for the benefits of the large companies, thus the developing countries' legislation, economic and consumer's ethical attitude got affected negatively. In addition, the developed countries threatened them by sanctions if they didn't make retroactively amendments on their legislation, which also led to prevent them to adopt the necessary measures that mitigate the negative impact on their economic and social life. Regarding the applied research method, this paper used secondary data sources and applied the descriptive and comparative analytical legal approaches to illustrate the most important points and findings on the topic.*

Keywords: TRIPS Treaty, intellectual property rights, infringements, economy.

JEL classification: K2, O34, P48.

1. Introduction

In today’s business environment producers tried to distinguish their commodity from other producer's products to discourage and restrict the efforts of illegal competition practitioners, thus a need was raised for what was later known as the "trademark".

Trademark means the producer turns to put name, word, marks, drawings, design, or symbol, indicating to the goods that belong to the owner of the trademark by the right of manufacturing, producing, trading or selling these goods (Lessig, 2002).

So why the trademark became a place of great interest by many of the world's legislation; and why are laws considering trademarks as valuable assets? for example, France enacted the Trademark Law in 1857, Britain passed the Trademark Law of 1875, the Ottoman Empire enacted the Trademark Law in 1879 which was valid in Jordan until the government passed this law after the independence in 1952 (The Jordanian Trademarks Law No. 33 of 1952). The Intellectual property (IP) laws are considered as a balance between interested parties to achieve their main aims through appropriate procedures and give the owner the

right to apply a monopoly by using the particular item for a specific period. It is also legal protection for the creators of original work which covers three well-defined sets of rights namely, copyright, trademarks, and patents (Kwanya, 2018). For that, the protection of intellectual property rights (IPRs) has been enforced by treaties such as TRIPS, the latest international action to enhance the protection level to IPRs, which is made to be a part of the World Trade Organisation (WTO) after Uruguay round negotiations.TRIPs provides WTO member countries the right to enforce the IPRs protection over borders with a compulsory framework on the domestic companies (Cardwell and Ghazalian, 2012). Whereby Developing Countries public authorities should comply with their obligations under part III of the TRIPS and put into place compatible with procedures for the effective enforcement of intellectual property rights (Trimble, 2019). In addition, member states of such agreements have to look into difficulties confronting them in the enforcement of intellectual property rights, knowing that, there are several means for enforcement such as investigation, administrative, and judicial enforcement in order to achieve effective and long-lasting for protection (Cafaggi and Iamiceli, 2017). However, intellectual property rights are subjected to infringements especially counterfeiting, piracy and contrabands are common occurrences through developing countries like China, where several industries that make goods that appear to be as similar to the original as to be passed off as genuine items and sell the counterfeited goods to the developing countries (Marron and Steel, .2000). Thus, the developing countries have been requested to make retroactively amendments on their legislation because, United States threatened them by sanctions, which led to prevent them to adopt the necessary measures that mitigate from the negative impact on their economic and social life (Correa, 2000).

In Jordan, literature revealed that, there is a weak implementation of enforcement of the IPRs because of the lack of coordination between the various enforcement agencies which claim authority to handle infringements and us extremely reliance on the judicial (criminal and civil) remedies instead of economic solutions which will lead to creating a model concentrate on the introduction of original products, thus undercutting the economic incentive for infringers (Nesheiwat, 2012). Moreover the collectivist cultures in the Arab world, including Jordan, such as cooperation, a sense of belonging to the community, tribe loyalty, solidarity, mutual trust, commitment, and support leads to a weak personal responsibility,limit freedom, less interest about protection for IPRs and share infringements with others who expects you to follow the same actions especially in piracy (Kurman, 2003).

This study intends to shed light on the Islamic law (Sharia) perspective which is totally different from collectivist cultures in the Arab world and its impacts on the consumer's ethical attitude to mitigate the intellectual property rights infringements. As well as discuss the importance of intellectual property rights topics in legal and commercial terms, this study represented the importance of intellectual property rights as a powerful tool for economic growth and their great role in the economic development by encouraging and protecting research and development (R&D) (Idris, 2002). Also, It focuses and discusses several important topics such as the effects of infringements, evaluation of the TRIPS treaty, counterfeiting on revenue, investment, and employment. Furthermore, the study discusses the causes of the infringement, introduces the audience to new terminologies such as copyright, patent, trademark, piracy, the criminal economy, cultural effect, and impacts on competition. Besides that, this study argues the effectiveness extent of treaties concerned with intellectual property enforcement especially TRIPS agreement, and who is the real winner from its regulations. Lastly, the study attempts to answer the following:

1. What are the causes of intellectual property rights infringements in developing countries?
2. What are the efficient means for intellectual property rights protections?

2. Methodologies

This study is using a descriptive analysis method by reviewing studies that rely on (secondary data) databases to choose several quality studies, which address the topic in a direct way. The data were forty references collected from the Ph.D. dissertations, libraries, thesis, books, articles, and Google Scholar to access the journals. The study has shed a light on the role of determinants in the Intellectual Property Rights Protection according to TRIPs agreement especially Copyright, Patents, and Trademark from an international and national perspective. These studies have analyzed the content in order to achieve the objectives of the study by answering the questions raised in the beginning by dividing the present literature review into three sections as follows:

First: Evaluation of the TRIPS agreement, as the latest international action to enhance the protection level to IPRs, and its impacts on the Member States particularly the developing countries.

Second: The concept of IP protection in Islamic law (Sharia) and its impacts on consumer's ethical attitude and the Arab World legislation including “Jordan" as part of them.

Third: Literature review related to Jordan as a prime example of a developing country to explain the effect of the TRIPs agreement on the efficient of IP law and economic development.

The comparative legal approach will be applied between the above sections and comparison between them to reach the functionalism to find suitable solutions to the study problems.

3. Literature Review

3.1. Evaluation of TRIPS

The twenty-first century has brought to the Intellectual property rights fundamental changes from the domestic governance to the globe. Consequently, it led up to create global rules to govern intellectual property practices their target. To confirm more protection of intellectual property rights at the expense of more customers access to those rights, TRIPS was made to be a part of the WTO, which was the direct result of huge pressed by companies executives who received full support from the trade negotiators of the advanced countries (Drahos, 2007).

Some scholars like Halbert and Gill adopting resistance of the neoliberal form of globalization, that is the inclusion of the resistance of such forms of commodification as part of the universal fight against IPRs, thence the theoretical criticism of harmonization has increased rapidly, because of the increased of harmonization of IPRs (Gill, 2008; Gurry and Halbert, 2005). In addition, he sees that to protect the types of creative endeavors from the further corrosion of value, that can still be found in women and developing countries produce, we should realize that the real threat occurred by the current commodification of IPRs (Halbert, 2006).

On the other hand, the people will reject the commodification of IPRs because of the main role of IPRs which is concentration on the protection just to increase the prices and focused on the scarcity model, thus led up to a non-efficient model of demand and supply (May, 2015).

Moreover, Braithwaite and Drahos considered that the developing countries have to resist this form of globalization, and they should negotiate and bargaining to adopt a networked governance approach, instead of depending on traditional coalitions-building (Drahos, P. and Braithwaite, 2002). But the Scholars above mentioned, they don't explain that such acts from developing countries will threaten its socio-economic stability because most of them receiving from advanced countries foreign aids which completely relies on it (Matthews, 2003, Sell, 2003, May, 2006).

Braithwaite and Drahos are also criticized the globally harmonized IP regime, because of the developing countries consider more developed than they are at reality ground. Not only, but also the Developing countries knowing that IP regimes, in general, and TRIPS in particular, not suitable for her technological and scientific capacities, especially the patent systems in TRIPs because they realized that enforcement needs great financial costs (Shadlen, 2008). Besides, TRIPS Treaty imposed the members' countries to set up national IPRs and policies regardless of their social conditions and economic, this could show a diminished difference in their IP laws especially in the validity of intellectual property, which may differ from one country to another. But the variation and flexibility which is available in Paris Convention, for example, giving some countries permissions to establish their patent rules for the Protection of Industrial Property, this flexibility and variation wasn't existence under TRIPS treaty, because it has one enforcement standards, and all the countries members have to follow the same standards (May, 2017).

The advanced countries still practicing great pressures on developing countries particularly after (TRIPS) Agreement to reinforced their intellectual property rights regimes in order to own and achieve more gain from their innovative activity and research. Such protection often needs substantial costs, knowing that, piracy prevents economic growth in developing countries which under pressure made legislative amendments with limited resources (Lee, Alba, and Park, 2018).

Finally, the developing countries according to TRIPS standards made not only immediate amendments for patents law but also, they have been requested to make retroactively amendments on their legislation, otherwise, United States will apply sanctions against them. This request led to prevent them from adopting necessary measures that mitigate the negative impact on their economic and social life (Correa, 2000).

3.2. IPRs in Islamic law (Sharia)

The concept of intellectual property was recognized in Arabs societies before Islamic civilization like livestock labeling and poems authors who distribute their poems to have money compensated for their work and they also get protection from society against plagiarism. Further to, this society was familiar with IPRs even though it was rudimentary especially trademark and copyright (Khoury, 2003; Malkawi, 2013).

The purpose behind shedding light on the Islamic law (Sharia) perspective, is to explain their stance from IPRs and its impact on consumer's ethical attitudes in the Islamic world to prevent infringements.

Islamic law (Sharia) has its effective impacts in different degrees on policies and laws in general, especially in the Arab World including "Jordan" as part of them, which refers to (Protecting People’s Rights) and prevent the others from stealing the other's effort or use it without permission whether intellectual or material.

Sharia guards the community's interests as well as protecting private property, so it's considered a balanced point stands in the middle between recognizing individual ownership rights and protecting the privileges of society.

Nevertheless, some scholars said that Sharia doesn't regulate the protection directly to the intellectual property rights and doesn't have specific rules such as in the case of inheritance, but the others said that the conclusions and explanations of Sharia principles can provide such protection (Price, 2007). Moreover, the most radical view in Islamic literature that considered the IPRs a tool used by developed countries to acquire benefits instead of the Muslim community (Melhem, Haloosh, and Mahafzah, 2009).

Generally, the majority of Islamic schools (four schools) have accepted the recognition of intellectual property including idea-based property, except "Hanafi" School, which only accepts the tangible property, they justified their view that science and knowledge should be public commodities, and benefit of all humanity including Muslims, thus intangible property can't be compared with industry or trade (Jamar, 1992; Islam, 1999; Raslan, 2006).

3.3. Literature Pertaining to Jordan

In general terms, Intellectual property law consists of several separate and legal disciplines, each with their own terminology. Whereas Copyrights law protects the rights to "original artistic works," including computer software, music, video, architecture, drama, and literature. The Trademarks law protects aspects of branding like symbols, words, and phrases that identify services, companies, and goods. While Patent law protects the rights of the innovation for a limited time determined by law. These include design, plant, and utility. So the infringements mean a work protected by IP laws is copied, used or exploited without having permission from a person who legally owns those rights (Zeidman, 2011).

This types of IP affected by collectivist cultures in the Arab world at the present time, such as cooperation, a sense of belonging to the community, tribal, solidarity, mutual trust, commitment, and support according to the literature perspective and bring many limitations on the self which leads to a weak personal responsibility and limit freedoms.

Therefore Jordan, as part of the Arab world, has the same motivated culture by the above-mentioned factors that lead to less interest in protection for IPRs and share infringements with others and expects them to follow the same actions especially in piracy (Kurman, 2003).

Some scholars like Nowefleh think that foreign direct investment won't flow to Jordan especially in the information technology sector without powerful protection to IPRs (Nawafleh, 2010).

Al Sharari and Sirhan agreed with Nawafleh's opinion that we need more human resources to activate IPRs enforcement in Jordan and unlike that, the weakness of IPRs led to less development research and fewer jobs (Sirhan, 2011; Al Sharari, 2006). But this result emerged without providing us with any basis of such a conclusion from the local context, on the contrary, this conclusion built on foreign reports and foreign scholar’s research which discussed the benefits of IP in general instead of the local analysis which shows that there’s a little impact of IP laws on foreign investment inflows (Al-Dajani, 2006).

In Jordan, we have a weakly implementation of enforcement of the IPRs because of the lack of coordination between the various enforcement agencies which claim the authority to handle infringements. And also, they extremely reliance on the judicial (criminal and civil) remedies instead of economic solutions which will lead to creating a model concentrate on the introduction of original products thus undercutting the economic incentive for infringers, Nesheiwat finds (Nesheiwat, 2012).

Moreover, behaviors of governmental institutions that are applying the enforcement of IP such as police department, the judicial system, excise agencies, and administration of customs, do not consider IP infringement to be a priority issue thus increase the risks and costs linked with protecting IPRs according to the social behaviors and protocols (Papageorgiadis, and McDonald; 2018; Al-Khashroom, 2002).

Finally, the previous empirical literature found that there is a relationship between income level and the intensity of IPRs protection is U-shaped, for high-income developing countries like Kuwait and Saudi Arabia, these two variables positively impact on their economic development and its companies can engage in their own innovation, but on the contrary, for low-income developing countries like Jordan and Egypt the two variables have a negatively impacted (Hwang, Wu, and Yu, 2016; Huddadeen, 2007).

4. Discussion and Conclusion

4.1. Discussion

This study attempts to answer the arguments in the manuscript according to the literature review and the implementation of IPRs in Jordan as a prime example of a developing country which shows that:

(A)TRIPS agreement imposed the member's countries to set up national IPRs policies according to the 'one-size-fits-all' standard, in spite of developing countries consider it as a rent collection device with potentially bad effects on public health, economic development and education in the majority of them. So according to many scholars like Halbert and Gill who adopting resistance of the neoliberal form of globalization that is the inclusion of the resistance of such forms of commodification as part of the universal fight against IPRs.
Also, May (2015) sees that concentration on the IPRs protection only for a certain aim which is increasing prices, as a result of the role of IPRs which is focused on scarcity model that led up to a non-efficient model of demand and supply.
Moreover, Braithwaite and Drahos consider that the developing countries have to resist this form of globalization, and these countries shouldn't depend on traditional coalition-building, instead of that they should be negotiating and bargaining to adopt a networked governance approach (Braithwaite and Drahos, 2002).
In addition, Shadlen (2008), Lee Park and Alba (2018) said that TRIPS do not suitable for Developing countries' technological and scientific capacities, especially the patent systems in TRIPs because they are realizing that enforcement needs great financial costs and piracy in specific (Piracy prevent economic growth in developing countries).
(B) Regarding to the second argument in the manuscript, which indicated the inefficient enforcement of the domestic laws in developing countries, resulting in the absence of the shock value that advances the commitment to the law, scholars like Nawafleh who think that foreign direct investment won't flow to Jordan especially in the information technology sector without powerful protection to IPRs.
Also, Al Sharari (2006) and Sirhan (2011) opinion that we need more human resources to activate IPRs enforcement in Jordan. unlike that, the weaker IPRs led up to less development research and fewer jobs. Moreover Nesheiwat (2012) thinks that in Jordan we have a weakly implementation of enforcement of the IPRs because of the lack of coordination between the various enforcement agencies which claim authority. In addition, Al-Khashroom (2002) said that the behaviors of governmental institutions that are applying the enforcement of IP such as police department, the judicial system, excise agencies, and customs do not consider IP infringement to be a priority issue thus increase the risks and costs linked with protecting IPR according to the social behaviors and protocols.
Without a doubt, Jordan is one of the low-income countries because of its heavily dependent on foreign aid which comes from the donors who in turn imposed the legal guidelines of IPRs and also the economy could not go far without fundamental input from multinational companies(foreigners) who are the suppliers of innovation and knowledge,so the economy had been affected negatively (Huddadeen, 2007). Finally, Kurman (2003) said that the collectivist cultures in the Arab world at the present time, bring many limitations on the self which leads to a weak personal responsibility and limit freedoms. Therefore Jordan, as part of the Arab world, has the same motivated culture that leads to less interest in protection for IPRs and shares infringements with others and expects them to follow the same actions, especially in piracy.

4.2. Conclusion

Our findings indicate that the causes of IPRs infringements related to many reasons, one of them is TRIPS agreement which is received many criticisms in the effectiveness and legitimacy especially in developing countries who consider it a rent collection device, with potentially bad effects on public health, economic development, and education in the majority states.
Moreover, the advanced countries like the United States threatened developing countries by sanctions if they didn't make retroactively amendments on their legislation according to TRIPS agreement standards, this request led to prevent them from adopting necessary measures to mitigate the negative impact on their economics and social life.

Furthermore, the benefits of TRIPs agreement and its function are not as they advertised, because it is targeting particular sections of society in those countries who appear to win most from it, for that, the large corporations practiced great pressure to adopt this agreement because they are the real winners from TRIPS.

Obviously, the TRIPS agreement prepared in a way that is believed to achieve the interests of all signatory States and to achieve free trade and technology diffusion, for that, TRIPS set the minimum protection standards that member states must adhere to and gave the members full free to adopt higher standards to mark the scope of protection if it was to their benefit. But when we look at the way that TRIPS agreement was prepared we note that, it did not come with radical changes in the intellectual property rights protection system which was prevalent before it, but rather by, the authors combined previous agreements and treaties with some addition such as amendments in the minimum protection periods for different forms of intellectual property and Provided TRIPS with a dispute settlement mechanism.

In addition, the empirical literature found that there is a relationship between income level and the intensity of IPRs protection is U-shaped, for low-income developing countries these two variables negatively impact economic development.

Based on the above, the gross domestic product per capita in developing countries (low-income), economic policies, weakness of law enforcement, behaviors of governmental institutions that applying the enforcement of IP who do not consider IP infringement to be a priority, and the consumer's ethical whom affected by the collectivist cultures at the present time (share infringements with others and expects them to follow the same actions especially in piracy) are important factors to explain the weakness level of IP protection.

Finally, the intellectual property law needed to apply the criminal sanctions in conjunction with civil remedies owing to the fact of the shock value or general deterrence to enhance the commitment to the law, hence extended to the liability of the corporates in both developing and developed countries. In addition, the State will follow up on the cost of prosecution without involved the owners of the rights personally in many cases.

5. Final discussion

The IP law in Jordan has been built like many developing counters under the pressure of the advanced countries and donors thus the impact on the economy nominally because it's not suitable for economic development but just protects the interests of the foreign corporations, moreover, it's not fit with Jordanian culture because they are unable to touch the results for their economic benefits.

Clearly, to rectify the gaps in IP law in Jordan it's important to discuss IPRs from a localized analysis approach instead of a global perspective to achieve reducing tension between the competitiveness social objectives and admitting private rights to support innovation, then this understanding can be used to Impact on the discussion of trade agendas and international IP. Also, it would have been more harmonizing from a global perspective to adopt a tiered system, offering more differential treatment and substantial according to the countries' needs and developmental, instead of adopting a 'one-size-fits-all" definitely inappropriate.

Not only but also, the application of criminal sanctions strictly will achieve two things, firstly, preventing the rights holders from attempting to extend their rights behind the terms of the grant, secondly, preventing the imitators from infringements.

References

Al Sharari, S., 2006. Intellectual Property Rights Legislation and Computer Software Piracy in Jordan. *Journal of Social Sciences*, 2 (1), pp.7-13.

Al-Dajani, E.M., 2006. Post Saddam restructuring of intellectual property rights in Iraq through a case study of current intellectual property practices in Lebanon, Egypt, and Jordan. *The John Marshall Review of Intellectual Property Law*, 6, pp. 250-271.
Al-Khashroom, A., 2002. The Effect of Jordan's Accession to the WTO in Jordanian Industrial and Commercial Property Legislations. *Law Journal*, Al-Kuwait University, 26 (2), pp. 5-13.
Cafaggi, F. and Iamiceli, P., 2017. The principles of effectiveness, proportionality and dissuasiveness in the enforcement of EU consumer law: The impact of a triad on the choice of civil remedies and administrative sanctions. *European Review of Private Law*, 25 (3), pp. 575-618.
Cardwell, R. and Ghazalian, P.L., 2012. The effects of the TRIPS agreement on international protection of intellectual property rights. *The International Trade Journal*, 26 (1), pp. 19-36
Correa, C.M., 2000. *Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options*. London: Zed Books.
Drahos, P. and Braithwaite, J., 2002. *Information feudalism: Who owns the knowledge economy?* Earthscan.
Drahos, P., 2007. Four lessons for developing countries from the trade negotiations over access to medicines. *Liverpool Law Review*, 28 (1), pp.11-39.
Gill, S., 2008. *Power and resistance in the new world order*. New York: Palgrave Macmillan.
Gurry, F. and Halbert, D., 2005, March. Globalization, development, and intellectual property: New challenges and new opportunities. In *Proceedings of the Annual Meeting (American Society of International Law)*, pp. 291-300.
Halbert, D., 2006. Feminist interpretations of intellectual property. American University Journal of Gender. *Social Policy and the Law*, 14, pp. 431-460.
Huddadeen, A.B, 2007. *The Effect of The Agreement on Trade-Related Aspects of Intellectual Property Rights" TRIPS" on the Jordanian Economy.* Master Thesis, Al al-Bayt University, Malfraq, Jordan.
Hwang, H., Wu, J.Z. and Yu, E.S., 2016. Innovation, imitation and intellectual property rights in developing countries. *Review of Development Economics*, 20 (1), pp.138-151.
Idris, K., 2002. Intellectual property: a power tool for economic growth, Vol. 888. WIPO.
Islam, M.W., 1999. Al-Mal: The concept of property in Islamic legal thought. *Arab Law Quarterly*, 14 (4), pp.361-368.
Jamar, S.D., 1992. The protection of intellectual property under islamic law. Cap. UL Rev., 21, p.1079.
Khoury, A.H., 2003. Ancient and Islamic Sources of Intellectual Property Protection in the Middle East: A Focus on Trademarks. IDEA, 43, p.151.
Kurman, J., 2003. Why is self-enhancement low in certain collectivist cultures? An investigation of two competing explanations. *Journal of Cross-Cultural Psychology*, 34 (5), pp. 496-510.
Kwanya, T., 2018. Social Bookmarking in Digital Libraries: Intellectual Property Rights Implications.In *Handbook of Research on Managing Intellectual Property in Digital Libraries* (pp. 1-18). IGI Global.
Lee, M., Alba, J.D. and Park, D., 2018. Intellectual property rights, informal economy, and FDI into developing countries. *Journal of Policy Modeling*, 40 (5), pp.1067-1081.
Lessig, L., 2002. *The future of ideas: The fate of the commons in a connected world*. New York: Random House Inc.
Malkawi, B.H., 2013. Intellectual property protection from a Sharia perspective. *Southern Cross University Law Review*, 16, pp. 87-122.
Marron, D.B. and Steel, D.G., 2000. Which countries protect intellectual property? The case of software piracy. *Economic Inquiry*, 38 (2), pp.159-174.
Matthews, D., 2003. *Globalising intellectual property rights: the TRIPS Agreement*. Routledge.

May, C., 2006.*World Intellectual Property Organization (WIPO): Resurgence and the Development Agenda*. Routledge.
May, C., 2015. *The global political economy of intellectual property rights: The new enclosures*. Routledge.
May, C., 2017. Why IPRs are a global political issue. In *Globalization and Intellectual Property* (pp. 21-25). Routledge.
Melhem, B., Haloosh, H. and Mahafzah, Q.A., 2009. The perspective of moral and financial rights of intellectual property in Islam. *Arab Law Quarterly*, 23 (4), pp.457-468.
Nawafleh, A., 2010. Development of intellectual property laws and foreign direct investment in Jordan. *Journal of International Commercial Law and Technology,* 5 (3), pp.142-153.
Nesheiwat, F., 2012. The Compliance with Intellectual Property Laws and their Enforcement in Jordan-A Post-WTO Review & Analysis (Doctoral dissertation, Durham University, U.K.).
Papageorgiadis, N. and McDonald, F., 2018. Defining and Measuring the Institutional Context of National Intellectual Property Systems in a Post-TRIPS World. *Journal of International Management*. 25 (1), pp. 3-18.
Price, D., 2007. The Dynamics of intellectual property protection in the Arab Gulf states. *International Review of Business Research Papers*, 3(1), pp.147-161.
Raslan, H.A., 2006. Shari'a and the Protection of Intellectual Property - the Example of Egypt. *IDEA*, 47.
Sell, S.K., 2003. *Private power, public law: the globalization of intellectual property rights,* Vol. 88. Cambridge University Press.
Shadlen, K.C., 2008. Policy space for intellectual property management: Contrasting multilateral and regional-bilateral arrangements. *Revista Econômica*, 10 (2), pp. 55-81.
Sirhan, A.A., Intellectual Property and Copyright Laws and Their Impact on Digital Resources in Jordan (May 2011), pp.7-13. [online]*,* available at: http://www. informationstudies. net/issue_list. php. [Accessed 04.02. 2019].
The Jordanian Trademarks Law and its amendments No. 33 of 1952.
Trimble, M., 2019. Enforcement of Intellectual Property Rights at Trade Shows: A Review and Recommendations. *Scholarly Works*. 1263. [online]*,* available at: https://scholars.law.unlv.edu/facpub/1263, [Accessed 04.02. 2019].
Zeidman, B., 2011. *The Software IP Detective's Handbook: Measurement, Comparison, and Infringement Detection*. Prentice Hall Professional.

Bio-note

Alfaouri Mohammad is a Ph.D. candidate at the Faculty of Law and Political Science, University of Debrecen, Hungary, and member of the several research teams developed within the projects implemented by our Faculty. Alfaouri as a researcher interested in intellectual property rights (IPRs) protection and its impact on the developing countries legislation and economics and conducted many types of research focused on intellectual property rights (IPRs).