JOURNAL OF
Economic and
Social Development

TABLE OF CONTENTS

Andra Gajevszky [1]

AUDIT QUALITY AND CORPORATE GOVERNANCE: EVIDENCE FROM THE BUCHAREST STOCK EXCHANGE

Abstract

Corporate governance attributes represent a resort for achieving the quality of the audit process, being a driving force of the entity`s corporate governance mosaic. The aim of this research is to investigate the association between audit quality and corporate governance attributes in the case of Romanian`s listed entities. In order to achieve this goal, a multiple regression was constituted with the following variables: audit quality as a dependent variable, and a series of corporate governance elements as independent variables, while firm size, firm age and industry being designed as controls. The full sample consists of the entities listed on the Bucharest Stock Exchange in the period 2008-2012, compiling both tier I, II and III companies. This research contributes to the existing literature in the area of emerging economies by being the first article that addresses the issue of audit quality and corporate governance attributes at the level of listed companies in Romania, one of the European Union`s emerging economies.

Keywords

Audit, Corporate governance, Emerging economies, Quality

1. Introduction

Corporate governance is perceived as being a key-element in the capital market`s development. According to World Bank Report – Improving Corporate Governance in Emerging Markets (2011), good corporate governance reduces the emerging markets` vulnerability associated to financial crisis, reduces the capital and transactions cost and, moreover, conducts to the development of capital markets, due to the fact that the capital markets represent a transparency conductor.

Corporate governance has been perceived as a vital tool in assessing the company`s health, especially under conditions of financial distress, such as the financial crisis. According to Adeyemi and Temitope (2010), the weakness of corporate governance is perhaps the most important factor blamed for the corporate failure, reason why the issue of *good corporate governance practices* gains a vivid importance, especially after the economic and financial crisis.

The company`s decision of adopting a specific corporate governance mechanism is influenced by a series of endogenous factors, such as the fundamental characteristics of that entity, managerial attributes and other corporative variables. Still, one of the most

---

[1] The Academy of Economic Studies, Bucharest, Romania, The Institute of Doctoral Studies, Tache Ionescu Street 11, Faculty of Accounting, e-mail: gajevszkyandra@yahoo.com

important functions that the corporate governance can fulfil is the one of assuring the quality of financial reporting (Cohen, Wright and Krishnamoorthy, 2004). In order to achieve its goal, out of the corporate governance mosaic, the audit committee plays a critical role by its main attribute of overseeing the financial reporting process under its major duty of certifying the integrity and credibility of financial reports.

This research aims to investigate the association between audit quality and corporate governance attributes in the case of Romanian`s listed entities. In Romania, one of the European Union`s emerging economies, the Bucharest Stock Exchange has proven its interest in the importance of corporate governance area by implementing a Code of Corporate Governance and specific Guidelines applicable to the listed companies since 2008.

The Bucharest Stock Exchange Code of Corporate Governance addresses a series of specific aspects related to corporate governance, such as corporate governance structures, shareholders` rights, the Board composition, transparency, financial reporting, internal control and risk management. Although the Code embraces a wide area of corporate governance aspects, its adoption by the listed companies is made on a voluntary basis, fact that leads to the assertion that the corporate governance rules elaborated by the Bucharest Stock Exchange are neither legally binding, nor mandatory.

Taking the previous aspects into consideration, it can be stated that the Romanian`s Code of Corporate Governance role is to promote a transparent and responsible managerial behaviour in accordance with international best practices, without enforcing these rules applicable for the listed companies. Based on this aspect, it is very difficult to capture the way the external auditors interact with the corporate governance practices adopted on a voluntary basis by the client.

The reminder of this paper is organized as it follows: Section 2 provides the relevant literature review, being centred on the researches conducted in the area of corporate governance and external auditor, Section 3 is dedicated to the research design and the methodology used in order to test the regression, while the last part of this article concerns the interpretations of the research`s results. Finally, Section 5 presents the limitations of this research and Section 6 reveals the main conclusions arising from the findings of this study.

2. Literature review

According to Deloitte (2013), the audit committee is seen as a ``key fulcrum of any company``, thus the responsibility for assessing effectiveness of the audit committee is assuming more and more importance.

The Chief Executive Officer duality signals the separation between decision control and decision management (Fama and Jensen, 1983; Finkelstein and D'Aveni, 1994), fact that leads to a concentration of power that reduces board monitoring effectiveness (Finkelstein and D'Aveni, 1994) which resides into lack of transparency and high information asymmetry. Taking these findings into account, it can be stated that companies with Chief Executive

Officer duality are more likely to be associated with a lower level of disclosure (Gul and Leung, 2004).

Another relevant study was conducted by Abdullah (2006) in an emerging economy and his findings indicate that the separation between the Board Chairman and the Chief Executive Officer, a higher proportion of non-executive directors on the Board, lower level of gearing and more profitable firms are more likely to reduce the length of the audit process. In the same area of researches, Afify (2009) investigated corporate governance variables in the Egyptian context revealed that Board independence and the separation between the Board Chairman and Chief Executive Officer decreased on a significant manner the length of audit.

The prior literature provides findings in supporting the assumption that Big 4 auditors conduct higher quality audits compared to non-Big 4 auditors. For example, Lawrence et al. (2011) provide suggestive evidence that results in prior literature need to be reconsidered, namely because these previous results could be explained by client-specific characteristics, such as firm size, that lead to a selection bias in the analyses. They conclude that these arguments may be leading to an erroneous inference that Big 4 auditors conduct higher quality audits.

The external auditor plays a crucial role in promoting the quality of financial reporting. The researches done in this area suggest that strong corporate governance mechanisms are associated with selecting auditors of a higher quality (such as Big 4). At a consensus level, the studies conducted in prior literature emphasise the positive association between audit committee`s independence and expertise and the external audit function`s efficacy (Cohen, Wright and Krishnamoorthy, 2004).

Due to the fact that the major observable outcome of an audit process is represented by the audit report, in the literature various proxies have been used in order to assess audit quality. Francis et al. (1999) suggest that Big 4 auditors are able to constrain opportunistic and aggressive reporting because their clients have higher total accruals, but lower discretionary accruals. This approach is focused on earnings management, on managerial behaviour which interfere with the financial reporting process. According to Lawrence et al. (2011), an extensive stream of literature focuses on the client`s financial statements, in which discretionary accruals are often used as a proxy for audit quality as they reflect the auditor`s constraint over management`s reporting decisions.

3. Methodology and research design

3.1. Sample Selection

In order to assess the association between audit quality and corporate governance attributes at the level of Romanian listed companies, the following restrictions are being used:
- The financial institutions were eliminated due to homogeneity considerations;
- The analyzed period is of five years, between 2008 and 2012;
- The entities must be present on the Bucharest Stock Exchange in all of these five years;

- The sample compiles entities listed on the Bucharest Stock Exchange Tier I, II and III.

After applying these restrictions, the final sample consists of 61 entities, analyzed through a period of five years.

3.2. Research Hypotheses Development

The research`s hypotheses were developed in order to assess the aim of this study, namely to investigate the association between audit quality and specific corporate governance attributes. In accordance, six hypotheses were formulated as it follows:
- *Hypothesis 1: There is a significant association between audit quality and board independence.*
- *Hypothesis 2: There is a strong correlation between audit quality and Chief Executive Officer Duality.*
- *Hypothesis 3: There is a significant association between audit quality and institutional ownership.*
- *Hypothesis 4: There is a strong relation between audit quality and managerial ownership.*
- *Hypothesis 5: There is a significant association between audit quality and audit committee existence.*
- *Hypothesis 6: There is a strong relation between audit quality and firm size, business complexity and financial leverage.*

3.3. Empirical Model

In order to test the research hypothesis, the modified Soliman and Elsalam (2012) logistic regression was used:

$$AQ=\beta 0+\beta 1BI+\beta 2CD+\beta 3IO+\beta 4MO+\beta 5AC+\beta 6CONTROLS+\varepsilon$$

Where:
AQ: audit quality; BI: board independence; CD: CEO duality; IO: institutional investors; MO: managerial ownership; AC: audit committee existence; CONTROLS: control variables composed of three independent variable, namely SZ: firm`s size; CM: business complexity and LE: financial leverage.

This multiple regression was implemented for determining the association between the audit quality which represents the dependent variable and specific corporate governance attributes, which constitute the independent variable.

3.3.1. Variables` Definition

The dependent variable of the regression is represented by the Audit quality, while Board independence, CEO duality, Institutional ownership, Managerial ownership and Audit committee existence are defined as independent variables. Firm size, Business complexity and Financial leverage are control variables.

- Audit quality (AQ) was dichotomous in nature and the size of audit firm (Big four or non-Big four) was used as a proxy for audit quality. Further, this variable equals 1 if the external auditor is Big four and 0 otherwise;
- Board independence (BI) was measured in terms of percentage of non-executive members in the board of directors;
- CEO duality(CD) was dichotomous and operated as 1 if the position of Chairman and Chief Executive Officer was occupied by the same person and 0 otherwise;
- Institutional investors (IO) was measured through the percentage of shares owned by institutions in relation to the company`s issued capital;
- Managerial ownership (MO) was computed as the number of shares owned by managers in relation to the company`s issued capital;
- Audit committee existence (AC) was defined as a dummy variable: it equals 1 if the company has an audit committee, otherwise it equals 0;
- CONTROLS: Control variables composed of firm size, business complexity and firm`s financial leverage, variables described below as it can be noticed:
  1. Firm size (SZ) was measured using the natural logarithm of total company assets;
  2. Business complexity (CM) was defined by dividing the sum of total accounts receivable and inventories to total assets;
  3. Firm`s financial leverage (LE) was measured as the ratio of debt to total assets.

4. Results and discussions

4.1. Descriptive Statistics

The Descriptive Statistics section is devoted to presenting and interpreting the results of the data collected in order to test the research`s hypothesis. The demarche was conducted using Microsoft Excel Data Analysis Tool, and the output of this statistical approach is being analyzed as it follows.

Variables	Min	Max	Mean	Std.Dev.	Range
Audit Quality	0	1	0.2786	0.4490	1
Board Independence	0	0.85	0.6323	0.1522	0.85
CEO Duality	0	1	0.4688	0.4998	1
Institutional Ownership	0	0.98	0.5623	0.2830	0.98
Managerial Ownership	0	0.78	0.1310	0.2285	0.78
Audit Committee	0	1	0.2983	0.4582	1
Firm Size	16.51	24.36	19.0042	1.4223	7.85
Business Complexity	0.006	1.9	0.3434	0.2398	1.894
Financial Leverage	0.005	1.45	0.2878	0.2559	1.445

Table 1: Descriptive Statistics

The results presented in Table 1 indicate that 28% (more precisely 27.86%) of the Romanian listed companies are audited by a Big 4 audit firm. In which concerns the independence of the Board, 63% (63.23%) of the members are classified as independent, reaching a minimum

of 0 independent members and a maximum of 85% non-executive members. When analyzing the CEO duality, the results show that 47% (46.88%) of the Romanian companies listed on the Bucharest Stock Exchange in the period from 2008 until 2012 are characterised by the fact that the position of Chairman and the one of Chief Executive Officer is being held by the same person, duality which supports this pattern in terms of emerging economies corporate governance characteristics. Overall, the Romanian entities Boards seem to be dominated by a single person.

Moving forward with the analysis of descriptive statistics, the results indicate, through the percentage of institutional ownership, namely 56.23%, that the average shares owned by institutions related to the companies` issued capital reach a percentage of approximately 56. As far as the control variables are concerned, Table 1 provides evidence of these three controls: firm size, business complexity and financial leverage.

4.2. Regression Output Analysis

In order to test the proposed hypotheses for this research, the analysis of logistic regression is being conducted. Table 2 presents the Matrix Correlation Analysis, namely the demarche of testing the multicollinearity issue that could affect the variables.

As it can be noticed in the following table, none of the variables is being affected by multicollinearity, due to the fact that the Pearson`s *R Coefficient* between each pair is situated in normal parameters of acceptance.

	AQ	BI	CD	IO	MO	AC	SZ	CM	LE
AQ	1								
BI	-0.33027	1							
CD	-0.17368	-0.05457	1						
IO	-0.00397	0.09822	-0.15934	1					
MO	-0.05224	0.0277	0.09639	-0.66153	1				
AC	0.28193	-0.11071	-0.16751	0.26738	-0.20829	1			
SZ	0.50593	-0.12625	-0.08303	0.22351	-0.17908	0.35515	1		
CM	-0.14893	0.08502	0.02101	-0.19402	0.13442	-0.02926	-0.29175	1	
LE	0.05077	-0.03707	-0.03637	-0.07018	0.07111	-0.04437	-0.00312	0.53253	1

***Table 2:** Matrix Correlation Analysis*

Table 3. presented below, illustrates the covariance analysis between the research`s variables.

	AQ	BI	CD	IO	MO	AC	SZ	CM	LE
AQ	0.20102								
BI	-0.0225	0.02309							
CD	-0.03886	-0.00414	0.24903						
IO	-0.0005	0.00422	-0.02247	0.07983					
MO	-0.00535	0.00096	0.01098	-0.04265	0.05208				
AC	0.05783	-0.0077	-0.03825	0.03456	-0.02175	0.20934			
SZ	0.3221	-0.02724	-0.05884	0.08967	-0.05803	0.23074	2.01633		
CM	-0.01599	0.00309	0.00251	-0.01313	0.00735	-0.00321	-0.0992	0.05734	
LE	0.00582	-0.00144	-0.00464	-0.00507	0.00415	-0.00519	-0.00113	0.03259	0.06532

Table 3: *Covariance Analysis*

Regression Statistics	
Multiple R	0.596663332
R Square	0.356007132
Adjusted R Square	0.343040833
Standard Error	0.36400159
Observations	305

ANOVA

	df	SS	MS	F	Significance F
Regression	6	21.82732252	3.63789	27.4563	4.90576E-26
Residual	298	39.48415289	0.1325		
Total	304	61.31147541			

Table 4: *Regression Output*

In the table 4, the results of the regression output are being presented as a basis for testing the initial hypothesis developed for this study. The R Square and Adjusted R Square describe the explanatory power of the regression model. Still, the Adjusted R Square for this regression is 34%, value which does not promote an acceptable explanatory power for the model.

As far as the corporate governance attributes are concerned, the following table (Table 5) indicate that there is no association between audit quality and board independence, namely the first Hypothesis is not being validated. When analyzing the p-value for the CEO Duality variable, the significance of this value indicates a negative association between the audit quality and the CEO duality, fact which supports Hypothesis 2. Under this result, it can be stated that the more the audit quality increases, the less importance gains the single person that cumulates the two functions: CEO and Chairman.

	Coefficients	Standard Error	t Stat	P-value
Intercept	-1.744183475	0.330966386	-5.26997	2.6E-07
BI	-0.772994661	0.141192035	-5.47478	9.3E-08
CD	-0.135020272	0.042769369	-3.15694	0.00176
IO	-0.203645854	0.102283585	-1.99099	0.04739
MO	-0.061022651	0.122799909	-0.49693	0.61961
AC	0.10625943	0.050441943	2.10657	0.03599
Controls	0.135765818	0.015838014	8.57215	5.6E-16

Table 5: *Regression Variables` Results*

The regression variables` results show that there is a negative association between audit quality and institutional ownership in the case of Romanian`s listed entities, finding which supports Hypothesis 3. Still, when taking into account the managerial ownership, the results indicate no association between this corporate governance attribute and the audit quality (p-value of 0.62), fact that does not validate the research`s Hypothesis 4.

	Coefficients	Standard Error	t Stat	P-value
Intercept	-1.698505255	0.343609815	-4.94312	1.3E-06
BI	-0.731467585	0.141134328	-5.18278	4.1E-07
CD	-0.135760853	0.042389376	-3.20271	0.00151
IO	-0.249767697	0.102678162	-2.43253	0.01559
MO	-0.060570279	0.12166906	-0.49783	0.61897
AC	0.108577735	0.050767561	2.13872	0.03328
SZ	0.137992989	0.016781603	8.22287	6.3E-15
CM	-0.099767493	0.111455428	-0.89513	0.37144
LE	0.108573607	0.098486038	1.10243	0.27117

Table 6: *Regression Variables` Results- Controls*

Empirical results indicate a strong positive association between audit quality and the existence of an audit committee at the companies` level, supporting Hypothesis 5. This finding suggests that the audit committee is responsible for the appointment of a Big 4 audit firm, recommending, in accordance, the nomination of the external auditor. When analyzing the controls, the results indicate a positive association between audit quality and firm size, partially supporting Hypothesis 6, as Table 6 presents. Still, the results do not indicate an association between audit quality and business complexity, on the one hand, and audit quality and financial leverage, on the other hand.

5. Limitations of this research

This research has several drawbacks. First of all, the sample consists of 61 entities analyzed through a period of five years, fact that leads to a sample small in size and, as a consequence, to a sceptical approach in evaluating the results. Still, the sample remains the same throughout the analyzed period of time, leading to a relevant output, from this point

of view. Second of all, the R Square and Adjusted R Square- which show the explanatory power of the model- are far below 80%, conducting to a regression which has a small explanatory power for the selected entities.

6. Conclusions and further research

The aim of this research is to examine the association between the audit quality and specific corporate governance attributes in the case of Romanian`s listed entities. This study reveals that there is a negative association between the audit quality and the CEO duality, on the one hand, and institutional ownership, on the other hand. Moreover, the empirical results indicate a strong positive association between audit quality and the existence of an audit committee at the companies` level.

Still, in the case of Romania, the results indicate that there is no association between audit quality and board independence, as well as managerial ownership. Thus, all the other variables that were found not to have a significant impact on the audit quality had, however, a punctual correlation with the quality of audit, at certain levels.

The above-mentioned findings emphasise the influence of corporate governance attributes on the quality of financial reporting process, especially in an emerging economy, characterized by a less-developed financial infrastructure and a real need for transparency and stronger corporate governance mechanism, all of these necessary into achieving a market-economy status.

7. Bibliography

1. Abdullah, S.N. (2006). *Board Composition, Audit Committee and Timeliness of Corporate Financial Reports in Malaysia*. Corporate Ownership and Control, 4(2), 33-145.
2. Adayemi, S.B. and Temitope, O.F. (2010). *Audit Quality, Corporate Governance and Firm Characteristics in Nigeria*. International Journal of Business and Management, 5(5).
3. Afify, H.A.E. (2009). *Determinants of Audit Report Lag: Does Implementing Corporate Governance have any Impact? Empirical Evidence from Egypt*. Journal of Applied Accounting Research, 10(1), 56-86.
4. *Bucharest Stock Exchange Code of Corporate Governance* (2008). Retrieved from http://www.bvb.ro/companies/CorporateGovernance.aspx
5. Cohen, J.,Wright, A. and Krishnamoorthy, G. (2004). *The Corporate Governance Mosaic and Financial Reporting Quality*. Journal of Accounting Literature, 87-152.
6. Deloitte (2013). *Centre for Corporate Governance India*. Retrieved from http://www.corpgov.deloitte.com/site/in/audit-committee/internal-external-audit/
7. Fama, E. and Jensen, M. (1983). *Separation of Ownership and Control*. Journal of Law and Economics, 26, 301-326.
8. Finkelstein, S. and D'Aveni, D.A. (1994). *CEO Duality as a Double-edged Sword: How Boards of Directors Balance Entrenchment Avoidance and Unity of Command*. Academy of Management Journal, 37, 1079-1108.
9. Francis, J., Maydew, E. and Sparks, H. (1999). *The Role of Big 6 Auditors in the Credible Reporting of Accruals*. Auditing: A Journal of Practice and Theory, 18(2), 17-34.
10. Gul, F.A. and Leung, S. (2004). *Board Leadership, Outside Directors' Expertise and Voluntary Corporate Disclosures*. Journal of Accounting and Public Policy, 23(5), 351-379.
11. Lawrence, A., Minutti-Meza, M., and Zhang, P. (2011). *Can Big 4 versus Non-Big 4 Differences in Audit-Quality Proxies Be Attributed to Client Characteristics?* The Accounting Review, 86(1), 259-286.

12.   Soliman, M.M and Elsalam, M.A. (2012). *Corporate Governance Practices and Audit Quality: An Empirical Study of the Listed Companies in Egypt*. World Academy of Science, Engineering and Technology, 71(2012).
13.   World Bank (2011). *Improving Corporate Governance In Emerging Markets*. Retrieved from http://siteresources.worldbank.org/FINANCIALSECTOR/Resources/Corporate_Governance_Introduction .pdf

Appendix Sample - Companies listed on the Bucharest Stock Exchange from 2008 until 2012

Nr crt	Company Name
1	Aerostar
2	Alro
3	Altur
4	Alumil Rom Industry
5	Amonil
6	Antibiotice
7	Armatura
8	Artego
9	Bermas
10	Biofarm
11	Boromir Prod
12	C.N.T.E.E Transelectrica
13	Calipso
14	Carbochim
15	Casa de Bucovina - Club de munte
16	Cemacon
17	COMCM
18	Comelf
19	Compa
20	Compania Energopetrol
21	Concefa
22	Condmag
23	Conpet
24	Contor Group
25	Dafora
26	Electroapartaj
27	Electroarges
28	Electromagnetica
29	Electroputere
30	Farmaceutica Remedia
31	Grupul Industrial Electrocontact
32	Impact Developer&Contractor
33	Mecanica Ceahlau
34	Mefin
35	MJ Maillis Romania
36	Oil Terminal

37	Oltchim
38	OMV Petrom
39	Petrolexportimport
40	Prefab
41	Prodplast
42	Retrasib
43	Romcarbon
44	Rompetrol Rafinare
45	Ropharma
46	S.N.T.G.N Transgaz
47	Santierul Naval Orsova
48	Transilvania Constructii
49	Sinteza
50	Siretul Pascani
51	Socep
52	Stirom
53	Teraplast
54	TMK- Artrom
55	Turbomecanica
56	Turism Felix
57	Turism, Hoteluri, Restaurante Marea Neagra
58	VES
59	voestalpine VAE Apcarom
60	Vrancart
61	Zentiva

Anna Soci [1]
Anna Maccagnan [2]
Daniela Mantovani[3]

DOES INEQUALITY HARM DEMOCRACY?
AN EMPIRICAL INVESTIGATION ON THE UK

Abstract

This paper presents an empirical investigation about the effect of increasing economic inequality on some aspects of the quality of a democracy. The main novelty of the paper lies in its methodology: it applies to a single country - the UK – in a long run perspective. Using Eurobarometer data for the period 1974-2009, we select three questions and check whether an increase in inequality alters the answers to these questions, subject to other control variables. In particular, as indicators of the quality of democracy, we select the degree of Democracy-Satisfaction, the frequency of Political Discussion and Participation in Election. Another novelty is the use of several measures of inequality: the Gini coefficient, the Foster-Wolfson polarization index, the interdecile ratios P90/P10 and P90/P50, the shares of top and bottom 1%, 5% and 10% income. Inequality indices have been computed using two British household budget/expenditure surveys, i.e. the Family Expenditure Survey and the Family Resources Survey. Using an array of indicators allows us to disentangle what happens in the different parts of the income distribution and to avoid the dependence of the results on the choice of the indicator. The estimation is carried out estimating probit and ordered probit models. The main finding is that higher level of income inequality, no matter how it is measured, impacts negatively on citizens' satisfaction with democracy and positively on their political discussion and intention to vote. This leads to the issue of limiting inequality as an engine of deterioration in the quality of democracy, and sustaining an active citizenship.

Keywords

Economic inequality, Factor analysis, Inequality indices, Quality of democracy, United Kingdom

1. Introduction

In western advanced economies the reduction in income inequality has been sharp and general since the 1st World War. Data for the period post WWII-1970s still support the Kuznet's vision of an inverse-U relationship between development and inequality, but after the 1970s a sharp reversal of that equalizing tendency started to be the rule. Income inequality increased both in boom and recession and widened in the two decades since the mid-1980s. In the late 2000s the majority of OECD countries were experiencing high Gini coefficients: the English speaking area – notably the US and the UK – and several European countries were ranging from the minimum of 0.30 for the Netherlands to the maximum of

---

[1] Department of Economics, University of Bologna, e-mail: anna.soci@unibo.it
[2] Department of Economics, University of Bologna, e-mail: anna.maccagnan@unibo.it
[3] Department of Economics "Marco Biagi", University of Modena and Reggio Emilia, e-mail: daniela.mantovani@unimore.it

0.41 for the US in the 2000-2010 period, while Northern Europe (Scandinavian block first) and Japan positioned on average well below 0.30, which is considered a "very good Gini" (Stepan and Linz, 2011, p. 847 and 854). Moreover, English-speaking countries have been showing another peculiarity: in US, UK, Canada, Australia, New Zealand and Ireland the share of top 1% in total income before tax is U-shaped with the rising portion appearing after the 1970s (while the continental Europe - precisely France, Germany, Netherlands, and Switzerland - exhibits an L-shaped form). Both aspects - the fact that inequality in the majority of the western economies is increasing and that there is a huge disproportion between the top and the remaining of the distribution - started to be recognized as a social problem.

This seems particularly true when considering that social mobility shrank in some countries of the first group: the correlation between sons' and fathers' incomes in 2005 was sensibly higher in the US and the UK than in Germany and Scandinavian countries: "*broadly, social mobility in the UK seems to have fallen from North European to something close to US level*" (Glyn, 2006, p. 174); the probability for the son of being in the same earnings quintile as his father is substantially higher in both the 1st and 5th quintile in the US and in the UK than in the Scandinavian group where the probability is smaller and equally distributed (OCSE, 2008, p. 206); the correlation between this intergenerational income elasticity and income inequality – the so called "Great Gatsby Curve" (Krueger, 2012) – is high, and it is still the US and the UK to perform the worst; lastly, whilst a reliable measure of social disease - the index of health and social problems elaborated by Wilkinson and Pickett (2010) - barely shows any relationship with the per-capita national income in rich countries, it appears strongly related to inequality. Thus, there is a piece of evidence that where income differences are bigger, social distances are bigger and social stratification more remarkable. The social distance among population-groups can become enormous and it can lead to social exclusion through differences in consumption sphere, in health and housing conditions, in access to education and to labor market, and in the social-relation network. A harmful environment for the attractiveness of the democratic institutions to their citizens might easily develop.

The difficulties to a correct working of democracy when population is divided by income and wealth are widely dealt with in the political science (and also sociology) literature[4]. Since Aristotle, the scholars of politics have theorized that the proper functioning of a democracy depends on a relatively equal distribution of economic resources. For all, Tocqueville stated that the degree of equality is the best predictor of democracy stability, and of the quality itself of democracy. More recently, Dahl (1971, 2000) reminds that economic resources easily become political resources and that an unequal distribution can generate frustration and can reduce the sense of community and legitimacy leading to a subtle deterioration of democracy. For our mature western democracies an appreciable degree of income inequality is not as dangerous as in provoking dramatic outcomes. Movements of de-democratization rather occur within the democratic regime inducing a failure in the proper functioning of institutions that eventually leads to a deterioration of trust and to an estrangement from participation. The trend of de-participation leaves empty spaces that

---

[4] See, for instance, Karl (2000); Bermeo (2009); Bartels (2008); Thorbecke and Charumilind (2002); Mueller (1988); Bollen and Jackman (1985); Boix (2003).

may well lead to an oligarchic power (in the specific case of a wealth-driven power, the *plutarchy*, in the Hacker-Pierson terminology, or *plutonomy* elsewhere), or to a power that is centered more and more on the interest of the few. The desire to keep privileges can favor the partial restriction of an open democracy (Winters, 2011).

The quantitative literature concerning the effects of inequality on democracy is very scant and it is not centered on the idea of testing *the quality* of democracy, with few exceptions (Sunde *et al.*, 2007; Solt, 2004, 2008; Anderson and Beramendi, 2008) considering an array of countries. Our paper joins these contributions in so far as it aims precisely at evaluating the quality of democracy. More specifically, we first test how inequality impacts on citizens' satisfaction, which is a suitable indicator for the concept of "responsiveness" (Diamond and Merlino, 2004, p. 27). Then, we inquire about the citizen's reaction towards two of the main characteristics of political life: participating in discussion and voting. In addition, we depart from the existing literature which performs cross-country analysis either on developing countries or on a mix of developing-developed ones.[5] We are not interested in a worldwide comparison because developing countries differ in fundamental ways from the developed ones, and democracies in transition have to be studied separately as well. Even within the universe of the developed countries with fully grounded democracy things are different: the kind and the reach of policies, their timing, the country-specific social norms and institutions, their position in the global economic context and so on. In fact, *"…. our results suggest that inequality is determined by factors which differ substantially across countries"* (Li, Squire and Zou, 1998, p. 27). This statement – based on a wide empirical evidence – implies that income inequality depends on the country-specific socio-politico-economic framework, which is sluggish to change, and it reflects the fact that the drivers of income inequality (changes in demography and living arrangements, labor market trends and government re-distribution, *in primis*) have varied sensibly across OECD countries: no single story holds for all. How could the effect on democracy – intended as citizens' reaction *vis-à-vis* institutions – be the same?

Thus, this paper will concentrate on a well grounded democratic country only, with a rich advanced economy, performing a time-series analysis for the last thirty years through the pooling of cross-section survey-data for the period 1974-2009. The country chosen is the UK on the basis of the following criteria: i) both the US and the UK have recently experienced an exacerbation in inequality but the income composition at the very top is less earnings - than wealth-based in the UK, making the fashionable top-incomes problem less relevant; ii) UK is a country with higher taxation level and that redistributes more than the US; iii) UK is the country that invented the modern Welfare State and is a country with an historical level of inequality much lower than the U.S.

Last but not least, we do not limit ourselves to the Gini index only as "the" indicator of inequality and we use several additional indicators. Our purpose is twofold: disentangling what happens in different parts of the income distribution and avoiding the dependence of the results on the choice of the used indicator.

---

[5] See Thorbecke and Charumilind (2002) and Atkinson and Brandolini (2006) for reviews.

The paper is organized as follows: the data and their sources, the variables and the model are illustrated; the results of the empirical investigation are provided and commented. Concluding remarks briefly summarize the findings.

2. Data sources and variables

The Eurobarometer Survey was used for the "quality of democracy" variables since *it* is the only survey that covers the whole time period we are interested in. As for income inequality, we computed inequality of household equivalent disposable income for the period 1971-2009 using *Family Expenditure* Survey (FES) and *Family Resources Survey (FRS).*

2.1. Dependent variables

As possible indicators of the quality of democracy we selected the three following questions:
- *Democracy-Satisfaction*. It corresponds to Eurobarometer question *"on the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the way democracy works in your country?"*.
- *Political Discussion*. This is the answer to the question: *"when you get together with friends, would you say you discuss political matters frequently, occasionally or never?"*
- *Participation in Elections*. This variable is built from the question: *"if there were a general election tomorrow, which party would you support?"*

2.2. Inequality indices

Several inequality indices have been computed using the above mentioned British household budget/expenditure surveys. In theory, different indicators can tell a different story on inequality and should they show different trends findings might be entirely due to the index choice. This is why no choice has been made and ten distinct indicators were calculated and used.

In addition to the well-known *Gini coefficient*, we computed the *interdecile ratios P90/P10* and *P90/P50*, the *share of the top 1%, 5%* and *10%,* the s*hare of the bottom 1%, 5%* and *10%, and* the *Foster-Wolfson polarization index*, which is *"… a Gini-like index measure of bipolarization based on the curve*…..[that] *indicates how far each population percentile's income is from the median income"* (Lambert, 2010, p. 241).

The ten indices are highly correlated (results are available from the authors on request), all telling the same story about inequality in UK: income distribution has been relatively stable during the 1970s, then there was a sharp increase in inequality from late 1970s to the early 1990s followed by an up and down movement without any of the dramatic changes seen in the past.

This same high correlation suggests that they may be expression of the same *latent construct,* a concept used in factor analysis, that is reflected into *observable indicators*. The latent construct can thus be interpreted as the inequality imperfectly measured by different indicators that are rough and partial realizations of a higher level concept (Bollen and Lennox, 1991; Edwards and Bagozzi, 2000). Using factor analysis, we are able to find (and measure) the latent variable lying behind (results of the factor analysis are available from the authors on request). In the progress of the paper we will mainly focus on this variable - duly standardized - that we simply call *Inequality* - leaning on the other inequality indices for comparison only. As we expect, given the high correlation, results are largely similar for all indicators.

2.3. Control variables

Personal and household characteristics were considered as control variables: age, education (university and secondary degree vs. lower educational level), gender (male vs. female), marital status (married vs. other marital status such as being single, divorced or widow). Additionally, we included information on occupational status: self-employed or entrepreneur, manager, white collar, manual worker, retired from work, unemployed, each vs. the group of non-active people (including individuals in the military service, individuals who are responsible for house-caring or people who do not work but are not recorded as unemployed). A dummy variable captures differences between individuals living in an urban area vs. individuals living in a rural area. Also a time trend year and a dummy distinguishing between the two pieces of the UK where the person interviewed lives (Great Britain vs. Northern Ireland) have been included. At a later stage of the analysis, also household income deciles will be included in the analysis.

3. The model

We estimated three distinct equations, one for each dependent variable. Due to the nature of data, Democracy-Satisfaction and Political Discussion have been analyzed using ordered probit models, whilst Participation in Elections was treated with a probit. In particular, Democracy-Satisfaction is an ordinal variable, recoded from a descendant into an ascendant scale, taking value 1 if "Not at all satisfied", 2 if "Not very satisfied", 3 if "Fairly satisfied" and 4 if "Very satisfied". Political Discussion takes different values according to how often the interviewed discusses about politics. Recoded into a convenient way, it takes values: 1 if "Never"; 2 if "Occasionally"; 3 if "Frequently". Participation in Elections has been recoded to take value 1 if "Would vote" and 0 otherwise ("Would not vote/I would blank or spoil my vote/ I would definitely not vote"). The equations are the following:

$$satisfaction = \beta_1 inequality + \beta_2 age + \beta_3 male + \beta_4 married + \beta_5 university + \beta_6 secondary + \beta_7 selfemployed + \beta_8 manager + \beta_9 whitecollar + \beta_{10} manual + \beta_{11} retired + \beta_{12} unemployed + \beta_{13} urban + \beta_{14} year + \beta_{15} GB + u$$

$$discussion = \beta_1 inequality + \beta_2 age + \beta_3 male + \beta_4 married + \beta_5 university + \beta_6 secondary + \beta_7 selfemployed + \beta_8 manager + \beta_9 whitecollar + \beta_{10} manual + \beta_{11} retired + \beta_{12} unemployed + \beta_{13} urban + \beta_{14} year + \beta_{15} GB + u$$

$$vote = \beta_0 + \beta_1 inequality + \beta_2 age + \beta_3 male + \beta_4 married + \beta_5 university + \beta_6 secondary + \beta_7 selfemployed + \beta_8 manager + \beta_9 whitecollar + \beta_{10} manual + \beta_{11} retired + \beta_{12} unemployed + \beta_{13} urban + \beta_{14} year + \beta_{15} GB + u$$

4. Results

The three models were estimated for each inequality indicator, however, we show the entire estimated equation only where the main inequality indicator (table 1) is present. For the ten remaining inequality indices we present only the coefficient attached to the specified inequality indicator (table 2).

4.1. Democracy-Satisfaction

The first important result is that an increase in the level of Inequality depresses Democracy-Satisfaction (first column of table 1). The hypothesis that growing Inequality has a negative effect on the perception of democracy quality is, therefore, confirmed.

In addition, we find that Democracy-Satisfaction increases with age (ageing people become wiser, or more indulgent, or more tolerant); males are more satisfied with democracy than women and married people more than individuals in another marital status (do women and singles have a greater sense of moral justice? Do they have more complaints against institutions that take care of them less than of others?); satisfaction increases with education - having university or a secondary degree *vs.* having a lower than secondary degree - and it is greater for more educated people (education helps in evaluating democracy and its virtues?). Also living in Great Britain vs. living in Northern Ireland positively and significantly impacts on Democracy-Satisfaction, while living in an urban area negatively affects Democracy-Satisfaction (cities present more occasions to interact with institutions than the country side does?). There exists a positive time-trend in the probability of being satisfied with democracy. The coefficients relative to the various types of employment position tell us the different probability that self-employed, managers, white collars, manual workers, retired from work and unemployed are more satisfied by democracy with respect to the control group: the non-actives. In particular, we find that managers and white collars are more satisfied with democracy with respect to the non-actives, while the opposite is found for manual workers and unemployed (who represent less-protected categories). On the contrary, self-employed and retired from work do not statistically differ from the non-actives in their level of Democracy-Satisfaction.

	Democracy-Satisfaction	Political Discussion	Participation in Elections
Inequality	-0.078*	0.028*	0.092*
	(0.011)	(0.009)	(0.022)
Age	0.003*	0.008*	0.009*
	(0.000)	(0.000)	(0.001)
Male	0.036*	0.248*	0.025
	(0.012)	(0.010)	(0.023)
Married	0.052*	0.121*	0.139*
	(0.012)	(0.010)	(0.022)
University degree	0.149*	0.597*	0.254*
	(0.019)	(0.016)	(0.042)
Secondary degree	0.135*	0.172*	0.093*
	(0.013)	(0.011)	(0.025)
Self employed/entrepr.	0.007	0.317*	-0.025
	(0.025)	(0.021)	(0.047)
Manager	0.090*	0.365*	0.166*
	(0.024)	(0.020)	(0.051)
White collar	0.065*	0.232*	0.103*
	(0.018)	(0.016)	(0.035)
Manual worker	-0.042*	0.026	-0.005
	(0.018)	(0.016)	(0.032)
Retired	0.014	0.051*	0.050
	(0.022)	(0.018)	(0.042)
Unemployed	-0.247*	-0.003	-0.105*
	(0.028)	(0.023)	(0.044)
Urban	-0.067*	0.072*	-0.014
	(0.011)	(0.009)	(0.022)
Year	0.009*	-0.010*	-0.028*
	(0.001)	(0.001)	(0.002)
Great Britain	0.477*	0.122*	0.465*
	(0.011)	(0.011)	(0.020)
Threshold 1/Constant	17.564*	-18.931*	-55.898*
	(2.175)	(1.690)	(4.633)
Threshold 2	18.482*	-17.408*	
	(2.175)	(1.690)	
Threshold 3	20.040*		
	(2.176)		
Obs	60699	93631	52461

Note: robust standard errors in parentheses. * $p < 0.05$

Table 1: *Estimation results of ordered probit and probit models on Democracy-Satisfaction, Political Discussion and Participation in Elections (elaborations on Eurobarometer data)*

4.2. Political Discussion

The second column of table 1 presents the results of the model for Political Discussion, showing that it is significantly augmented by an increase in Inequality. Relying on the precedent result on Democracy-Satisfaction, the discontent about the quality of democracy induced by an increase in Inequality does not turn into any reduction in political participation. On the contrary, it appears to nourish a more lively Political Discussion.

Significant coefficients are also found for almost all regressors: age, being male, being married, having a university or secondary degree, living in an urban area, living in Great Britain, all increase the frequency of talking about politics. It seems again that experience and social status helps being more involved with the surrounding world, while the gender-result reaffirms that it is not in women habits to talk about politics. The time trend has a negative coefficient, implying that Political Discussion today is not as frequent as in the past. The occupational status variables suggest that people in all occupational categories but unemployed are significantly more likely than non-actives to talk more frequently about politics. Contrarily to the previous question where the Democracy-Satisfaction was dependent on the working conditions, here the results are uniform: does having a job let everybody feel part of a community? Does it suggest that Political Discussion might be useful in one's own job-space? Does having a job just simply provide more opportunities for Political Discussion?

	Democracy-Satisfaction	Political Discussion	Participation in Elections
Inequality	-0.078*	0.028*	0.092*
	(0.011)	(0.009)	(0.022)
Gini coefficient	-1.925*	0.689*	2.384*
	(0.265)	(0.222)	(0.556)
Foster-Wolfson index	-2.918*	0.981*	2.169*
	(0.285)	(0.234)	(0.606)
Interdecile ratio P90/P10	-0.147*	0.047*	0.106*
	(0.015)	(0.013)	(0.032)
Interdecile ratio P90/P50	-0.595*	0.278*	0.615*
	(0.075)	(0.063)	(0.156)
Share top 1%	0.045	0.028	2.864*
	(0.565)	(0.484)	(1.123)
Share top 5%	-1.776*	0.666	3.383*
	(0.455)	(0.392)	(0.932)
Share top 10%	-2.073*	0.827*	3.257*
	(0.407)	(0.349)	(0.844)
Share bottom 1%	349.047*	-66.771*	-97.847
	(33.642)	(30.259)	(67.628)
Share bottom 5%	37.248*	-12.823*	-33.853*
	(4.025)	(3.496)	(8.110)
Share bottom 10%	15.063*	-4.998*	-13.198*
	(1.656)	(1.399)	(3.368)

Note: robust standard errors in parentheses. * $p < 0.05$

Table 2: Estimated coefficients of the 11 inequality indices (elaborations on Eurobarometer data)

4.3. Participation in Elections

The third column of table 1 shows the results of the probit model on the probability of voting if there were a general election tomorrow. Again, a positive effect of Inequality on political participation is confirmed here: an increase in Inequality significantly increases the probability of voting.
In addition, we find that increasing age, being married, having a higher educational level, and living in Great Britain increases significantly the probability of electoral participation (results are on average highly consistent with the previous ones). The time trend has a

negative coefficient, suggesting that, other things being equal, Participation in Elections in UK is decreasing with time (as it was the Political Discussion attitude).

No statistically significant effect is found for being male and living in an urban area. On the contrary, occupational status impacts electoral participation: managers and white collars are more likely to vote than non-actives, whilst the opposite is true for the unemployed (here again the results are consistent with the previous ones). No significant coefficient in found for the other occupational categories.

As anticipated, we run the three models with the ten alternative indicators, starting with the traditional Gini coefficient, in order to check whether the results were robust along the entire distribution and its main parts as well (table 2). Our main Inequality indicator is presented again in the first row for the sake of comparison. No statistically significant result clashes with our first evidence: where significant, all indicators tell us the same story: an increase in inequality, no matter how it is measured, reduces the level of Democracy-Satisfaction, while increasing Political Discussion and Participation in Elections.

5. Does income matter?

Though moral aversion to inequality may, in theory, be distributed roughly uniformly across income levels, it may reasonably be argued that, with growing inequality, the riches are better off than the poor and, therefore, the actual attitude is likely to differ for persons lying in different points of income distribution. In order to investigate this feature - in line with Solt - we estimated the three models (for Democracy-Satisfaction, Political Discussion and Participation in Elections) running separate regression models separately by income quintile. Table 3 reports the estimated coefficients related to Inequality for the different quintiles and the different equations. Only in the case of Democracy-Satisfaction there is a clear pattern. The effect of inequality on Democracy-Satisfaction is negative at all levels of income, though not statistically significant for the richest group, and it decreases in absolute value from the poorest to the richest group. This suggests that the frustrating effect of income inequality is particularly felt by the poorest individuals. As regards Political Discussion, we find a positive and significant effect of Inequality for every level of income, and this effect is higher for the poorest and the richest quintile, suggesting that these two groups are the ones more concerned about their interests. The effect of Inequality on Participation in Election appears to be much weaker. Indeed, it is positive and significant only for the third and fifth income quintile.

	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Democracy-Satisfaction	-0.218*	-0.191*	-0.157*	-0.110*	-0.038
	(0.043)	(0.044)	(0.043)	(0.041)	(0.043)
Political Discussion	0.187*	0.119*	0.094*	0.104*	0.153*
	(0.036)	(0.039)	(0.037)	(0.036)	(0.037)
Electoral participation	0.072	0.030	0.157*	-0.010	0.186*
	(0.072)	(0.074)	(0.077)	(0.077)	(0.075)

Note: robust standard errors in parentheses. * $p < 0.05$

Table 3: Estimated coefficients of Inequality on the three variables by income quintile (elaborations on Eurobarometer data)

The results are fairly poor. We think that this is due to several drawbacks in the Eurobarometer income-variable. The first problem is that data source does not collect all the information needed for calculating household equivalized income. The second concerns the number of available survey rounds: income has been collected only until 2004, shortening the time span of our analysis. Thirdly, household income has many missing observations: whether the non-response is not purely random, as it is often the case, a problem of selection bias arises. Fourthly, income is not reported as such but it is collected in classes that differ in size and number from year to year. In order to create an ordinal income class variable, we have to assume that it is uniformly distributed within classes. Lastly, the concept of income used here is not disposable income, but *gross* income, which includes benefits though being before taxes and social contributions.

6. Conslusion

As far as we know, this paper is the first one which relates income inequality – measured through a wide array of indicators – to some aspects of the quality of a democracy in an advanced-economy-and-rooted-democracy country, in a long-run perspective.

We tested the impact of inequality on three indicators of the quality of democracy: citizens' satisfaction and citizens' attitude to participation in the two aspects of political discussion and intention to voting.

Our findings reveal that Inequality decreases citizens' satisfaction and stimulates participation. This result seems quite interesting since the second and third indicator of quality move in opposite directions with respect to the first. However, this is not an inconsistent outcome in so far as it tells us that when a discontent occurs a positive reaction originates, which is debated in the political theory as one of the two possible outcomes (Solt, 2008, pp. 48-49). Contrarily to elsewhere found (Solt 2008) this may be due to the fact that we focus on a single country only with a fully rooted democracy rather than a pool of countries. Thus, the problem we are facing in such an environment might be the persistence of dissatisfaction – the degree of Inequality – and the efficacy of citizens' reaction rather than the reaction to the dissatisfaction as such. This leads to the issue of limiting inequality as an engine of deterioration in the quality of democracy, and sustaining an active citizenship.

7. Bibliography

1. Anderson, C. and Beramendi, P. (2008). Income, Inequality and Electoral Participation. In P. Beramendi and C. Anderson, *Democracy, Inequality and Representation – A Comparative Perspective,* pp. 278-312,. New York: Russell Sage.
2. Atkinson, A. and Brandolini, A. (2006). The Panel-of-Countries Approach to Explaining Income Inequality: an Interdisciplinary Research Agenda. In S. Morgan, D. Gruski and G. Fields, In *Mobility and Inequality: Frontiers of Research in Sociology and Economics, Studies in Social Inequality,* pp. 400-448, Stanford: Stanford University Press.
3. Bartels, L. (2008). *Unequal Democracy: the Political Economy of the New Gilded Age.* Princeton: Princeton University Press.

4. Bermeo, N. (2009). Does Electoral Democracy Boost Economic Equality? *Journal of Democracy,* 20(4), 21-35.
5. Boix, C. (2003). *Democracy and Redistribution*. Cambridge: Cambridge University Press.
6. Bollen, K. and Jackman, R. (1985). Political Democracy and the Size Distribution of Income. *American Sociological Review,* 50(4), pp. 438-457.
7. Bollen, K. and Lennox, R. (1991). Conventional Wisdom on Measurement: A Structural Equation Perspective. *Psychological Bulletin*, 100, pp. 305-314.
8. Dahl, R. (1971). *Polyarchy: Participation and Opposition*. New Haven, CT: Yale University Press.
9. Dahl, R. (2000). *On Democracy*. New Haven, CT: Yale University Press.
10. Diamond, L. and Morlino, L. (2004). The Quality of Democracy: An Overview. *Journal of Democracy,* 15(4), pp. 20-31.
11. Edwards, J. and Bagozzi, R. (2000). On the Nature and Direction of Relationships between Constructs and Measures. *Psychological Methods,* 5, pp. 155-174.
12. Glyn, A. (2006). *Capitalism Unleashed*. Oxford: Oxford University Press.
13. Karl, T. (2000). Economic Inequality and Democratic Instability. *Journal of Democracy,* 11(1), pp. 149-156.
14. Krueger, A. (2012). *The Rise and Consequences of Inequality: Speech at the Center for the American Progress, Washington DC.* Retrieved 14.01.2014 from http://www.whitehouse.gov/sites/default/files/krueger_cap_speech_final_remarks.pdf
15. Lambert, P. (2010). James Foster and Michael Wolfson's 1992 Paper "Polarization and the Decline of the Middle Class". *Journal of Economic Inequality,* 8, pp. 241–245.
16. Li, H., Squire, L. and Zou, H. (1998). Explaining International and Intertemporal Variations in Income and Inequality. *The Economic Journal,* 108, pp. 26-43.
17. Mueller, E. (1988). Democracy, Economic Development and Income Inequality. *American Sociological Review,* 53(1), pp. 50-68.
18. OECD. (2008). *Growing Unequal? Income Distribution and Poverty in OECD Countries*. Paris: OECD Publishing.
19. Solt, F. (2004). Economic Inequality and Democratic Political Engagement. *LIS Working Paper* 385.
20. Solt, F. (2008). Economic Inequality and Democratic Political Engagement. *American Journal of Political Science,* 52(2), pp. 48-60.
21. Stefan, A. and Linz, J. (2011). Comparative Perspectives on Inequality and the Quality of Democracy in the United States: Review Essay. *American Political Science Review,* 9(4), pp. 841-856.
22. Sunde, U., Cervellati, M. and Fortunato, P. (2007). Are All Democracies Equally Good? The Role of Interactions Between Political Environment and Inequality for Rule of Law. *IZA Discussion Paper No. 2984.*
23. Thorbecke, E. and Chutatong, C. (2002). Economic Inequality and Its Socioeconomic Impact. *World Development,* 30(9), 1477-1495.
24. Wilkinson, R. And Pickett, K. (2010). *The Spirit Level: Why Equality is Better for Everyone*. London: Penguin.
25. Winters, J. (2011). *Oligarchy*. Cambridge: Cambridge University Press.

Davor Filipovic [1]
Ilko Vrankic [2]
Damir Mihanovic [3]

THEORETICAL OVERVIEW OF MICROECONOMIC ASPECTS OF MERGERS AND ACQUISITIONS

Abstract

Mergers and acquisitions represent prominent phenomenon of the developed capitalist world. In turbulent business environment of 21st century companies are forced to use different growth strategies in order to successfully position themselves with respect to competition and to preserve and increase their profit margins. Mergers and acquisitions, as a part of a growth strategy, often fail to create synergies and value for shareholders. Therefore, variety of organizational variables like employee resistance, changes in business strategy and organizational structure, as well as changes in organizational culture are being analyzed and pointed out as crucial variables for M&A success. Since majority of research in field of M&A is focused on internal organizational variables the main aim of this paper is to present overview of microeconomic aspects of M&A with special focus on industry structure and its impact on M&A success. Besides, historical development of mergers and acquisitions is also presented in this paper.

Keywords

mergers and acquisitions, industry structure, Herfindahl-Hirschman Index, M&A waves

1. Introduction

In turbulent business environment of 21st century companies are forced to use different growth strategies in order to successfully position themselves with respect to competition and to preserve and increase their profit margins. Growth strategy is part of the corporate strategy which emphasizes corporation as a whole and provides answers regarding business scope of the corporation and recourse allocation (Tipurić, 2005, p. 105). Growth strategies are concerned with increasing the size and viability of the business over time. A successful growth strategy will allow entrepreneurs to increase its customer base, market segments, geographical scope, and/or product lines, which should lead to revenue growth. Mergers and acquisitions, as a part of growth strategy, but also as a research field of numerous scientists and consultants, represent prominent phenomenon of developed capitalist world since the end of 20th century. Mergers and acquisitions have become popular choice for companies' growth and expansion. M&A come in waves and extant literature identifies six M&A waves. In academic community heterogeneity regarding probable obstructions for

---

[1] University of Zagreb, Faculty of Economics and Business Zagreb, J.F. Kennedy 6, 10000 Zagreb, Croatia, e-mail: dfilipovic@efzg.hr
[2] University of Zagreb, Faculty of Economics and Business Zagreb, J.F. Kennedy 6, 10000 Zagreb, Croatia, e-mail: ivrankic@efzg.hr
[3] Croatia zdravstveno osiguranje d.d., Miramarska 22, 10000 Zagreb, e-mail: d.mihanovic@yahoo.com

successful execution of M&A prevails. Employee resistance, changes in business strategy and organizational structure, as well as changes in organizational culture are being analyzed and pointed out as crucial variables for M&A success. Since majority of research in field of M&A is focused on organizational variables the main aim of this paper is to present overview of microeconomic aspects of M&A with special focus on industry structure and its impact on M&A success. Besides, historical development of mergers and acquisitions is also presented in this paper.

2. Historical development of mergers and acquisitions

Research regarding M&A is present in economic literature for a long time period starting form 1890s. It is a well-known fact that mergers and acquisitions come in waves when firms in industries react to shocks in their operating environments. Shocks could reflect such events as deregulation; the emergence of new technologies, distribution channels, or substitute products; or a sustained rise in commodity prices (DePhampillis, 2014, p. 11). Thus far, six completed waves have been examined in the academic literature. Beginning of the first wave at the end of 19th century in the United States of America was characterized with huge technological changes, economic expansion and innovation in industrial processes. An important attribute of this wave was the simultaneous consolidation of producers within industries, thus qualifying the description "horizontal consolidation". Nobel Prize winner George Stigler described the first wave as merging for monopoly. In that time period more than 1800 firms disappeared due to consolidation, and many of the US corporate giants such as General Electric, Eastman Kodak, American Tobacco and DuPont during the first wave trough such consolidation. The wave came to an end around 1903–1904 due to the stock market crash (Sudarsanam, 2010, p. 16).

M&A activity remained at a modest level until the late 1910s as a consequence of the First World War. The second takeover wave emerged in the late 1910s and continued through the 1920s. The second wave was considered as a move towards oligopolies because, by the end of the wave, industries were no longer dominated by one giant firm but by two or more corporations. Most of the mergers of the 1920s were between small companies left outside the monopolies created during the previous wave. By merging, these companies intended to achieve economies of scale and build strength to compete with the dominant firm in their industries (Marynova and Renneboog, 2008, p. 2150). The second wave accompanied economic growth and stock market boom. An estimated 12.000 firms disappeared during this period, although the impact on the market structure of industries was much less dramatic than the first wave mostly due to antimonopoly legislation acts. This wave ended in 1929 with the stock market crash of that year. In the following four years, due to the global economic depression, many corporations formed during second wave collapsed into bankruptcy (Sudarsanam, 2010, p. 18).

After the Second World War which followed after the worldwide economic depression, M&A activities decreased significantly. The third M&A wave took off only in the 1950s and lasted for nearly two decades. The beginning of this wave in the US coincided with a tightening of the anti-trust regime in 1950. The main feature of this wave was a very high number of diversifying takeovers that led to the development of large conglomerates. Compared to first

and second wave, mergers in this wave where not large and did not involve large acquirers and their motive was growth through unrelated diversification. The main feature of this wave was a very high number of diversifying takeovers that led to the development of large conglomerates. By building conglomerates, companies intended to benefit from growth opportunities in new product markets unrelated to their primary business. This allowed them to enhance value, reduce their earnings volatility, and to overcome imperfections in external capital markets. The third wave peaked in 1968 and collapsed in 1973, when the oil crisis pushed the world economy into a recession (Marynova and Renneboog, 2008, p. 2151).

Recovery of the stock markets in the USA at the middle of the 1980s indicated the revival of takeover activity and start of the fourth wave. The start of the fourth wave coincided with changes in anti-trust policy, the deregulation of the financial services sector, the creation of new financial instruments and markets (e.g. the junk bond market), as well as technological progress in the electronics industry. Many transactions were financed with large amounts of debt, and takeovers were often conducted by company's management trough management buyouts (Damodaran, 2002, p. 5). Except of management buyouts, this wave was characterized the activity of private equity funds which conducted takeovers trough leverage buyouts (Lake and Lake, 2007, p. 109-115). As the main motive for this wave, the academic literature suggests that the conglomerate structures created during the 1960s had become inefficient by the 1980s such that companies were forced to reorganize their businesses. The merger wave of the 1980s includes a number of mergers designed either to downsize or to specialize operations. Some of these corrected excessive conglomeration, others responded to excess capacity created by the 1970s recession (following the creation of the OPEC oil cartel), while yet others responded to the important advances in information and communication technologies. The 1980s also experienced the largest number of hostile bids in U.S. history. Like all earlier waves, the fourth one declined after the stock market crash of 1987 (Shleifer and Vishny, 1991, p. 51-59).

The fifth takeover wave started in 1993 along with the increasing economic globalization, technological innovation, deregulation and privatization, as well as the economic and financial markets boom. This wave is important because of its size and geographical dispersion emphasizing its international nature. Remarkably, the European takeover market was about as large as its US counterpart in the 1990s, and an Asian takeover market also emerged. Second, a substantial proportion of M&As was cross-border transactions. Previously domestically-oriented companies resorted to takeovers abroad as a means to survive the tough international competition created by global markets. The dominance of industry-related (both horizontal and vertical) takeovers and the steady decline in the relative number of divestitures during the fifth wave suggests that the main takeover motive was growth to participate in globalized markets. Compared to the takeover wave of the 1980s, the 1990s wave counted fewer hostile bids in the UK and US. However, an unprecedented number of hostile takeovers were launched in Continental Europe (Marynova and Renneboog, 2006, p. 1).

As with the four prior merger waves, the fifth wave came to an end when the economy turned down and entered a brief eight-month recession in 2001. An initially weak recovery took place after the recession ended. However, the economy was buoyed by the low interest

rates initially established by the American Federal Reserve as a response to the 9/11 economic shock that took place at the end of the 2001 recession. These low rates provided the fuel for a speculative bubble in real estate that became an international bubble as the international investment world developed an insatiable appetite for mortgage-backed securities and other debt securitizations. The low interest rates also gave a major boost to the private equity business. Leveraged acquisitions became less expensive for private equity buyers to do as the bulk of the financing costs were relatively low interest rate debt. This wave came to the end in 2008 due to subprime mortgage crisis in the United States of America (Gaughan, 2013, p. 18).
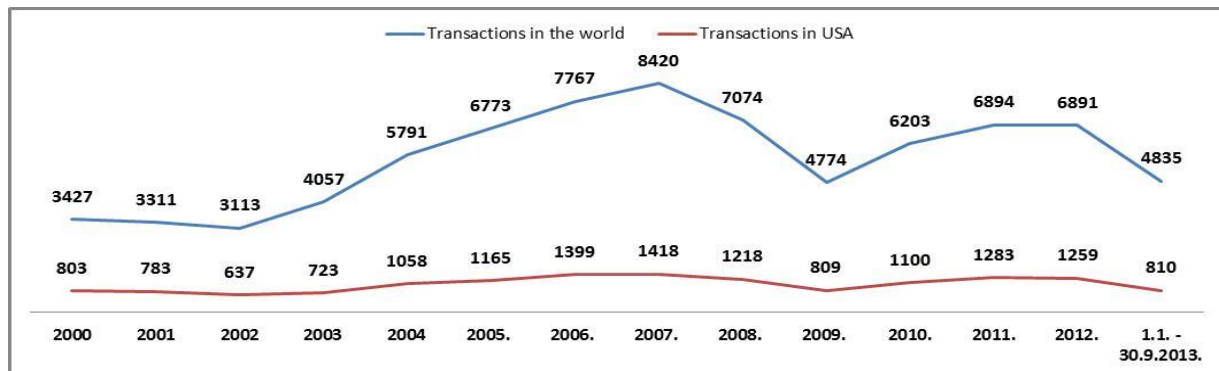
Figure 1: M&A activity in the world in period from 2000 to 30.9.2013.

Figure 1 presents M&A activity in the USA and world in the period from 2000 to 30.9.2013.[4], and also encompasses volume of transactions during the sixth merger wave.

3. Microeconomic aspects of mergers and acquisitions

One of the external organizational variables which is in the focus of this paper is the industry structure and its impact on the M&A success. In the long run, higher or lower profitability as a feature of a company's competitiveness is not solely the result of the development and implementation of strategic activities, but it also depends on the industry structure, i.e., the competitive space in which companies compete. The industry structure is characterized by a number of companies in the industry at a given point of time as well as by size of these companies, and the industry concentration ratio is used as a measure of industry structure (Lipczynski and Wilson, 2001, p. 103).

Scientists use different measures of concentration through which they try to describe the industry structure. Information on industry concentration suggests the nature of competitive forces in any industry. Most commonly used concentration measures are the concentration ratios and the Herfindahl-Hirschman Index. Concentration ratio measures the market share of the N largest firms in the industry, and N usually presents 3, 4, or 8 companies. The market share is generally measured by the value of sales, assets or number of employees. Concentration ratios represent an incomplete measure of industry concentration, because

---

[4] Information regarding M&A activity in the world was gathered from the Mergermarket data base and includes all deals with value of 5 million Euros or more.

the N shows how much of the total industry output was produced by only the largest companies in the industry. The shortcomings of these indicators include frequent impossibility of precisely defining the industry, inability of incorporating the entry and exit barriers along with the regional and foreign competition, and not taking into account the distribution of the market shares of other companies. Due to the shortcomings of the concentration ratio, some scientists use measures of concentration which take into account all the companies in the industry (DePhampillis, 2014, p. 57). Unlike the concentration ratio, the Herfindahl-Hirschman Index (HHI) shows not only the distribution of market shares by the N leading companies in the industry, but also the market shares of other companies. In order to obtain statistical measures of concentration, Herfindahl-Hirschman Index, squares the market shares of all companies in the relevant market and by doing so it gives greater importance to the shares of leading companies and thus more accurately reflects the relative importance of large companies in the event of a merger or a takeover. The index can have a value from 0 to 10 000 (100^2). If the index tends to be lower, then the industry has a large number of companies with a small market share (fragmented industry), whereas the index of 10 000 means that the industry consists of only one company - a monopoly (Tipurić, Pejić-Bach and Pavić, 2008, p. 97-118). The Federal Trade Commission (FTC) is an independent agency established to protect consumers and to prevent and eliminate what regulators think to be harmful anti-competitive business practices. According to the FTC, when the value of the HHI index is less than 1000, the market is not concentrated, while index values between 1000 and 1800 reflect moderate concentration (DePhampillis, 2010, p. 63). Index values above 1.800 suggest a concentrated market.

Industry structure may range from a highly fragmented to a firmly consolidated industry. The fragmented industry is a form of poorly concentrated industry with a large number of small or medium-sized enterprises, none of which is in a dominant position, nor does it have the power to shape the industry events (Porter, 1980, p. 196-212). Consolidated industry is a form of concentrated industry dominated by one company or a small number of large companies. The main feature of this type of industry structure is the accentuated interdependence of companies, which is reflected by the fact that the actions of one company affect the profitability of others, as well as their market shares. The more concentrated the industry, according to some research, the more likely it is for the companies in the industry to recognize their interdependence and not to encourage strong rivalry that can reduce everyone's profitability (Tipurić, 2007, p. 2).

There are lots of studies about the influence of industry structure on the company's profitability. In 1951 Bain conducted an analysis of the impact of industry structure on the profitability of 42 manufacturing companies in the USA and came to the conclusion that the profitability of companies that operate in industries with a higher degree of concentration is higher than the profitability of companies which operate in low concentrated industries. Demsetz's research from 1973 was conducted on a sample of 95 manufacturing companies, and it showed that the profitability of companies in the sample did not grow with the increase in the concentration ratio (Demsetz, 1973, p. 1-9). Horizontal mergers and acquisitions increase the company's market share, as well as its market power, which can affect the price of the industry products. Increasing market share in the situation of horizontal mergers and acquisitions is a short-term increase and it is a real challenge to maintain this share in the long term. After a merger or acquisition of one

or two companies within the same industry, many companies follow that trend, and the initial increase in the market share of companies is very hard to maintain (Sudarsanam, 2003, p. 100). On a sample of 1000 mergers and acquisitions in the period from 1950 to 1972, Mueller showed that only 18% of companies in the sample managed to retain their market share as opposed to 88,50 % of companies that have maintained their market share, while not being involved in mergers and acquisitions. The study did not confirm the hypothesis that mergers and acquisitions increase the efficiency of the companies involved in transactions by increasing its market share. Mueller postulates that bidders, whose market share did not increased, operated neither better nor worse than companies that did not use mergers and acquisitions as a growth strategy. In addition, Mueller's opinion was that it was difficult to believe that the loss of market share did not affect the decrease in profitability (Mueller, 1985, p. 262-266). Mergers and acquisitions can result in increased industry concentration but that does not automatically mean a reduction of competition between established companies in the market. Thus, the increased concentration does not result in increased profitability and creation of shareholder's wealth. Schmalensee and Willig concluded that the relationship, if there is any, between concentration and profitability of companies is statistically insignificant and the estimated effect is usually small (Schmalensee and Willig, 1989, p. 992-995). Extensive research by Hay and Morris, conducted in 1991, suggests that very little research proves that the concentration has a negative impact on profitability, and that only half of the research stresses the significant positive correlation between these two variables (Hay and Morris, 1991, p. 261). Keating's study from 1991 was conducted on a sample of 2.438 large companies and their performance in the period from 1969 to 1981. The conclusion was that the profitability of companies in concentrated industries is less stable compared to the profitability of companies in fragmented industries (Keating, 1991, p. 897-902). Research by Kandžija, Filipović and Kandžija conducted on the sample of 43 companies that were taken over in Republic of Croatia in period from 1998 to 2006 confirmed the proposed hypothesis which states that lower the concentration ratio of the target company's industry, the more successful is the target company's performance after the takeover. Authors of the same research point out that after the M&A variety of changes occur in companies involved in transaction, and therefore if the industry is characterized by lower concentration ratio, these changes will have a greater effect on the business performance of the target company as opposed to the situation when the industry is concentrated (Kandžija, Filipović and Kandžija, 2014, p. 17-25). Taking into consideration presented empirical evidence it can be concluded that industry structure impacts M&A success and that M&A practitioners should put special focus on that external organizational variable when closing M&A transactions.

4. Conclusion

Despite the increasing popularity of mergers and acquisitions, it has been reported that the rate of M&A failure is very high, so there is a need for analysis of variables that impact M&A success. It is hard to find books, journals and scientific papers in the current literature that do not address issues such as the impact of mergers and acquisitions on the increase or decrease of shareholder value, motives for M&A, realization of planned synergies, operational efficiency of acquired companies and the reasons due to which mergers and

acquisitions fail and do not achieve the expected benefits. Researchers usually point out corporate culture and other internal organizational variables as the most common explanation of high failure rate for M&A while little attention is given to external organizational variables. Therefore, theoretical overview of microeconomic aspects of M&A was used to achieve the main goal of this paper which relates to the analysis of the impact that industry structure, as an external organizational variable, has on the success of mergers and acquisitions. In the long run, higher or lower profitability as a feature of a company's competitiveness is not solely the result of the development and implementation of strategic activities, but it also depends on the industry structure, i.e., the competitive space in which companies compete. Considering the results of studies presented in this paper about the impact of industry structure on M&A success it can be concluded that M&A success is related to industry structure and that it is important for M&A success that companies involved in transactions conduct business in industries which are characterized with low concentration ration. If companies operate in industry with low concentration ratio all changes that occur after the transaction will have higher impact of business performance than in the situation if companies operated in industry with high concentration ratio. Finally, after the overview of historical development of mergers and acquisitions, and microeconomic aspects of M&A reflections presented in this paper can help M&A practitioners to focus on industry structure, as well as other organizational variables, when closing M&A transactions.

5. Bibliography

1. Damodaran, A. (2002). *Investment Valuation: Acquisitions and Takeovers*. John Wiley & Sons Inc.
2. Demsetz, H. (1973). Industry structure, market rivalry and public policy. *Journal of Law and Economics*, 16(1), 1-9.
3. DePamphilis, D.M. (2014). *Mergers, acquisitions, and other restructuring activities, 7th ed*. San Diego: Academic Press.
4. DePamphilis, D.M. (2014). *Mergers, acquisitions, and other restructuring activities, 5th ed*. San Diego: Academic Press.
5. Gaughan, P.A. (2013). *Maximizing Corporate Value through Mergers and Acquisitions: A Strategic Growth Guide.* Hoboken. New Jersey: John Wiley & Sons, (71-72).
6. Hay, D.A. and Morris, D.J. (1991). *Industrial Economics and Organization*. Oxford: Oxford University Press.
7. Kandžija, V., Filipović, D. and Kandžija, T. (2014). *Impact of industry structure on success of mergers and acquisitions.* Tehnički vjesnik – Technical Gazzete, 21(1), 17-25.
8. Keating, B. (1991). *An update on industries ranked by average rates of return.* Applied Economics, 23(5), 897-902.
9. Lake, R., Lake, R.A. (2007). *Private Equity and Venture Capital*. London: Euromoney Books.
10. Lipczynski, J. and Wilson, J. (2001). *Industrial Organization: An Analysis of Competitive Markets*. Harlow Essex: Pearson Education Limited.
11. Marynova, M. and Renneboog, L. (2006). *Mergers and Acquisitions in Europe.* Brussels: European Corporate Governance Institute. Finance Working Paper.
12. Marynova, M. and Renneboog, L. (2008). *A century of corporate takeovers: What have we learned and where do we stand?* Journal of Banking and Finance, 32(10), 2148-2177.
13. Mueller, D.C. (1985). *Mergers and Market Share.* The Review of Economics and Statistics, 67(2), 262-266.
14. Porter, M.E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: The Free Press.
15. Schmalensee, R. and Willig, R. (1989). *Handbook of Industrial Organization*. Amsterdam: North-Holland.

16. Shleifer, A. and Vishny, R.W. (1991). *Takeovers in the '60 and the '80s: Evidence and Implications.* Strategic Management Journal, 12, 51-59.
17. Sudarsanam, S. (2003). *Creating Value from Mergers and Acquisitions*. London: Prentice Hall International Limited.
18. Sudarsanam, S. (2010). *Creating Value from Mergers and Acquisitions: The Challenges*. London: Prentice Hall International Limited.
19. Tipurić, D. (2005). *Alternativne strategije. In: Buble, M. (ed.) Strateški menadžment*. Zagreb: Sinergija.
20. Tipurić, D. (2007). *Porterov model industrijske strukture: industrijska analiza kao ključna pretpostavka oblikovanja strategije poduzeća*. Ekonomski fakultet Zagreb.
21. Tipurić, D., Pejić-Bach, M. and Pavić, T. (2008). *Concentration of the insurance industry in selected transition countries of Central and Eastern Europe*, 1998–2006. Post-Communist Economies, 20(1), 97–118.

Monica-Veronica Honu [1]

THE RELATIONSHIP BETWEEN ROMANIAN AVIATION INDUSTRY TURNOVER AND NATIONAL GDP

Abstract

Since its emergence, at the beginning of the 20th century, the national aviation industry was considered one of the top industries. Acknowledging the potential of the industry, we try to focus our attention towards the status of several long established aviation company and the wellbeing of the economy as a whole. The purpose of this paper is to establish a correlation between the turnover of the most important aerospace companies and the gross domestic product (GDP). In order to achieve the research aim, a linear regression was designed. Following market dynamics the study shows a direct relationship between the specific company turnover and national GDP in the case of Romanian entities operating in aeronautic industry. This relationship confirms Maslow's hierarchy of needs.

Keywords

Aviation industry, GDP, Linear regression, Romania, Turnover

1. Introduction

One of the main business function, on which this study is based on, is the marketing function. It ensures that the goods and services are delivered from the producer to the consumer by using market research, advertising, and most importantly sales (Bund and Carroll, 1957; Krasnikov and Jayachandran, 2008; http://www.mindset.co.za/learn/node/47533/5#). The sum of products sales and/or services rendered at microeconomic level represents the company's turnover (Dictionary of Economics, 2001). Seen on a bigger scale, it assembles the gross domestic product (GDP).

In order to provide a better understanding of the relationship between the two indicators (turnover and GDP), we decided to conduct an analysis at sector level. Thereby we compiled a simple linear regression that should confirm or not the relationship between the sectors turnover and the 'national' turnover (GDP). Using the collected data from the relevant companies, on a five year period, we managed to rebuild the regression for enterprise-level study, resulting the same type of direct connection between the variables.

---

[1] The Academy of Economic Studies, Bucharest, Romania, The Institute of Doctoral Studies, Tache Ionescu Street 11, Faculty of Accounting, e-mail: veronique_hmv@yahoo.com

2. Literature review

System of National Accounts is a concept used by all nations in the world. The first set of such accounts was explained in a report to the U.S. Congress in 1934, drafted by the Bureau of Foreign and Domestic Commerce and National Bureau of Economic under the management of Simon Kuznets (Bureau of Foreign and Domestic Commerce and National Bureau of Economic Research, 1934). Alongside Kuznets, professor Richard Stone has laid the groundwork for the UK National accounts in 1938. Both have later received a Nobel prize for their findings.

The concept, organization and functioning of national accounting systems of most countries is today under the auspices of the National Accounts System of the United Nations (SNA), which is in force from 1995, with the 1993 version, that has replaced the one from 1968. All European Union countries have gradually adopted directives now fit into the European System of Accounts (ESA). In the case of Romania, the European system of national and regional accounts with the 1995 version (SEC-95) was implemented starting 1998.

Previous research that studied the history and importance of using national accounts have set GDP as the main reference indicator of the economy (Raipuria, 2002; Hein and Tarassow, 2010; Ben-Ami, 2013, Kulshreshtha and Singh, 1996; Matkowski, 2004; Mohanty and Raghavan, 1990; Kansal, 1992; Jalali-Naini, 2005; Hosein and Lewis, 2005). GDP estimates helped in assessing the economy's overall productive capacity and the impact of moving from consumer spending on goods and services to government expenditure (Landefeld, Seskin and Fraumeni, 2008).

Seen as a stand-alone index, GDP depicts the main needs and demands of the population, if calculated using the expenditure approach. Most often, GDP is considered to be a value added index (Kulshreshtha and Singh, 1996; Ben-Ami, 2013).

At industry level, the indicator that best represents the companies status is the turnover. The turnover consists of all revenues obtained by current activities namely the sales of goods and services rendered, including subsidies, after deducting commercial discounts offered to customers. The turnover does not include financial and extraordinary income. The concept of turnover can be classified into several categories: net turnover, average turnover, marginal turnover and critical turnover, each highlighting a different aspect of the company activity. (Minister of Public Finance Order, 94/2001; Niculescu, 1997; Vâlceanu, Robu and Georgescu, 2005; Carcello, 2008).

3. Research design

The aviation industry includes all activities that results in added value (namely GDP) by manufacturing aero structures, components, assemblies; production and integration of electronic systems, communication and IFF systems; MRO (maintenance, repair and overhaul) and upgrades of military and commercial aircrafts.

With the purpose of demonstrating the relationship between the two variables, we collected the required data from Ministry of Finance, Bucharest Stock Exchange, Eurostat.

	Company name	NACE Code	Analyzed period
1	Aerostar	35.30 – Manufacture of aircraft and spacecraft	2008-2012
2	Eurocopter	35.30 – Manufacture of aircraft and spacecraft	2008-2012
3	Unison Engine Components	35.30 – Manufacture of aircraft and spacecraft	2008-2012
4	Romaero	35.30 – Manufacture of aircraft and spacecraft	2008-2012
5	Turbomecanica	35.30 – Manufacture of aircraft and spacecraft	2008-2012
6	Avioane Craiova	35.30 – Manufacture of aircraft and spacecraft	2008-2012

Table 1: Sample Data

Therefore, we collected data for the major companies in this sector: six entities operating in the aviation industry that are listed on the Bucharest Stock Exchange (Tier I, II and III) as can be seen in Table 1. All these companies, considered captive suppliers (Sturgeon, 2002; Sturgeon and Lee, 2001), were analyzed over a period of five years, from 2008 to 2012.

3.1. Hypotheses Development

The main purpose of this study is to analyze the link between turnover at sector level and GDP. In order to reach the aim of the research, the following two research hypothesis were developed:

- Hypothesis 1 (H1): There is a significant positive relationship between turnover at sector level and national GDP.
- Hypothesis 2 (H2): There is a significant positive relationship between turnover of enterprise-level operating system aviation industry and national GDP.

3.2. Regression Model

After establishing clear objectives, it was concluded that the best approach in solving the theory is by using linear regression.

The following regression model was used to test whether there is an association between turnover and GDP of entities operating in the aviation industry in Romania.

$$\text{(H1) R1: } GDP1 = \alpha_1 + \beta_1 TTTS + \varepsilon_{1i}$$

$$\text{(H1) R2: } GDP2 = \alpha_2 + \sum \beta_{2i} TT_{it} + \varepsilon_{2i}$$

The dependent variable is represented by the gross domestic product (GDP). The independent variables are represented by the turnover at sector level (TTTS) – in the first

regression, and the turnover of each analysed company (TTi), where i stands for the serial number from Table 1, t represents the year and ε is the error term.

3.3. Regression Analysis

3.3.1. Regression statistics

In order to analyse the two hypothesis, we performed a logistic regression analysis. Table 2 and Table 3 present the regression statistics. Thus, if we analyse the overall accuracy of the regression, we find a close relationship between the two variables in the first hypothesis (R2 is a little over 80%). For the second hypothesis we find an R2 of 0,0081 that implies that only 0,8% of the variance of the output variable is explained by the variance of the input variable.

Table 2. Regression statistics for H1 Regression Statistics	
Multiple R	0,911420582
R Square	0,830687478
Adjusted R Square	0,774249971
Standard Error	16627287684
Observations	5

Table 2: Regression statistics for H1

Regression Statistics	
Multiple R	0,090376747
R Square	0,008167956
Adjusted R Square	-0,027254617
Standard Error	32266597825
Observations	30

Table 3: Regression statistics for H2

3.3.2. Analysis of Variance

In the ANOVA analysis, we study to what extend to regression result is not accidental. The most important indicator is the value of Significance F. In case of Hypothesis 1 (Table 4), there is a probability of 3% that the regression results are random, where in case of the second hypothesis, there is a probability of over 60%.

	df	SS	MS	F	Significance F
Regression	1	4,07E+21	4,07E+21	14,71871	0,031223
Residual	3	8,29E+20	2,76E+20		
Total	4	4,9E+21			

Table 4: Regression – Analysis of Variance (ANOVA) for H1

	df	SS	MS	F	Significance F
Regression	1	2,40071E+20	2,40071E+20	0,230586196	0,634819825
Residual	28	2,91517E+22	1,04113E+21		
Total	29	2,93918E+22			

Table 5: Regression – Analysis of Variance (ANOVA) for H2

3.3.3. Regression Output

Reliability of the regression, presented in Table 5 for H1 and Table 6 for H2, is better noted by the P-value indicator. It represents the probability that the value of the two indicators (α and β) to be random. In the case of H1, the P-value of the intercept (α1) is <1% and in the case of independent variables (β1), 3%, that implies that there is a probability of more than 95% in both cases that the value of the coefficients may not be happenstance.

In Assumption 2, the P-value for α2 is a insignificant, but the significance for β 2 is a little over 60% that indicates that the result is not reliable.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95,0%	Upper 95,0%
Intercept	3,6802E+11	4,46E+10	8,25133	0,00372	2,26E+11	5,1E+11	2,26E+11	5,1E+11
TT_{TS}	303,741650	79,1716	3,836498	0,031223	51,78228	555,701	51,78228	555,701

Table 6: Regression Output for H1

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95,0%	Upper 95,0%
Intercept	5,321E+11	11293572	47,11717	3,25096E-28	5,08987E+11	5,5525E+11	5,08987E+11	5,5525E+11
TT_{it}	56,28400	117,2109	0,480193	0,63481982	-183,8118227	296,37983	-183,8118227	296,3798

Table 7: Regression Output for H2

Taking into account the results of the regression analysis we can confirm the first hypothesis. Thus, it shows that there is a positive relationship between the aeronautics industry total turnover and the national GDP. In case of the second hypothesis, we cannot say with certainty that there is a correlation between the variables analysed seeing that there are numerous indicators that favour randomness.

4. Conclusions and further research

This study aims to analyse the link between the aerospace industry companies turnover and the national GDP over a five year period – since 2008 to 2012.To archive the goal of this paper, we have developed two hypothesis regarding the connection between the aerospace industry and the national GDP.

The results of the study show that there is a positive correlation between turnover of the sector and GDP (H1) but we couldn't demonstrate any relation between the turnover of the most important aerospace companies and GDP (H2).

Considering the history and tradition of each company presented in this study, we concluded that they are profit-led, thus confirming the seminal theoretical conclusions of Bowles and Boyer (1995) and Bhaduri and Marglin (1990).

There are a few drawbacks of this study. First of all the population is undersized, but the fact that the same companies were analyzed for the entire period stated in the study, increases the relevance of the observations. Second, the independent variable is not set to the completely main component of GDP.

Regarding further research, there is a wide range of possibilities. For example, the population can be extended to all companies listed on the Bucharest Stock Exchange. Also, a comparative analysis can be drafted studying the relation between the Romanian aeronautical industry and a similar sector from another emerging country, research regarding the linkage between turnover at sector-level and GDP.

In many theoretical models, the main factor determining economic growth is gross capital formation (Matkowski, 2004). Thus a future research will focus on analyzing the influence capital formation on value added.

An interesting approach towards the companies turnover would be by analysing the main stakeholders influence on it. Marketing of products and services on international markets instead of a domestic one can bring a change in turnover. Following the same line of thought, we can observe nationwide the grounds for aeronautical production imports (e.g. insufficient or inadequate domestic production) and adjusting it for a higher competitiveness thus becoming an issue of global buyers and performance of local suppliers.

5. Bibliography

1. Ben-Ami, D. (2013). *The value-added measure of GDP*, (26).
2. Bhaduri, A. and Marglin, S. (1990). *Unemployment and the real wage: the economic basis for contesting political ideologies*. Cambridge Journal of Economics, 14, 375-393.
3. Bowles, S. and Boyer, R. (1995). *Wages, aggregate demand, and employment in an open economy: an empirical investigation*. Macroeconomic Policy after the Conservative Era. Cambridge. Cambridge University Press.
4. Bund, H. and Carroll, J.W. (1957). *The changing role of the marketing function.* Journal of Marketing, 3(Jan), 268-325. Retrieved 10.11.2013 from http://www.jstor.org/stable/1247516.
5. Bureau of Foreign and Domestic Commerce and National Bureau of Economic Research (1934). *National Income 1929-32.* Report to Congress. Washington DC.: Government Printing Office. Retrieved 10.10.2013 from http://library.bea.gov.
6. Carcello, J.V. (2008). *Financial and Managerial Accounting*. McGraw-Hill Irwin. (199).
7. *Dictionary of economy (second edition)* (2001). Editura Economică, (97).
8. Hein, E. and Tarassow, A. (2010). *Distribution, aggregate demand and productivity growth: theory and empirical results for six OECD countries based on a post-Kaleckian model.* Cambridge Journal of Economics, 34(Nov), 727-754.

9. Hosein, R. and Lewis, T.M. (2005). *Quantifying the relationship between aggregate GDP and construction value added in a small petroleum rich economy – a case study of Trinidad and Tobago.* Contruction Management and Economics, 23 (Feb), 185-197.

10. Jalani-Naini, A.R. (2005). *Capital accumulation and economic growth in Iran: Past experience and future prospects.* Iranian studies, 1(Mar), 91-116. Retrieved 10.11.2013 from http://www.jstor.org/stable/4311707.

11. Kansal, S.M. (1992). *Contribution of "other services" sector to gross domestic product in India: an evaluation.* Economic and Political Weekly, 38(1992). Retrieved 10.11.2013 from http://www.jstor.org/stable/4398912.

12. Krasnikov, A. and Jayachandran, S. (2008). *The relative impact of Marketing. Research-and-Development, and Operations Capabilities on Firm Performance*. Journal of Marketing, 4(2008), 1-11. Retrieved 10.11.2013 from http://www.jstor.org/stable/30162295.

13. Kulshreshtha, A.C. and Singh, G. (1996). *Domestic product by gender in the framework of 1993 SNA.* Economic and Political Weekly, 51(Dec), 3330-3334. Retrieved 10.11.2013 from http://www.jstor.org/stable/4404911.

14. Landefeld, J.S., Seskin, E.P., Fraumeni. B.M. (2008). *Taking the pulse of the economy: measuring GDP.* The Journal of Economic Perspectives, 2, 193-216. Retrieved 10.11.2013 from http://www.jstor.org/stable/27648248.

15. Martkowski, Z. (2004). *Postsocialist countries: macroeconomic performance, growth prospects, and Social Welfare.* Eastern European Economics, 3(Jan), 44-80. Retrieved 10.11.2013 from http://www.jstor.org/stable/4380381.

16. *Minister of Public Finance Order No. 94/2001 for approving the Accounting Regulations harmonized with Directive IV of the European Economic Community and the International Accounting Standards.*

17. Mohanty, D. and Raghavan, V.S. (1990). *New series of national accounts statistics and structure of Indian economy.* Economic and Political Weekly, 27(Jul), 1480-1486. Retrieved 10.11.2013 from http://www.jstor.org/stable/4396475.

18. Niculescu, M. (1997). *Global strategic diagnostic*. Bucharest: Editura Economică, (229).

19. Raipuria, K. (2002). *What size the 'new' economy? A conduit Approach*. Economic and Political Weekly, 11(Mar), 1062-1067. Retrieved 10.11.2013 from http://www.jstor.org/stable/4411879.

20. Sturgeon, T. (2002). *Modular production networks: a new American model of industrial organization*. Industrial and Corporate Change, 3, 451-496.

21. Sturgeon, T. and Lee, J.-R. (2001). *Industry co-evolution and the rise of a shared supply-base for electronics manufacturing.* Paper presented at Nelson and Winter Conference. DRUID. Aalborg. June.

22. *The eight functionns of a business enterprise*. Retrived 05.11.2013 from http://www.mindset.co.za/learn/node/47533/5#.

23. Valceanu, G., Robu, V. and Georgescu, N. (2005). *Financial Analysis*. Bucharest: Editura Economică.

Irena Jankovic [1]
Mirjana Gligoric [2]

THE REMITTANCE INFLOWS' IMPACT ON SAVINGS IN THE SERBIAN ECONOMY

Abstract

Remittance inflows represent one of the most significant sources of foreign funding for most developing countries. These funds have also proven to be one of the most stable sources of external financing for developing countries during the past few decades and in the period of the last global crisis. They are much less responsive to economic cycles and economic shocks than foreign direct investments and other private and official capital flows. The benefits that a developing country can have from stable cash inflows are various as far as they are directed in activities that contribute to economic growth and development. Theoretically, channeling remittances into savings and investments can lead to long-term economic growth. Formal transfer of remittances through the banking system and financial markets can lead to stronger financial stability and development of new financial instruments. Since remittances reduce the volatility of GDP and may contribute to financial system development they are able to additionally boost country's growth and development. Finally, these resources significantly contribute to the fight against poverty and inequality. Taking into account all the positive impacts the remittances may have in developing countries, the goal of this paper is to investigate in further detail the relationship between remittances and savings in Serbian economy. With this analysis, we aim to test whether there is a potential for remittance inflows channeling not only in consumption, but also in various investment alternatives that could provide long-term benefits to the local economy.

Keywords

Economic Growth and Development, Financial Sector, Investments, Remittances, Savings

1. Introduction

Over the past decade remittances to developing countries have significantly increased. Officially recorder remittances have reached around USD 401 billion in 2012 and are expected to reach USD 515 billions in 2015. They remain one of the most significant and stabile external financial sources after FDI that is surpassing the level of official foreign aid and private debt and portfolio equity flows to these countries (The World Bank, 2013, p. 1). It is important to notice that unofficially transferred remittances are estimated to represent additional significant unregistered inflows. The problem of underreporting is especially pronounced in developing countries with weaker financial system and economic and political instability.

---

[1] Faculty of Economics, Belgrade University, Serbia, e-mail: irenaj@ekof.bg.ac.rs
[2] Faculty of Economics, Belgrade University, Serbia, e-mail: gligoric@ekof.bg.ac.rs
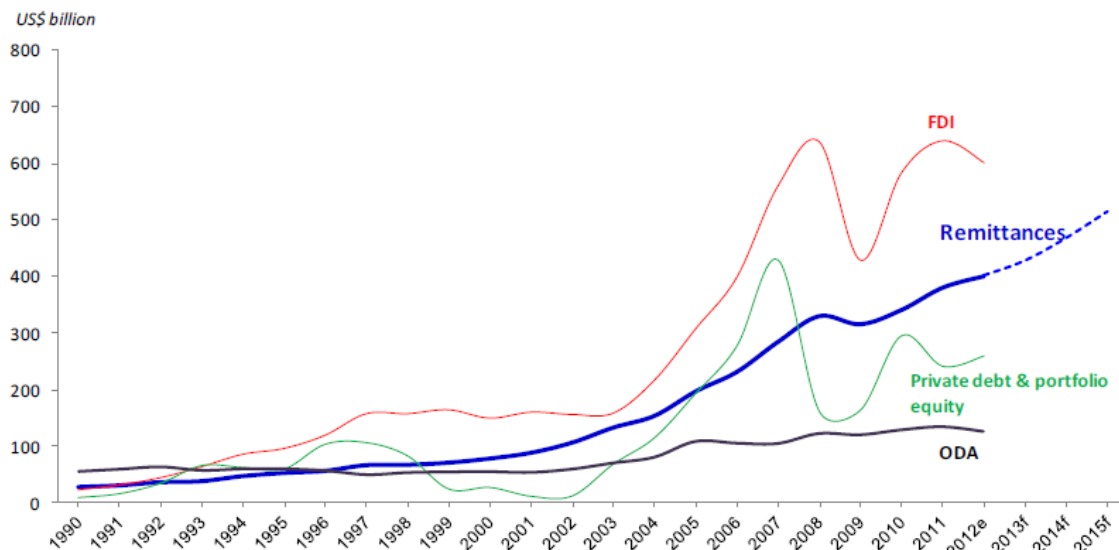
Chart 1: *Remittances and other international inflows to developing countries*
(The World Bank, 2013, p. 2)

Most of the papers dealing with remittance flows to developing countries confirm their positive influence on local consumption and social position of local population. Recent theoretical and empirical studies suggest remittances' economic potential in circumstances when they are properly channeled into investment opportunities (land, housing, financial assets, microenterprises, education, etc.) that can boost economic growth.

The goal of this paper is to investigate the effects remittances may have on both, home country consumption and savings, which opens possibilities for their channeling into profitable investments. The theoretical discussion is followed by empirical evidences based on Serbian economic data. Finally, suggestions are provided for possible improvements of remittance channeling into productive uses.

2. Remittances and consumption in receiving countries

In this part of the paper we examine consumption patterns related to the inflow of remittances. The initial economic position and households' living standard are main determinants of remittances usage in the home country. Better initial economic situation allows migrants and their families to use remittances more for savings and investments. On the other side, for very poor migrants' families, the priority is to increase consumption and meet existing financial obligations rather than to save received funds.

The main motive for sending remittances to the country of origin is the concern for individuals and families. According to the so-called *Insurance hypothesis* (as it is defined in Kapur, 2003), remittances have a role of insurance in lower income countries and a significant impact on poverty and equality. Also, because they provide an additional income

to individuals/households, they are critical for personal consumption in poor states. Empirical facts show that the inflow of remittances increases when home country experiences some sort of macroeconomic shock, which is in accordance with the above mentioned hypothesis. The increase of the value of remittance inflows is due to the fact that the remitter experiences a positive income shock due to the devaluation, while the receiver faces a negative income shock because of the recession. According to the results of one empirical research (Kapur, 2003) using balanced and unbalanced panel data, share of remittances in personal consumption is higher during the period of economic downturn than during the "regular" times.

Apart from this effect of poverty alleviation – resulting from the fact that remittances increase the average income and provide less vulnerability to shocks, it is especially important to emphasize their potential to increase the long-term consumption. Investing this additional income into savings, production or human capital can provide long-term benefits, by increasing the economic growth, future consumption and therefore reducing the dependence on external sources of financing.

Although savings and investments based on remittance inflows can generate various long–term benefits for individuals and the home country (see the next part of this paper), the effects they have on current consumption can also be very positive if remittances are used for consumption financing of domestically produced goods and services. Additionally, this positive effect is pronounced if that consumption provides an individual with better life conditions (household, hygiene and physical and mental well-being), which consequently increases labor productivity. As a result of higher consumption remittances also increase the amount of money collected from indirect taxes. As some previous research studies (see e.g. Kapur, 2003; Zarate-Hoyos, 2004) show remittance receiving households have higher propensity to save than non-remittance receiving households. At the same time, former households have lower income elasticity for current consumption and for durable consumer good expenditures than the later.

In literature, the negative effects of remittances were also stressed out and may include the following: inflation, depreciation, slower GDP growth, conspicuous consumption by migrants who do not invest money in productive uses, which then has a negative influence on the consumption behavior of non-migrants. Also, one additional negative effect can be found in literature – remittance receivers can lose the motive to work, because they are secured with the regular inflow of money.

In essence, the lack of productive investments based on remittances may be a consequence of insufficiently developed institutions and infrastructure which do not provide opportunities for productive and efficient usage of these resources. It is, therefore, important to

emphasize that the state and the quality of institutions and regulations, and not only migrants, have the main role in channeling remittances into savings and investments.

3. Remittances and savings

Although migrant transfers to home country are mostly altruistic in nature, they may also significantly contribute to local capital accumulation. Total transfers to home country thus may be divided into two parts, remittances that support home families' present consumption, and the part that is put to savings that may potentially increase future consumption. That means that remittances may have indirect positive effects on both poverty and growth through channels such as savings and investments.

The use of remitted funds for savings and investments can be initiated either by migrants themselves or the receiving households. In general, migrants will diversify their asset by saving in both host and home country. The decision on asset allocation depends in great amount on the macroeconomic characteristics of both economies, the level of investors' protection, household characteristics (primarily original wealth level), cost of official money transfer, potential rate of return on investments, etc. Poorer families usually receive higher transfers. On the other side, investments in the home country are positively correlated with home country household resources. The wealthier migrants and their families usually save more (Osili, 2007, p. 447). Thus, there exists certain threshold income level necessary for present consumption (Balde, 2011, p. 16). If remittances received increase the income level above the threshold they may be directed to savings and investments. Investments in the host country are usually safer than investments in the home country, thus they should bring lower return to the migrant. But since home country investments have to be monitored from abroad and that effect is pronounced if the home country is less developed, that adds additional transaction costs and reduces net return for the migrant. Also, if he transfers returns generated in his origin country abroad to the country where he works, the exchange rate changes additionally affect generated returns.

The more often home country household receives the remittances from abroad within one year, the more it is inclined to potentially save some portion of that money (International Labour Organization, 2010, p. 4). However, the less developed the home country is and the less knowledge and trust is connected to saving opportunities in the local banking sector and other financial products, the more of the saved money is kept at home. The additional reason why this money sources are often kept out of banking sector include often small amounts of remittances received and high transaction cost incurred that follow remitting and depositing. In the first quarter of 2013, the global average total cost for sending remittances was 9.1 percent, as measured by the World Bank's Remittance Prices

Worldwide database.[3] In addition, local banking costs for depositing are stated to be significant although they vary among developing countries.

4. Some empirical evidence for Serbia

Remittances from abroad are a particularly significant source of foreign capital in Serbia, as their post-crisis amounts in absolute terms exceed all other categories of capital inflows from private and public sources. Unfortunately, Serbia ranks among countries with high transfer costs. The commission charges on money transfers to Serbia are, in percentages, relatively higher for smaller amounts, which decreases incentives for many migrants to send money through formal channels. The significant portion of these inflows enters the country through informal channels and is often not invested into productive activity. According to Suki, 2006, 2/4 to 3/4 of total remittances' inflows in Serbia are unregistered. The invested amounts were estimated to be insufficient and low. This may have negative long-term effects on economic growth and development.

The annual level of remittances sent to Serbia is very high (the average is EUR 2.24 billions, or 7,5% of GDP for the period 2007-2012). That is 70% higher than the average inflow of FDI in the same period. The amount of remittances sent home by Serbian migrants is estimated to have reached around EUR 2 billion or almost 11% of GDP in 2013 (the National Bank of Serbia – data at the end of the third quarter of 2013). As our previous papers show, these resources appear to be quite stable over time (Janković and Gligorić, 2012, pp. 215-236; Gligorić and Janković, 2013, pp. 212-222).
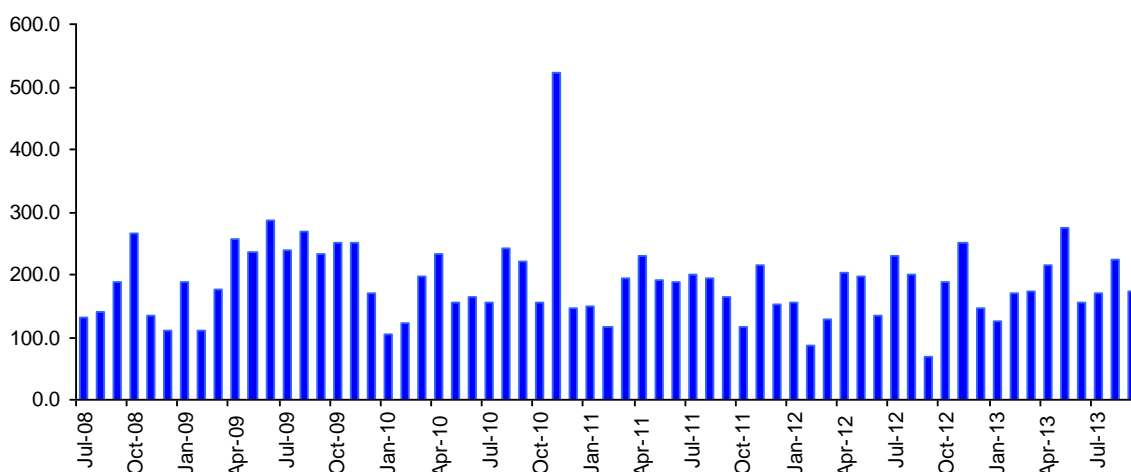
Chart 2: *Remittances inflows in Serbia, in millions of EUR (National Bank of Serbia)*

The question that remains is which part of remittances to Serbia is used for current consumption, to cover everyday needs, and how much remains for savings and investments?

---

[3] http://remittanceprices.worldbank.org

Because the data necessary to empirically estimate this is unavailable, we can only suppose, based on the facts that Serbia is a developing country with a relatively underdeveloped financial market, high private demand and low level of investments – that a larger part of remittances goes to current consumption and non-productive uses. The remittances sent to Serbia help local households to solve some of their financial problems and mostly are spent on immediate basic consumption. Dominant amount of these resources is altruistic in nature. Even though a certain part of remittances is used for savings, they should definitely be channeled more towards long-run development through increase in investments and production.

In Serbia we can also find a confirmation for the *Insurance hypothesis* if we take a look at data on remittance inflows before and during the crisis. Namely, remittance inflows in Serbia were extremely high in 2009 and 2010, as a consequence of providing more income to remittance receiving households in order to protect them from recession. Chart 3 presents the share of remittances in individual household consumption. It shows that this ratio has increased from the average of almost 14% in 2007 and 2008 to the average value of 19.5% in 2009 and 2010, but it decreased again in 2012 and 2013, when domestic economy started to recover.

Still, because of a high dependence on imports, we think that remittances in Serbia have significant influence on local currency appreciation, which consequently has an adverse impact on the trade deficit.
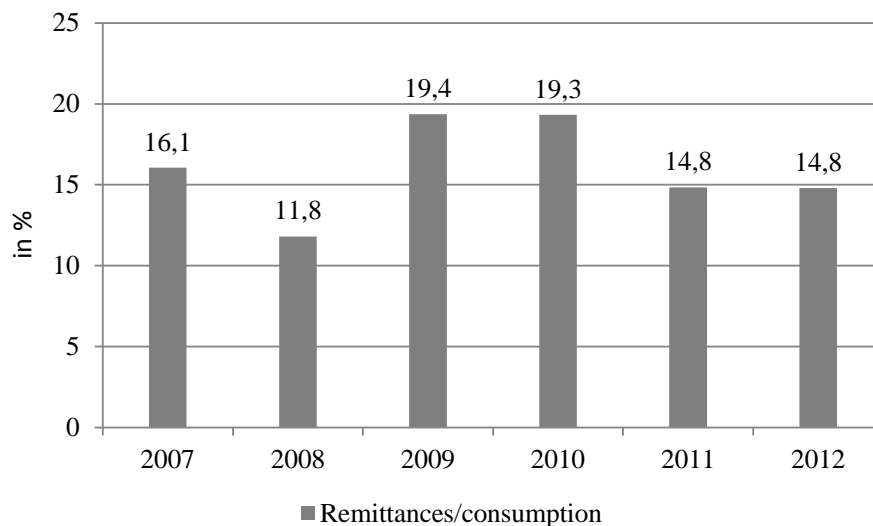
Chart 3: *Serbia: Share of remittances in individual consumption, 2007-2012, in % (Authors' calculations based on data from Statistical Office of the Republic of Serbia and National Bank of Serbia)*

In one survey that examined development financing and the remittance market in Serbia and Switzerland it is stated that (SECO, 2007, p. 17): "Migrant-sending households in Serbia use most of their remittances sent from Switzerland to help pay for recurrent living costs

and basic needs. This is particularly true among older recipient households. Remittances are most commonly spent on: utilities (water, electricity, and gas), phone service, petrol for cars and farm machinery, food, medicine and healthcare, household appliances and furniture. Remittance income is very rarely used to pay for non-essentials. Beyond consumptive expenditures, recipients also use remittances for social expenditures such as basic education and health care, although at much lower rates".

Although the deposit base of the banking sector in Serbia is constantly growing, it is estimated that large number of remittances receivers keeps their savings outside of the formal banking and broader financial sector. However, it is important to note that official estimates on the level of remittances received are partially based on the household savings in the banking sector, indicating that some smaller amount of this resources passes through, predominantly, transaction deposits and short-term savings accounts to consumption. Thus, investments of these funds in longer-term sustainable economic activities are, for now, quite limited.

Since Serbia faces low external capital inflows based on FDI, portfolio and other investments, and at the same time copes with big external inequalities (high public and total foreign debt, high current account deficit), very limited opportunities and unfavorable borrowing conditions, as well as slow economic recovery in Europe and the rest of the world, money from remittance inflows will become even more important in the following period. Therefore, economic policy should be oriented and "wisely" devised to channel this stable and high inflow of money into productive uses. Giving up a part of current consumption for the sake of providing future growth and the prospect of larger consumption, as well as stronger economy and consequently better living conditions for all citizens, should be well devised and infrastructurally and institutionally supported by the state.
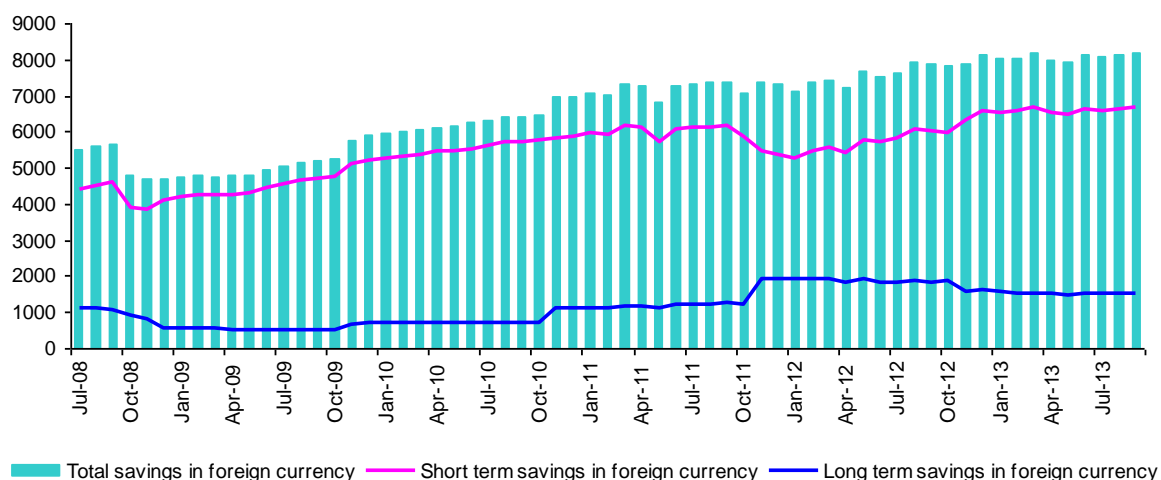
Chart 4. Total, short-term and long-term household savings in foreign currency, in millions of EUR (Authors' presentation based on the National Bank of Serbia data)

This is a reason why we continue with main recommendations for developing countries and Serbia that could stimulate more significant remittances' transfer through formal channels with clearer orientation on savings and productive investments.

5. Recommendations for greater remittances' channeling into savings and investments

Recommendations for more efficient channeling of remittances into savings and investments include:

- Better coordination between national authorities of remittance sending and receiving countries and reduction of administrative constraints for efficient remittances' transfer. Regulatory authorities in sending and receiving countries should enter into bilateral agreements in order to formalize and facilitate transferring, recording and channeling of funds. The process could take the form of a public-private partnership, with participation of financial institutions. In addition, a unified clearing system could be developed for all countries involved in this process.
- Higher efforts of monetary authorities in recording and channeling of remittance flows (some African and European banks have established agencies in countries with high migration to capture migrants' savings and help them channel these resources into productive uses in their home countries).
- A greater role played by banks in the transfer of remittances should lower transaction costs and increase the transfer speed and reliability of these resources. The decrease of transaction costs for remittance transfer and depositing in both urban end rural areas demands closer mutual cooperation between banking sectors in sending and receiving countries and also with Money Transfer Agencies. This should lower transaction costs of transfers and accelerate the sending of remittances through formal channels.
- A more developed infrastructure that supports money transfers from abroad would at the same time facilitate access to other financial services (such as current accounts, savings accounts, and credit instruments) for a broader population, which would, in turn, foster the development of the country's financial sector. This would also allow these institutions to encourage entrepreneurship and other investments by using the funds received to attract deposits and offer loans, advisory services, insurance and custody operations.
- Increased competition between formal transfer intermediaries and lower costs of transfer services would increase migrant interest in sending remittances through formal channels that provide numerous benefits to recipients, such as easier access to financial institutions, cheaper finance for the broader public, lower cost of investments due to more options for diversification, and better education of receivers about alternative forms of employing funds.
- Further development of formal channels for remittances' transferring could be based on creation of innovative products that would make it possible for migrants to directly invest into their home countries in land, real estate, education, microenterprises, insurance, etc. This proposal includes development of remittances-backed financial products (remittance backed micro loans, consumer loans,

educational loans, car loans, loans for houses/construction, loans for development of agricultural firms, event financing schemes, medical insurance products, etc.);

- Investments based on remitted funds could be additionally stimulated by creating a better climate for investing, as well as with incentives for putting funds to productive use (e.g. tax breaks, etc.).
- Very important aspect for more effective remittance channeling into investments that could boost economic growth is comprehensive education of remittance receivers about possible savings and investing schemes.
- Finally, the gradual regulation of remittance flows would be desirable, so that they could be better studied and this segment of the market developed without excessive government intervention that could abrupt additional inflows of these funds.

These and other possible improvements of the regulatory environment and financial system could contribute to greater remittances' inflows into Serbia through formal channels and their more efficient channeling into investments, which is expected to have a positive impact on economic growth and development of the country.

6. Conclusion

Remittances can play a significant role in home country development through both, poverty reduction and savings. Migrants' savings have a potential to increase investments and indirectly economic growth in labor exporting countries. The distribution of received resources between consumption and savings depends in large amount on migrant and home family income distribution. The large amount of transferred resources still reaches the receivers through informal channels. In this paper we have provided some recommendations that could help remittances channeling into productive uses via formal intermediaries. There still exists a big potential for financial institutions in Serbia to attract unused savings of those receiving remittances into financial system.

7. Bibliography

1. Balde, Y. (2011). The Impact of Remittances and Foreign Aid on Savings/Investment in Sub-Saharan Africa (SSA). *African Development Review*, Forthcoming. Retrieved 01.2011 from http://ssrn.com/abstract=1756730.
2. Gligorić, M. and Janković, I. (2013). Testing Stability of Remittance Inflows in Serbia. In the book of proceedings of the 2*st International Scientific Conference Economic and Social Development*, 5th April 2013: Filipovic, D. And A. G. Urnaut, ed. Paris, France (pp. 212-222). Varazdin: Varazdin Development and Entrepreneurship Agency and Celje: Faculty of Commercial and Business Sciences.
3. International Labour Organization. (2010). *Migrant Remittances to Tajikistan: The Potential for Savings, Economic Investment and Existing Financial Products to Attract Remittances*. Moscow: ILO Subregional Office for Eastern Europe and Central Asia, International Labour Office.
4. Janković I. and Gligorić, M. (2012). Remittances as a Stable Source of Foreign Currency Inflow in Serbia. In thematic collection of papers: Jovanović Gavrilović, B., T. Rakonjac-Antić, and Ž. Stojanović, ed.

Economic policy and development (pp. 215-236). Belgrade: Publishing Center of the Faculty of Economics in Belgrade.

5. Kapur, D. (2003). Remittances: the New Development Mantra?. *Paper prepared for the G-24 Technical Group Meeting*, August 2003. Retrieved 30.12.2013 from http://dspace.cigilibrary.org/jspui/bitstream/123456789/13268/1/Remittances%20The%20New%20Development%20Mantra.pdf?1

6. Osili, U. O. (2007). Remittances and Savings from International Migration: Theory and Evidence Using a Matched Sample. *Journal of Development Economics* 83 (pp. 446–465). Philadelphia: Elsevier.

7. SECO. (2007). *Development Financing and the Remittance Market in Serbia and Switzerland*. A survey commissioned by the State Secretariat for Economic Affairs SECO, Switzerland, February 2007. Berne: State Secretariat for Economic Affairs SECO

8. Suki, L. (2006). *Remittances in Serbia and Financial Sector Development: Business Opportunities and Priorities for Investment*. Program on Remittances and Development, Center on Globalization and Sustainable Development, The Earth Institute at Columbia University, September 2006.

9. The World Bank. (2013). *Migration and Development Brief 20*. Washington: Migration and Remittances Unit, Development Prospects Group.

10. Zarate-Hoyos, G.A. (2004). Consumption and Remittances in Migrant Households: toward a Productive Use of Remittances. *Contemporary Economic Policy* 22 (4) (pp. 555-565). Oxford University Press.

11. http://remittanceprices.worldbank.org

12. www.nbs.rs

13. http://webrzs.stat.gov.rs/WebSite/

Irina Berezinets [15]
Yulia Ilina [16]
Lyudmila Alekseeva [17]

DIVIDENDS ON COMMON AND PREFERRED SHARES: THE RELATIONSHIP WITH THE OWNERSHIP CONCENTRATION IN RUSSIAN PUBLIC COMPANIES

Abstract

This paper investigates the relationship between the dividend policy and ownership structure in Russian public companies. A study of the link between dividends and ownership concentration is based on the sample of public companies with dual class share structure. These shares were traded on the Russian Trading System (RTS) in the period of 2003-2009. The authors explore a broad range of factors related to the ownership concentration. This study allows making conclusions on the impact of the ownership concentration on the dividend policy. Moreover, there is evidence that this impact differs for the dividends on ordinary and preferred shares.

1. Introduction

The growing attention to the agency problem and to the role of dividends in mitigating an agency problem is explained, in particular, by the growing number of corporate scandals related to violation of shareholders' rights and to managers using insider information for personal enrichment. The corporate scandals, having resounded around the world during the recent decade, revealed serious drawbacks in corporate governance systems. Thus, the study of dividend policy, as a way to mitigate the agency problem and the factors affecting it, is of relevance in general and in the context of the Russian market, for example, in view of existence of such factors aggravating the agency problem as high concentration of ownership and weak legal protection of shareholders' rights.

There is a limited number of studies based on Russian companies and dealing with the problems range in question. This research, in a way filling up the gap in the studies in place, is based on data on companies having two classes of shares simultaneously traded on RTS stock exchange during 2003-2009.

---

[15] Associate Professor, Department of Finance and Accounting, Graduate School of Management, St.Petersburg University, e-mail: berezinets@gsom.pu.ru

[16] Associate Professor, Department of Finance and Accounting, Graduate School of Management, St.Petersburg University, e-mail: jilina@gsom.pu.ru

[17] Senior Audit Consultant, ZAO PricewaterhouseCoopers Audit, e-mail: lyudmila.alekseeva@ru.pwc.com

2. Dividend policy, corporate governance and dual class shares structures

According to Jensen and Meckling (Jensen, Meckling, 1976), agency costs arise when the decisions taken by the managers entail destruction of the company's value and the investors have to incur monitoring costs. One of the mechanisms capable to reduce agency costs is decrease of the cash flow at the managers' disposal. Availability of an ample free cash flow results in managers adopting more investment programs even if with low net present value (NPV). Thus, payment of extra funds to shareholders in the form of dividends is more appropriate to avoid such funds spending in a way ineffective from the point of view of the company value maximization. Easterbrook (Easterbrook, 1984) notes that dividends are the main means of reduction of the cash flow available to managers and play an important role in the agency problem mitigation.

Another argument in favour of dividend payment is the assertion that firm pay dividends in order to create a favourable image and avoid underestimate of the company in situations when the firm has to raise external capital. Increasing the dividends paid, the company has to resort to the capital market to raise funds to make investments. This entails thorough evaluation of the management's decisions by potential investors which also mitigates the agency problem.

According to studies (such as, for example: (Shleifer, Vishny, 1997; La Porta et al., 2000)), pyramidal structures of property, cross-holdings, issue of two or more types of shares and other mechanisms used for changing the proportionality and distribution of risk and control within the company represent a source of agency costs. These instruments are capable to increase private benefits from control and the conflict of interests between major and minority shareholders and, accordingly, may affect the company's dividend policy. R.La Porta (La Porta et al., 2000) qualifies issue of two classes of shares as one of the most apparent and frequent ways of managers and shareholders "entrenchment".

In companies with two classes of shares cash flow and voting rights are distributed unequally. Thus, in companies with two classes of shares the conflict of interests is more acute than in those with but a single class of shares. Co-existence of two classes of shares within a company enables the largest holder to maintain control over the company through holding a large portion of voting shares without the need to have hold of shares conferring rights to cash flow only. Thus, the largest shareholder is capable to control decision-taking within the company without assuming the costs burden. This enables a greater extent of benefiting at the expense of minority shareholders as compares to largest shareholders of companies with but a single class of shares.

In Russia the two classes of shares were introduced in 1992 parallel to the privatization program launch. The program envisaged three variants of state-owned enterprises privatization and stipulated obligatory introduction of a corporate charter for all large state-owned enterprises proposed as privatization targets. One of privatization ways was transformation of state-owned enterprises into companies with chartered capital wherein preferred or non-voting shares freely distributed among the active and retired employees of

the company could account for as much as 25%.

The legal status of the two classes of shares was defined in the charters of all privatized companies. Notably, the status of ordinary shares was similar to that of ordinary shares in most developed countries (grant of the right to vote at a general meeting of shareholders and the right to dividends the amount whereof was undefined) while preferred shares had certain specificity.

Since enactment of the federal law "On joint-stock companies" in 1996 the rights granted by preferred shares became variable, depending on changes in companies' charters. Thus, holders of preferred shares ceased to enjoy the veto right but were occasionally granted the right to vote at a general meeting of shareholders. But since the portion of preferred shares in the chartered capital was not in excess of 25%, their holders could not ban any decision. Additionally, the law ceased to attach to holder of preferred shares the right to dividends amounting to 10% of net profit, confining itself to indication that companies be obliged to define in their charters the amount of dividends on preferred shares in the form of a fixed percentage of the company's net profit or in any other clearly defined form. With a view of enhancing the level of minority shareholders' rights protection several important amendments were introduced to the law in 2001. Thus, the veto right was returned to preferred shares holders.

Preferred shares have certain advantages over ordinary ones. However, absence of the right of vote and the company being entitled to partly define the rights under preferred shares at its own discretion demonstrate essential inequality between the two classes of shareholders and the opportunity for preferred shares holders being expropriated by holders of ordinary shares.

3. Hypotheses

For a long time empirical studies in corporate governance dealt mostly with companies with dispersed ownership structure (Grossman, Hart, 1980). Investigators into dividend policy focused mostly on the impact of the owner holding the controlling block of shares on decisions taken on dividend payment (see, For example, (Jensen, Meckling, 1976; Shleifer and Vishny, 1986)). However, the ownership structures prevailing in many countries involve presence of multiple major shareholders within the company. For example, in Germany about a quarter of publicly traded companies have two or more shareholders with a portion of shares amounting to at least 20% (Gomes and Novaes, 2005). According to works available (Maury and Pajuste, 2002; Bebczuk, 2005), such companies' dividend policy is the result of largest shareholders interaction: formation of coalitions or largest shareholders fight for influence on decision-taking. Only recently researches started to study the categories and amount of largest shareholders' ownership portions as well as such controlling group's impact on the fact of minority shareholders expropriation.

According to the studies of S.Grossman and O.Hart (Grossman nad Hart, 1980) as well as

A.Shleifer and R.Vishny (Shleifer and Vishny, 1986), it is the major shareholders that should carry out management monitoring. Presence of a major shareholder within the company mitigates "the free rider problem", accordingly reducing agency costs. Shareholders in possession of a major portion of shares are more incentivized to carry out management monitoring since the benefits from such monitoring considerably exceed the implementation costs. Notably, the more recent works by R.La Porta (La Porta et al., 2000) and A. Gomes (Gomes, 2000) state that in countries where the legal protection of shareholders is weak it is through high concentration of ownership that the agency problem is to be reduced.

At the same time, existence of shareholders in possession of a major portion of shares or a controlling shareholder among the company owners may be unfavourable for less influential stakeholders. A.Shleifer and R.Vishny (Shleifer and Vishny, 1997) assert that in a situation when major shareholders obtain almost complete control over the firm they begin to derive private benefits minority shareholders fail to participate in. There are multiple ways of minority shareholders' rights impairment, M.Faccio, L.Lang and L.Young (Faccio, Lang and Young, 2001) specially emphasizing low dividend payments.

Hypothesis 1. Increase of percentage of ordinary shares held by a major shareholder will lead to decrease of dividend payments.

Hypothesis 2. Increase of percentage of ordinary shares held by three major shareholders will lead to decrease of dividend payments.

Hypothesis 3. Increase of percentage of ordinary shares held by the second largest shareholder will lead to increase of dividend payments.

Hypothesis 4. Decrease of the difference between the amounts of ordinary shares held by the first and the second largest shareholders will lead to increase of dividend payments.

Hypothesis 5. Presence of a controlling shareholder within the company will lead to decrease of dividend payments.

Hypothesis 6. Largest shareholders having a portion of ordinary shares exceeding that of preferred shares will prefer dividend payments to decrease.

It is worthy of note that researchers' opinions differ with regard to practically every of the listed suppositions concerning the described relations character. This fact is quite understandable. Legislation peculiarities, level of financial markets development, corporation's evolution history and legal status of holders of different types of shares entail variable impact of ownership concentration and a specific shareholder type on dividend payments policy.

4. Methodology

The study aimed to reveal the character of ownership structure impact on the dividend policy of Russian companies with two classes of shares is based on a regression model (1):

$$Div\_Payout_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Y_{it} + \beta_3 Z_{it} + \beta_4 \chi_{it} + u_{it}, \quad i = 1, ..., n; \ t = 1, ..., T. \qquad (1)$$

Dependent variable *Div_Payoutit* characterizes the dividend payout ratio of company *i* at moment *t*. In equation (1) *Xit* is the vector of variables characterizing concentration of ordinary shares in the hands of the company's shareholders (dimension (m ×1)) ; *Yit* is the vector of variables characterizing the type of the company's major shareholders (dimension k×1)); *Zit* is the variable determining the largest shareholder's portfolio structure; χ_{it} is the vector of variables "in charge of" the company's financial and economic standing indicators (dimension (l×1)); u_{it} is a random disturbance. All the vectors and variable have index *it* showing that the data are measured for each company *i* at time moment *t*. Note that the model is linear in terms of parameters but the variables vectors include non-linear components.

5. Data and sample

Included into the study sample were companies that were traded on RTS stock exchange during 2003-2009 and had two classes of shares. All in all, during 2003 - 2009 there were 145 such companies. The final panel is composed of 598 observations. The conditions for companies to be included in the sample were as follows: both classes of shares simultaneously traded on RTS stock exchange; dividends paid in cash form. The required data on the companies' ownership structure and dividend payments were obtained from the issuers' quarterly reports. For collection of data on the results of financial and business activities, ownership concentration, the largest owners identity, amount of dividends paid and other details of the issuers we used SKRIN and SPARK public databases. See Table 1 for description of the variables used in regression models.

Variable	Description
1	2
Dependent variables	
Div_Payout	The aggregate dividend payout ratio, the variable characterizing the company's dividend policy. *Div_Payout* value is calculated as the ratio of the sum total of dividends actually paid on the both classes of shares during the year to the firm's net profit following the results of the year wherefore the dividends were paid
Ord_Payout	Ratio of dividend payout on ordinary shares; calculated as the ratio of the amount of dividends actually paid on ordinary shares during the year to the firm's net profit following the results of the year wherefore the dividends were paid

Pref_Payout	Ratio of dividend payout on preferred shares; calculated as the ratio of the amount of dividends actually paid on preferred shares during the year to the firm's net profit following the results of the year wherefore the dividends were paid
Independent variables	
Variables included in vector X	
*Share_*1	Largest shareholder's ordinary shares portion
*Share_*2	Second largest shareholder's ordinary shares portion
*Share_*3	Third largest shareholder's ordinary shares portion
*Conc_*3	Portion of ordinary shares held by the three largest shareholders
Spread	Difference between the portions of ordinary shares in possession of the first and the second largest shareholders
Control(*d*)	Binary variable characterizing existence of a controlling shareholder within the company. Its value is equal to 1 if there is a shareholder with a 50% portion of shares within the company and to 0 if otherwise
*Share_*2(*d*)	Binary variable characterizing existence of a second largest shareholder within the company who is a blockholder. Its value is equal to 1 if the second largest shareholder's portion of ordinary shares is in excess of 25% and to 0 if otherwise
Variable Z	
*Power_*1	Variable characterizing the largest shareholder's portfolio structure The variable value is calculated as the ratio between the portions of, accordingly, preferred and ordinary shares belonging to the largest shareholder
Variables included in vector χ	
Size	Variable characterizing the company size and measured as the natural logarithm of sales
ROA	Return on assets
Leverage	Variable characterizing the company capital structure: debt to equity ratio.

Table 1: *Description of variables used in regression analysis*

For the results of descriptive statistics of the variables used in the econometric analysis see Table 2.

From Table 2 it follows that the average value of the aggregate dividend payout ratio for the whole of the period is 0.311 which means that the sampled companies paid out in the form of dividends, on the average, approximately 31% of their net profit. Preliminary statistical analysis showed that the minimum value of the dividend payout ratio was –0.401 since nine of the companies under observation paid dividends having a negative value of net profit while the maximum dividend payout ratio value was 2.393. Such situations when the dividend payout ratio value is negative or in excess of 1 are possible in cases when the

company pays out dividends from reserves[18]. In the course of further statistical and econometric analysis the outliers were excluded.

Variable	Mean	Standard deviation	Minimum	Maximum
Div_Payout	0.311	0.681	0	1.934
Ord_Payout	0.236	0.606	0	2.901
Pref_Payout	0.078	0.099	0	0.982
Share_1	0.563	0.176	0.072	0.995
Share_2	0.159	0.092	0	0.449
Share_3	0.059	0.069	0	0.295
Conc_3	0.781	0.143	0.073	0.995
Spread	0.404	0.229	0	0.995
Power_1	0.156	0.585	0	1.915
Size	22.736	1.627	16	27.630
Leverage	201.167	711.693	0	2336.270
ROA	5.944	11.181	0	39.487

***Table 2:** Descriptive statistics*

Analysis of the average dividend payments dynamics evidences considerable fluctuation of the dividend payout ratio from year to year. Notably (as we already remarked above), the largest fluctuation of dividend payout ratio occurred in 2006–2009.

Thus, from the descriptive statistics, behaviour of dividend payout ratio as well as the main ownership concentration characteristics it follows that the amount of dividends paid by the companies underwent a considerable variation during the period under consideration. Notably, a variation also occurred in the companies' ownership concentration and the ratio of the amounts of the largest shareholders' portions, and consequently - in the character of such shareholders' interaction as well. In order to test the suppositions concerning existence and character of the relation between the dividend amount paid and the ownership concentration we applied regression analysis.

6. Regression analysis results

See Table 3 for the results of the regression analysis wherein the following three types of dividend payout ratio were used as the dependent variables: aggregate ratio of dividend payout on the both classes of shares (*Div_Payout*), for ordinary shares (*Ord_Payout*) and preferred shares (*Pref_Payout*). Consequent testing of the models demonstrated that the

---

[18] See [Russian Federal Law on Joint-Stock companies, 1995, p. 2, page 42].

fixed effect model describes the empirical data most adequately.

All the models apart from that presented in Column 9 are statistically significant. Variable *Share*_3, *Conc*_3, $(Conc\_3)^2$ turned significant in all the models. Variable *Control*(*d*) is significant in the models where the dependent variables are: ratio of dividend payout on the both classes of shares *Div_Payout* и dividend payout ratio for ordinary shares *Ord_Payout*. In the model (see Column 11) wherein the dependent variable is represented by the ratio of dividend payout on preferred shares *Pref_Payout*, in contrast to the other model, it is the variable characterizing the largest shareholder's portion of ordinary shares *Share*_1 that is significant. In some parameter assessments the coefficients on the significant variables are different from those supposed. Thus, the coefficient on the variable *Control*(*d*) has a positive sign in spite of the hypothesis put forward alleging existence of a reverse relation between the dividend payments amount and existence of a controlling shareholder within the company.

Let us proceed to analysis of the variables characterizing the impact of ownership concentration on the dividend payout ratio (Table 3). Contrary to the supposition concerning existence of the link between the major shareholder's portions of ordinary shares and *Div_Payout* and *Ord_Payout*, variables *Share*_1 (largest shareholder's ownership portion) and *Share*_2 (second largest shareholder's ownership stake) are insignificant in the models (Columns 1, 2, 6 and 7). However, in the model with *Pref_Payout* as the dependent variable (Column 11) the coefficient on the variable characterizing the largest shareholder's portion of ordinary shares *Share*_1 is significant. Consequently, one can admit the supposition on existence of a reverse relationship between concentration of ordinary shares held by the largest shareholder and the amount of dividends paid on preferred shares.

Additionally, one revealed statistically significant relation between the third largest shareholder's portion of ordinary shares *Share*_3 and the dividend payout ratios. The negative value of the coefficient (Columns 1, 6, 11) shows that this variable is inversely related to the three types of the dividend payout ratio. With regard to this variable no hypothesis was put forward, the variable having been introduced with a view of analyzing the relation revealed in the paper (Maury and Pajuste, 2002).

	Dividend payout ratio														
	Type of the ratio			Div_Payout				Ord_Payout				Pref_Payout			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Share_1	−0.146	0.012				−0.100	−0.007				−0.067**	−0.132			
Share_2	0.108	0.285				0.090	0.039				−0.038	0.024			
Share_3	−1.267***	−0.675				−0.914***	0.047				−0.206***	0.023			
Share_1^2		−0.179					−0.142					0.050			
Share_2^2		−0.659					0.047					−0.171			
Share_3^2		−3.270					−5.600*					−1.475**			
Conc_3			−2.249**	−0.352				−1.815**	0.185				−0.374**	−0.053	
Conc_3^2			1.551**	0.265				1.288**	−0.041				0.229*	0.012	
Spread			0.099	0.072				0.056	0.022				0.011	0.005	
Control(d)					0.175***					0.147***					0.012
Share2(d)					0.018					0.069					0.008
Power_1				−0.039	−0.018				0.003	0.017				0.001	0.007
Size	0.078**	0.082**	0.065*	0.071*	0.095**	0.085***	0.090***	0.073**	0.077	0096***	0.019***	0.019***	0.017**	0.019***	0.023***
Leverage	−0.0002**	−0.0002**	−0.0002**	−0.0002***	−0.0002***	−0.0001	−0.0001	−0.0001*	−0.0001	−0.0001*	−0.00002*	−0.00002	−0.00002*	−0.00002*	−0.00002*
ROA	−0.005**	−0.005**	−0.005**	−0.005**	−0.005**	−0.003*	−0.003*	−0.003*	−0.003	−0.003**	0.000	−0.000	0.000	−0.001	−0.001
Cons	−1.272	−1.403	−0.370	−1.178	−1.943**	−1.591**	−1.715**	−0.839	−1.643	−2.08***	−0.294*	−0.291*	−0.159	−0.317*	−0.452***
R^2	0.0111	0.0141	0.0056	0.0024	0.0124	0.0054	0.0088	0.0021	0.0001	0.0043	0.0021	0.0058	0.0012	0.0004	0
p-value	0.0002	0.001	0.0065	0.0461	0.0005	0.0015	0.0032	0.0128	0.1289	0.0006	0.0036	0.0042	0.011	0.0954	0.0237
N	551	551	551	541	542	519	519	519	509	510	514	514	514	504	505
Note: *, **, and *** mean significance at 10, 5, and 1 percent levels respectively															

Table 3: Regression analysis results

We found statistically significant non-linear relation between the aggregate portion of ordinary shares held by the three largest shareholders *Conc*_3 and the value of the dividend payout ratio for the both classes of shares as well as for the ordinary and the preferred shares viewed separately (Columns 3, 8, 13). Analysis of the quadratic function (Column 3) shows that growth of ordinary shares concentration in possession of the three largest shareholders from 7.3 to 73% brings about decrease of the ratio of dividend payout on the both classes of shares *Div_Payout*, while further concentration growth within the range from 73 to 99.5% will entail increase of the dividend payout ratio. Similar analysis of the quadratic function (Column 8) that in case of variable *Conc*_3 value change from 7.3 to 70.5% the amount of dividend payments on ordinary shares *Ord_Payout* is reduced, further change of the variable value within the interval from 70.5 to 99.5%, entailing increase of the ratio of dividend payout on ordinary shares. Additionally, the results of analysis of the non-linear

function (Column 13) enable one to conclude that at a 7.3-81.7% concentration of ordinary shares growth in concentration of ordinary shares in possession of the three largest shareholders will entail decrease of dividend payments on preferred shares *Pref_Payout*. Notably, increase of ordinary shares concentration within the interval from 81.7 to 99.5% will entail increase of the volume of dividend payments on preferred shares.

According to the results obtained (Columns 5 and 10), there is a statistically significant relation between the ratio of dividend payout on the both classes of shares *Div_Payout* and on ordinary shares *Ord_Payout* and existence of a controlling shareholder within the company. Relying on the coefficients signs, one may conclude that the amount of dividend payments on the both classes of shares and on ordinary shares with companies having a controlling shareholder are accordingly 17.5% and 14.7% higher as compared to companies without a controlling shareholder.

The other ownership concentration indicators (difference between the two largest shareholders' portions of ordinary shares *Spread* and fact of presence of a second largest shareholder with a block stake described by the binary variable *Share*2(*d*) turned insignificant in all the models considered.

Analysis of the models wherein variable *Power*_1 (characterizing the largest shareholder's portfolio structure) is used (Columns 4 and 5, 9 and 10, 14 and 15) fails to allow of a conclusion on the possibility of the largest shareholder using the portion of ordinary shares in excess of that of preferred ones to derive private benefits of control and reduction of the level of dividends paid. From the regression analysis it follows that this variable is statistically insignificant.
One may conclude that dividend policy on preferred shares considerably differs from that on ordinary shares and is determined predominantly by the company's performance measures and ownership concentration.

7. Conclusions

Taking into account high concentration of ownership in Russian companies with two classes of shares as well as imperfection of the Russian legislation concerning protection of minority shareholders' rights, we supposed that *increase of ordinary shares concentration in the hands of the largest shareholders is associated with lower dividend payments* because of the largest shareholders deriving private benefits of control. However, we did not reveal the relation between the amount of aggregate dividend payments on the both classes of shares and that of the ordinary shares portions held by the largest and the second largest shareholders. Notably, there is a nonlinear relationship between dividend payout ratio and concentration of ordinary shares in possession of the three largest shareholders. We found out that with companies where ordinary shares concentration in possession of the three largest shareholders grows from 7.3 to 73% the dividend payout ratio on the both classes of shares aggregately will decrease while further ordinary shares concentration growth (within the range from 73 to 99.5%) will lead to increase of the dividend payout ratio. One of the hypotheses was that *existence of a controlling shareholder within the company will lead to decrease of dividend payments*. It found confirmation, for example, in the market of Finland

(Maury and Pajuste, 2002). However, according to our study, with companies having a shareholder with a controlling portion of ordinary shares, the average value of the dividend payout ratio is 17.5% higher as compared to companies without a controlling owner. Thus, the hypothesis previously put forward was not supported.

Relying on the results obtained, we may conclude that the character of the relation between the ownership concentration factors and the ratio of dividend payout on ordinary shares considerably differs from the said factors relation with dividend payments on preferred shares. We found a similar link between the ratio of dividend payout on ordinary shares and the company's financial and economic indicators, a non-linear relationship with concentration of ownership in the hands of three largest shareholders, a direct relationship with the factor characterizing the fact of a controlling shareholder presence. At the same time, we revealed that most ownership concentration factors fail to significantly affect the amount of dividend payments on preferred shares.

However, we confirmed the hypothesis on existence of a reverse relationship between concentration of ordinary shares in the hands of the largest shareholder and the amount of dividends paid. Such a result may be demonstrating a manifestation of the agency problem between the major and the minority shareholders in accordance wherewith the largest shareholder strives to reduce the portion of net profit paid in the form of dividends on preferred shares and to use this part of free cash flow for deriving private benefits. The reverse relationship between the ratio of dividend payout on preferred shares and the largest shareholder's portion of ordinary shares may be attributed to largest shareholder, as a rule, failing to strive at possession of preferred shares or having held of but a small portion thereof. According to the descriptive statistics data, 77% of the largest owners fail to have preferred shares in their portfolios, the average amount of the largest shareholder's portion of preferred shares being 6.8%. The reverse relation between the amount of dividends on preferred shares and concentration of ordinary shares in possession of the largest shareholder, at first sight, contradicts the result on existence of direct relation between the amounts of both dividend payments on ordinary shares and aggregate dividend payments on the both classes of shares and existence of a shareholder with a control stake within the company. This result may be attributed to controlling owners having hold of small portions of the company's preferred shares: only 20% of controlling shareholders hold preferred shares, the average amount of preferred shares portion with controlling owners being 6.1% of the total amount of the company's preferred shares. Thus, largest shareholders, apparently, may be not interested in high dividend payments on preferred shares.

Thus, dividend policy on preferred shares considerably differs from that on ordinary shares and is determined predominantly by the company's financial and economic indicators and ownership concentration. However, the amount of dividend payments on preferred shares, unlike those of dividend payments on ordinary shares and aggregate dividend payments, is unaffected by existence of a controlling shareholder that, according to the results of the analysis, is represented by the state or state corporations to an extent of 74%. As one has previously noted, controlling shareholders, on the average, hold a small portion of preferred shares and thus may be not interested in increase of dividends on preferred shares, the same way they are interested in dividends on ordinary shares.

Based on the study results one may conclude that ownership concentration factors more apparently affect the amount of dividend payments on ordinary shares while dividend payments on preferred shares (determined predominantly by the company's financial results and decisions of the largest shareholder) are an obligation of the company similar to debt obligations on the one hand and means to manipulate distribution of voting shares among the largest shareholders - on the other.

All the aforesaid serves to raise questions regarding legal protection of preferred shareholders' rights in general and such rights abuse by large shareholders of the company that are holders or ordinary shares. It appears that even further steps for enhancement of investors' rights protection level are not likely to dismantle the acute problem. Only unification of shares classes meaning equalization of shareholders' control and cash flow rights as per one share may promote mitigation of the agency problem with regard to the conflict of interests between holders of different types of shares.

8. Bibliography

1. Bebczuk R. *Asymmetric Information in Financial Markets*. Cambridge, UK: Cambridge University Press, 2003.
2. Bebczuk R. *Corporate Governance and Ownership: Measurement and Impact on Corporate Performance and Dividend Policies in Argentina* Inter-American Development Bank Research Network. Working Paper N R-516. 2005.
3. Easterbrook F. Two Agency-Cost Explanations of Dividends American *Economic Review*. 1984., 74. pp. 650–659.
4. Faccio M., Lang L., Young L. Dividends and Expropriation. *American Economic Review*. 2001., 91(1). pp. 54–78.
5. Gomes A. Going Public without Governance: Managerial Reputation Effects *Journal of Finance*. 2000, 55(2). pp. 615–646.
6. Gomes A., Novaes W. *Sharing of Control versus Monitoring as Corporate Governance Mechanisms*. Working Paper N 01–029. Pennsilvania Institute for Economic Research, 2005.
7. Grossman S., Hart O. Takeover Bids, The Free-Rider Problem, and the Theory of the Corporation *Bell Journal of Economics*. 1980., 11(1) pp. 42–64.
8. Grossman S., Hart O. One Share, One Vote, and the Market for Corporate Control *Journal of Financial Economics*. 1988. 20(1/2) pp. 175–202.
9. Jensen M., Meckling W. Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure *Journal of Financial Economics*. 1976., 3(4)pp. 305–360.
10. La Porta R., Lopez-de-Silanes F., Shleifer A., Vishny R. Agency Problems and Dividend Policies around the World *Journal of Finance*. 2000., 55(1). pp. 1–33.
11. Maury C. B., Pajuste A. Controlling Shareholders, Agency Problems, and Dividend Policy in Finland. Swedish School of Economics and Business Administration. *Working Paper*: pp. 15-45. 2002.
12. Maury C. B., Pajuste A. Private Benefits of Control and Dual – Class Share Unification. Swedish School of Economics and Business Administration. *Working Paper*. 2007.
13. Shleifer A., Vishny R. Large Shareholders and Corporate Control *The Journal of Political Economy*. 1986., 94(3) pp. 461–488.
14. Shleifer A., Vishny R. A Survey on Corporate Governance *Journal of Finance*. 1997., 52(2). pp. 737–783.

Elena Limanov [1]

EFFECTIVENESS OF ECOLOGICAL EDUCATION AND AWARENESS IN PUBLIC POLICY: MICROECONOMIC ANALYSIS OF REGULATION EFFECTS AT REGIONAL ENERGY MARKET

Abstract

Ecological safety is one of the most important challenges for the people all over the world. Remedies applied are often a part of public policy ad, as a rule, undermine losses of public welfare in a short-run to achieve environmental goals. These losses may be considered as a fee paid by society for cleaner environment. The aim of the state as a regulator in this context (or even a kind of its social responsibility) is to choose the way to better environment which guarantees a minimum public welfare loss. Welfare effects are construed here in microeconomic perspective – as welfare changes measured at the markets under regulation. Ecological education and awareness represent a rare case of regulation which could result in gain of public welfare. The arguments come from theoretical analysis of situation when the information first unavailable is transmitted to consumers, and they change their preferences. Public welfare gain as a result of consumers' awareness on NOx emission, measured at Novosibirsk regional energy market, could run up to 25 mln of rubles per month (regional market is based on energy consumption and production data). This gain of welfare could occur if consumers show rational reaction, which undermines a decrease of energy demand as a response on information of energy production externalities; or if they react at all. The second remark is crucial for regulation effect. It means that consumers have to consider ecological information as meaningful. These values and behavior are next to ecological education. As some researches show the cleaner environment is out of the priorities for people in Russia. Therefore Russian government has to promote ecological education. Sufficiency of current efforts is considered in the paper as well.

Keywords

ecologic awareness, ecological education, environmental policy, microeconomic analysis

1. Introduction

Being a part of public policy environmental regulation is very sensible to efficiency matter. Its benefits sometimes are hardly to be measured and are hardly to be expected soon enough to be transmitted to political benefits for the authorities today. As for the costs, environment-friendly behavior is rather expensive thing both for the state and for the society. For the State it means considerable efforts (and the budget is always limited). For the society it results in rather restrictive changes of production and consumption patterns. Being painful enough to change polluters' behavior environmental regulation affects domestic producers' competitiveness which is a crucial point for the state.

So if the regulator is wise enough to follow long-run benefits of cleaner environment, it is anxious for environmental regulation costs efficiency. Regulation costs here mean losses in

---

[1] Novosibirsk State University, Novosibirsk, Russia, e-mail: dekeko@lab.nsu.ru

public welfare which can be considered as a price of better environment for the society. The aim of the state as a regulator in this context (or even a kind of its social responsibility) is to choose the way to achieve environmental goals which guarantees a minimum public welfare loss.

Public welfare is considered usually as a sum of consumers' and producers' net incomes (incomes after expenses incurred). It is measured, as a rule, in a macroeconomic way (for national economy). In the meantime microeconomic analysis allows to measure welfare of the market actor's as a sum of consumer and producer surpluses. The last approach seems to be convenient for regulation effects analysis, since the regulation often affects some of the markets, not all of them. Still, in most cases of environmental regulation we face the losses of surpluses sum. If the society cares of the environment, it can accept these losses. But the most interesting thing is that if the people care, they can change their preferences so the environmental goal can be achieved without negative welfare changes. Going further with the concept of consumer sovereignty it can result in eco-friendly behavior of producers without any substantial efforts from the state.

To observe this idea more precisely we start from conventional microeconomic analysis of market welfare change resulting from consumer preferences alteration. We apply then this analysis to the case of Novosibirsk regional energy market and see how and when environmental regulation can bring welfare gain. Finally, we conclude whether or not regional or federal authorities in Russia are doing enough to take advantage of social awareness as an instrument of environmental policy.

2. Social awareness as an instrument of environmental policy: microeconomic analysis

The most common environmental regulators considered in the textbooks are taxes and standards – as a kind of generalization for direct (administrative) and indirect (economic) policy instruments. Both of them, as well as many other, affect producer (polluter), which results to supply decrease. Conventional microeconomic analysis demonstrates then market welfare loss as for the case of environmental tax (Figure 1). Transfer to the state is S_{p1DFB}, and the welfare loss is S_{DEF}. Compare it with the case, where consumers are informed about negative effect of good's consumption or production. If they care of, they change their preferences, which results in demand decrease (Figure 2). We can reach the idea of welfare gain if we imagine the situation as following: curve D_1 reflect false preferences (consumption under externalities ignorance), while curve D_2 reflects consumers' real preferences. Therefore the figure between two curves cannot be interpreted as surplus loss. It seems like they don't want to buy amount Q_1-Q_2, but they do. So their excess expenditures are equal the figure ACQ_1Q_2FB, and they will gain this amount while adjusting preferences.
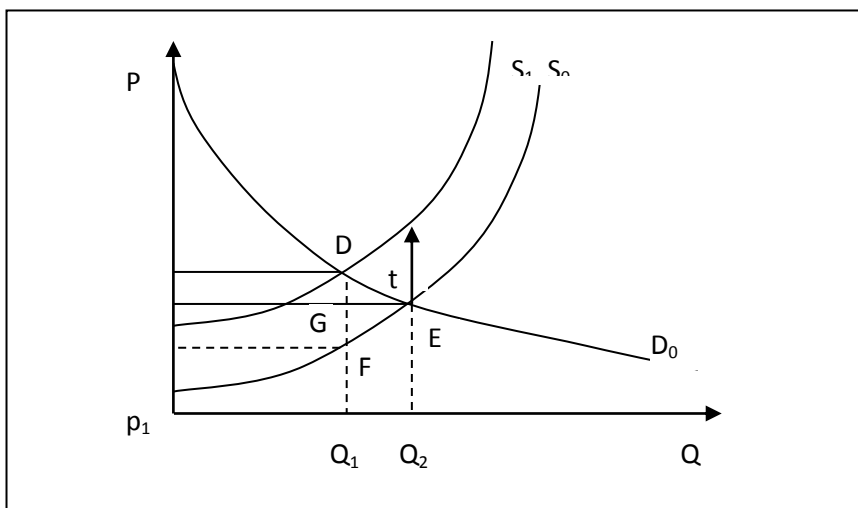
Figure 1: *Market under regulation: environmental tax*
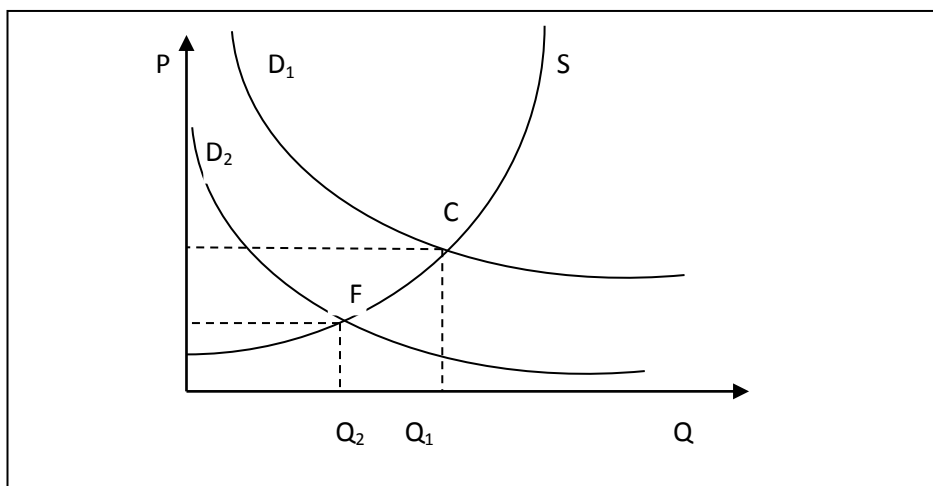
Figure 2: *Market under regulation: information campaign*
(as in Arnold, 1994)

As for the producer's side, his surplus loss is equal to the figure *ACBD*. All in all we have net gain of market welfare measured as the figure CQ_1Q_2F. Arnold (1994) provides more detailed analysis of the case.

To apply this analysis to the case of Novosibirsk regional energy market, the market itself was modelled, environmental goal was chosen and responses of regional energy company were estimated.

3. Modeling of regional energy market

Modeling of demand and supply at regional energy market started with research by N. Suslov, A. Mishura (2003). Empirical basis for their modelling consists of monthly data on energy consumpltion and prices for different groups of energy consumers within the period 1995-2000. For the purpose of current research regression analysis of demand functions was

made on monthly data of energy consumption, prices and accumulated price indexes for the period 1998-2003 with further adjustment to the changing structure of energy consumption.

Energy prices were considered as exogenious variable, because tariffs are first fixed by regiobal regulator and then affect consumers decisions. As data series derived were nonstationary, we turned to logarithm difference. Dummy variable was introduced to meet seasonal changes of energy consumption. ADL model was considered for demand modeling:

$$x_t = \mu + \varphi_1 x_{t-1} + \alpha_0 z_t + \alpha_1 z_{t-1} + \varepsilon_t.$$

Suppose factor z_t and error ε_t are stationary, then if $|\varphi_1| < 1$ the target variable is stationary as well. For expectation of the equation we've got the following:

$$\bar{x} = \mu + \varphi_1 \bar{x} + \alpha_0 \bar{z} + \alpha_1 \bar{z}.$$

Or:

$$\bar{x} = \frac{\mu}{1-\varphi_1} + \frac{\alpha_0 + \alpha_1}{1-\varphi_1} \bar{z} = \mu' + \lambda \bar{z}.$$

This equation describes long-run stationary condition of the process.

Table 1 shows estimates of demand functions for different group of consumers. Price and consumption lags coefficients were calculated on data of energy prices and production in 2005 weighted according structure of energy consumption for year 2002.

Consumers	Demand function formalization	Demand function estimate
Industry	$E_t = 10^{-0.0098}\left(\frac{P_t}{P_{t-1}}\right)^{-0.4807}\frac{E_{t-1}^{0.719}}{E_{t-2}^{-0.281}}$	$E_t = 320259.6 * P_t^{-0.4807}$
Agriculture	$E_t = 10^{0.000925}\frac{P_t^{-0.2403}}{P_{t-1}^{-0.372}P_{t-2}^{0.1317}}\frac{E_{t-1}^{0.6162}}{E_{t-2}^{-0.3832}}$	$E_t = 59444.73 * P_t^{-0.2403}$
Forestry	$E_t = const$	727
Transport and communications	$E_t = 10^{0.0247}\left(\frac{P_t}{P_{t-1}}\right)^{-0.1777}\frac{E_{t-1}^{0.8796}}{E_{t-2}^{-0.1204}}$	$E_t = 217187.6 * P_t^{-0.1777}$
Construction	$E_t = 10^{0.0523}\left(\frac{P_t}{P_{t-1}}\right)^{-0.2831}\frac{E_{t-1}^{0.7205}}{E_{t-2}^{-0.2795}}$	$E_t = 17245.53 * P_t^{-0.2831}$
Communal services	$E_t = 10^{0.1602}\frac{P_t^{-0.4412}}{P_{t-1}^{-0.1409}P_{t-2}^{-0.3003}}\frac{E_{t-1}^{0.7048}}{E_{t-2}^{-0.2952}}$	$E_t = 13124 * P_t^{-0.4412}$
Final consumption (population)	$E_t = 10^{0.0812}\left(\frac{P_t}{P_{t-1}}\right)^{-0.7814}\frac{E_{t-1}^{0.5245}}{E_{t-2}^{-0.3755}}$	$E_t = 60454.01 * P_t^{-0.7814}$
Other	$E_t = 10^{0.0423}\left(\frac{P_t}{P_{t-1}}\right)^{-0.4621}\frac{E_{t-1}^{0.592}}{E_{t-2}^{-0.408}}$	$E_t = 149882.6 * P_t^{-0.4621}$

Table 1: *Estimates of energy demand functions adjusted to energy consumption structure in 2005 (Limanova, 2011, p.148)*

Regional demand function is calculated by the aggregation of individual demand functions:

$$E_{рын_e} = 727 + 320259.6 * P_t^{-0.4807} + 59444.73 * P_t^{-0.2403} + 217187.6 * P_t^{-0.1777} + 17245.53 * P_t^{-0.2831} +$$
$$+ 13124 * P_t^{-0.4412} + 60454.01 * P_t^{-0.7814} + 149882.6 * P_t^{-0.4621}.$$

This function allows estimating energy demand per month for Novosibirsk region.

Starting point for supply modeling is the idea that regional energy company is an example of natural monopoly. As the average cost of the company are falling while energy production increases, the only producer at the market operates more effectively than several companies. It means that regional energy operator is regulated by the state. Price policy for the energy is based on the level of average costs plus normal profitability. Prices vary for different kind of consumers, which allows realizing cross-funding for some groups of energy consumers.

This consideration is important, because it brings us to the idea of supply function as a horizontal line at the level of average costs of energy production. Analysis of market welfare changes resulting environmental regulation comes then to consumer surpluses difference before and after regulation.

4. Environmental regulation modeling

Environmental goal setting is based on the information about heat and power plants emissions of air pollutants and their contribution to pollution of the environment in the region.

Heat and power plants are the main air polluters in Novosibirsk region among stationary sources of pollution. They generate over 20 % of air pollutant emission (see at Обзор состояния окружающей среды в г. Новосибирске за 2005 г. Новосибирск: мэрия г. Новосибирска, Городской комитет по охране окружающей среды и природным ресурсам). Two pollutant – NO_x and benzapirene – are the most problematic for energy sector. Their emission causes regular violation of maximum permitted concentration (MPC). So hypothetical environmental goal here is 10 % reduction of NOx emission (real concentration of NO_x near heat and power plants in Novosibirsk is about 1.1 of NO_x MPC (Limanova, 2011, p. 153)), which means 153.5 tons of NO_x reduction per month.

We're going to consider consumers' preferences changes after information campaign. They are expected to reduce energy consumption as much as needed for heat and power station to abate 153 tons NO_x per month. That's why we need to convert NO_x remission into energy production. The combustion of 1 kg of coal generates 4 kilowatts of power and 4 grams of NO_x. It's not difficult to calculate desirable decrease of energy consumption - 153 mln of kilowatt-hours.

Now we can imagine perfect world, where regulator knows precisely desirable parameters of regulation and sounds reasonable enough to convince people to act; and the people are eco-friendly to be convinced, they do act and they act predictable. That's what we need to estimate effects of regulation.

5. Ecologocal awareness effect for market measured welfare

As we arrived to the situation of absolute elastic supply for energy market (energy company provides any amount of heat and power at the price fixed by the regional authorities), let's first adjust our theoretic model.
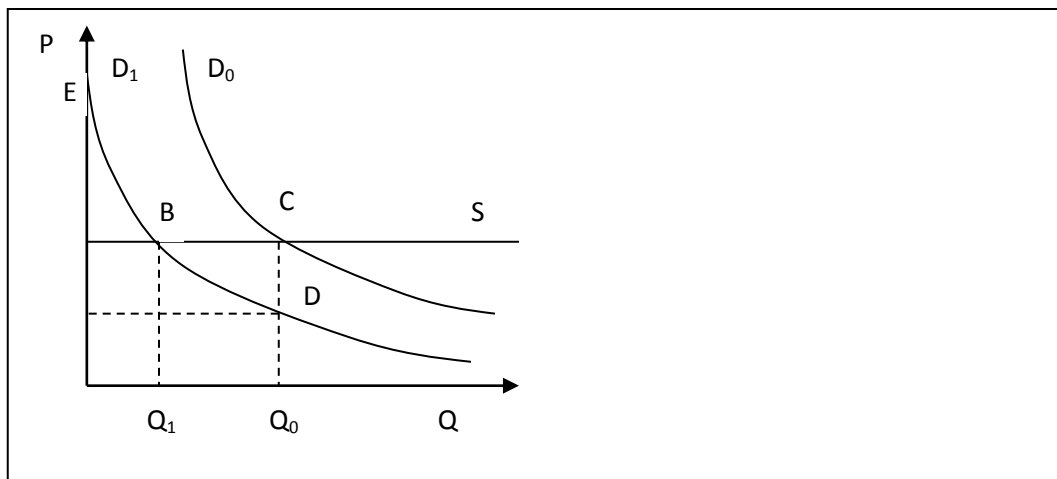
Figure 3: *Ecological awareness effect at the market with absolute elastic supply*

We analyze the situation when previously unavailable information about energy consumption externalities is delivered to consumers. If they react, and react rationally, we can observe changes of their preferences, for instance, energy saving. For the case of absolutely elastic supply of energy at regulated price, as we see at figure 3, there is no producer's surplus. For the consumers we can imagine as they buy amount Q_0 at price p_0 while willing to buy amount Q_1. They pay for this extra amount Q_0-Q_1 $p_0*(Q_0-Q_1)$ though they value it as area under D_1 curve within the interval $[Q_1;Q_0]$. If the consumers adjust the amount to buy, they win area BCD. That's welfare gain for this kind of market.

Let's estimate this gain if consumption decrease is 153 mln of kilowatt-hours, p_0 is equal 0.91 roubles/kilowatt-hour, Q_0 is 870,5 kilowatt-hours (as it was in 2005). Net change of welfare measured at the market is equal area BCD, i.e.:

$$\Delta W = Q_0(p_0 - p_1) - \int_{p_1}^{p_0} D_1 dp \ .$$

Or:

$$\Delta W = 260288.5896 - \int_{0.611}^{0.91} D_1 dp = 260288.5896 - (616714 p^{0.5193} + 78247.64 p^{0.7597} + 264122.1 p^{0.8223} +$$

$$+ 24055.7 p^{0.7169} + 23486.4 p^{0.5588} + 276550.8 p^{0.2186} + 278664 p^{0.5379} - 152273 p + C) \Big|_{0.611}^{0.91} =$$

$$= 25085.1896$$

As we see, estimated welfare gain is near 25 mln. roubles monthly. This estimate is to be considered as upper edge for a number of reasons. First, regional demand aggregates different consumers' demands, not only population, whereas information campaign is aimed to the people. Second, people in Russia in general do not share ecological values to get desirable feedback (see, for example, Blam (2005)). Third, the other (institutional)

consumers are not interested to save energy as their clients (people) do not put eco-friendly behavior in claims.

6. Concluding remark on political appropriateness

Well, the truth is that ecological information as theoretically very attractive instrument for environmental policy, hardly to be effective for real life in Russia. To make it acting it is to rely on ecological values people share. Is it possible then to grow these values? Yes, it is. As any other values, they can be produced by education and training. That's why ecological education is crucial to the point. It is a part of public policy as well. The problem is that new values as a base for a new ideology are forming for a long time. It is a matter of generation, frankly speaking, which takes for politicians to make hard decision: to launch costly programs and keep going without any hope to get feedback for decade(s).

How realistic is this in Russia? The legislative base favors to ecological education. It's mentioned both in federal law on environmental protection and in Ministry of natural resources and the environment plans. Ministry report on achievements and plans for 2014-2016 (http://www.mnr.gov.ru/regulatory/detail.php?ID=131696) is arguing that ecological culture and education corresponds to the Concept of long-run development for Russian Federation up to year 2020 adopted by Russian government in 2008. However we often face a gap between normative and positive sides of reality in Russia, so let's see to the other side. To start with, the share of environmental protection does not exceed 0,15% of federal budget expenditures for last 3 years (see the structure of federal budget expenditures http://www.protown.ru/information/hide/6395.html), there are no ecological education or ecological culture mentioned within. There were no educational expenditures planned in the budget of the Ministry of natural resources and the environment for year 2012. For the year 2013 the Ministry planned to spend about 4.9 mln roubles for ecological education which is about 0.004 % of Ministry budget. The same share is planned for year 2014. Every year I ask my students whether or not they had some experience in this field studying in the school. The answers are negative. Without exceptions.

So we have to conclude that the government doesn't spend enough efforts for ecological education. No wonder. If the society is not interested for something, politicians prefer to ignore it. Somehow it reminds a vicious circle.

The positive thing is that the government really becomes more transparent. I've got response for every question addressed to governmental bodies for the last couple of years. In this sense the one who wish to be aware will be aware. If either society or the state would try, the vicious circle could change direction.

7. Bibliography

1.   Arnold, F.S. (1994). *Economic analysis of environmental policy and regulation*. John Wiley & Sons, Inc. New York, p. 251.
2.   Блам И.Ю. (2005). *Заинтересованность домашних хозяйств России в повышении экологических стандартов*. Moscow: EERC, p. 44.

EFFECTIVENESS OF ECOLOGICAL EDUCATION AND AWARENESS IN PUBLIC POLICY: MICROECONOMIC ANALYSIS OF REGULATION EFFECTS AT REGIONAL ENERGY MARKET

67

3. *Доклад о результатах и основных направлениях деятельности Минприроды России на 2014 г. и плановый период 2015 и 2016 годы.* Retrieved 03.01.2014 from http://www.mnr.gov.ru/regulatory/detail.php?ID=131696

4. Лиманова Е.Г. (2011). *Выбор инструментов регулирования охраны окружающей среды: от теоретического анализа к практическому применению на региональных рынках электроэнергии.* LAP LAMBERT Academic Publishing GmbH & Co. p. 197.

5. *Обзор состояния окружающей среды в г. Новосибирске за 2005 г.* (2006). Novosibirsk: мэрия г. Новосибирска, Городской комитет по охране окружающей среды и природным ресурсам, p. 27.

6. *Планируемая динамика и структура расходов федерального бюджета в 2011-2013 гг.* Retrieved 28.12.2013 from http://www.protown.ru/information/hide/6395.html

7. Суслов Н.И., Мишура А.В. (2003). *Моделирование и эмпирический анализ политики ценообразования на региональном рынке электроэнергии*/ Препринт. – Novosibirsk: ИЭиОПП СО РАН, p. 32.

Patricia Carmina Inzunza Mejía [1]
Armando Javier Sánchez Díaz [2]

THE RESTORATION OF PUBLIC SECTOR OF MEXICO THROUGH THE FISCAL POLICY AND THE CONTEMPORARY ECONOMY

Abstract

In Mexico, since the early 80's, neoliberal economic policies are aimed at economic liberalization and fiscal discipline. Since then it has prioritized macroeconomic stability at the expense of public finance constraints and increased productive investment that prevent sustained economic growth of the country. In this context, the Mexican government continues to express that the economy is controlled by the market, however, in reality is necessary the intervention of State and the implementation of fiscal policies progresive, allowing restructure the public sector to better allocation and distribution application of economic resources. The aim is to show the impact of fiscal policy on economic growth from an endogenous perspective that allows the wedges visible by the repeated use of economic policies go against the development of production and economic welfare of the majority of Mexicans. To support the theoretical method, we analyze the main contributions of the scientific literature on the economic and fiscal, contrasting with statistical evidence to identify the ravages of contemporary economy and globalization, what reveal the lack of resources to encourage the public sector Mexico and limited ability to pay tax to economic development, limiting government revenue capacity, hence, arise a better implementation of productive public spending and increased state intervention in the economy, as a means to restructure the public sector and generate productive optimal conditions to ensure productive development and the financial solvency of Mexico. This could be achieved through fiscal policy with more levying higher revenues and the implementation of progressive spending to encourage investment in industrial infrastructure, productive development and social spending.

Keywords

Fiscal policy, ability to pay, revenue capacity, contemporary economy

1. Introduction

The recent financial and public debt crises in developed countries has resurfaced once again in the discussion about the role of public expenditure and the role of the state, because large sums of money should have gone to the productive areas (including large corporations) and banking, however, have been used to pay the debt.

Recent events of international crisis, has led to a growing interest in the economic and social actors on the recovery of forgotten public policy objectives now recovering value, to be left

---

[1] Universidad Autónoma de Sinaloa, Gral Angel Flores, Poniente, Sin Número, Centro, CP 80000, Culiacan de Rosales Sinaloa, Mexico, e-mail: inzunzap@uas.edu.mx
[2] Universidad Autónoma de Sinaloa, Gral Angel Flores, Poniente, Sin Número, Centro, CP 80000, Culiacan de Rosales Sinaloa, Mexico, e-mail: asanchez@uas.edu.mx

behind, for the preeminence of the Washington Consensus, and they seem to win again the interest of the makers of public policy.

One of these elements is forgotten Development Agenda, through a gradual and long-term fiscal and taxation policy as a key instrument for growth and economic development.
The progressive tax policy is crucial to improve the ability to pay in the private agents and increase state revenue capacity. In this article, the way the public sector capacity, the various functions of public spending and the privatization scheme, through which the public sector finances, influence the economic provisions of the government's performance and explains to private agents.

Given these constraints, constant pressures to reduce fiscal activism arise, and thus inhibit the increase in the level of tax and tax revenues. The subliminal idea that has been led to believe, is the argument and incrementing high public spending harms the stability of prices, and also harms economic growth.

In general, the Mexican government supports that increasing public spending positive impact is insignificant, arguing that its impact would be more harmful than the distortions generated taxes and fiscal resources why are used to finance public spending, or if , said spending displaces private spending (Tanzi, 2009).

In this context, the challenge for Mexico and other developing countries, is "to enhance the catalytic role of the public sector with high social returns policies, avoiding the effects of displacement associated to inadequate financial management and possible distortions of the tax system" (Martner, Podestá and González, 2013, p. 7).

We agree with what refer us Martner, Podesta and Gonzales (2013), by exposing how important it is for both economic growth and for building a level playing field, designing fiscal policies with countercyclical capacity, but emphasizing the importance of tax policies and tax revenue with collection capacity, which would consider the strategy of positive impact on income distribution, increasing quality in spending and tax revenue collection systems, efficient and equitable fiscal capacity.

However, we must be clear that to carry out this strategy of positive impact on development objectives: economic growth, distributional equity and social inclusion, fiscal policy, and the taxes, has several hacendarios instruments as components public spending, taxes and the deficit or debt, which in turn require public institutions to be properly managed and administered

We know of the existence of problems of political economy, institutional capacity, fiscal sustainability problems and efficiency costs of taxes and debt that may limit the ability to implement fiscal policies, but the functions of fiscal policy explaining for Musgrave and Buchanan, (1999): supply of public goods, adjust income distribution and stabilize the macro economy, enhance the growth of the economy, provided that there is sufficiency in the first two conditions or features of fiscal policy, and for that financial liquidity required in the economic activity and the Mexican state prosecutor.

1.1. The Problem: Lack of tax collection capacity

In Mexico, since 1982 an economic policy designed from the ground of the Washington Consensus is applied. For over three decades, the Mexican government has chosen to issue debt to finance their public spending. The elimination of trade activities, privatization of enterprises, preferential tax regimes, tax exemption and strong fiscal discipline, have generated a decrease in the tax base and low in sources of wealth of the State, diminished tax collection and financial capacity of the Mexican State.

In this scenario of economic liberalization, have also led to special tax regimes and the tax exemption, has led to a decline in the tax base and low in sources of wealth of the State. These actions have led to the Mexican economy has slowed, and maintained a sustained rise in commodity prices. Along with this, in the first half of 2013, it had increased in goods, given the increased value added tax (VAT) on food and medicine, on the grounds of poor collection tax.

While, the data show that offers CEPAL (2013a, p. 5) in the group of countries with the lowest tax burden, the case of Mexico, during of the last ten years, experienced a reduction in tax load (in the narrow sense). One explanation for the low levels of collection and unproductive taxes, is due to the implementation of a restrictive fiscal policy and regressive, whose ratios represent different tax rates, preferential arrangements, high exemptions, special treatment and subsidies high.

In the last fifty years, Mexico has been the Latin American countries with lower taxes and greater amount of transactions exempted from VAT, however, is also of the countries that reduced selectively the tax base by establishing zero rates or exempt items, for what the government Mexican, is proposing to increase the tax rates to offset the decline in the tax base, which has affected a reduction in tax revenues as a percentage of GDP.

Lowering taxes has a negative impact on growth, recognizing that the main obstacles to growth, indicate possible reforms of fiscal policy, either on taxation or public spending and its impact on growth, which is where it was due restoring the role of the public sector as a catalyst and dynamics driving force of the economy of Mexico.

2. The link of fiscal policy and growth: theory and empirical contribution

Even as the Inter-American Development Bank, recognizes that the major theoretical and empirical contributions to the literature of growth and fiscal policy, focusing on Latin America, are supported in the work of Kong (2007) and Myles (2009), shows that the significant link of fiscal policy and economic growth, growth diagnostics offer, made by Agosin, Fernández Arias and Jarmaillo (2009) and Rojas Suarez (2010), Martner, Podesta and González (2013), focus on identifying the limitations of growth, with the purpose of for develop tax reform actions and for mitigate the constraint of financial activity of the State.

Although these studies lead us to identify constraints to growth, from a physical perspective, this study is based on the tenets of Keynes (1945), and suggestions of Raul Prebisch (1950;

2008) and Aníbal Pinto (1965) on the social distribution of tax instruments for the support for economic , as well as in the conceptions of Celso Furtado (1968), on the renewal of the development agenda in developing countries, arguing in the best application of productive public expenditure, and subtracting weight to fiscal discipline leading to the containment of public spending.

With all these arguments, this abstraction largely focuses on the proposals of ECLAC (2010 and 2011) expressed in the publication: "Time for equality: closing gaps, opening trails" as well as the effects adverse to the economic liberalization policies implemented in Mexico, that have generated the last three decades. Nationally, we can analyze studies that expose the relationship between fiscal policy and economic growth.

These have been developed through a theoretical and methodological body called "endogenous growth models", assumed that fiscal policy can affect growth, provided that the application of public expenditure and obtained resource, express characteristics of ability to pay and contribution in the private agents and revenue capacity in the public sector.

Meanwhile, Ramirez Cedillo (2008), correlate well with endogenous growth perspective, but his think is that these models are based in almost always assumed public finances in balance based on fiscal discipline, so do not give importance that deserves the real risk of falling into a fiscal deficit. In this context it is considered that in making any fiscal policy should be that considered the countermeasures should be taken at a time of economic crisis to determine the pro-cyclicality or counter-cyclicality you deserve or was due to apply to restore economy public sector

Hence in the coming years, our country will face the challenge of increasing participation in financing flows in an international context marked by low growth and fiscal fragility, so it is required that the Mexican State have the resources to increase public spending and investment in the productive and social sectors.

We know that the Mexican economy is marked by the rule of fiscal discipline that involves taking different situations in terms of fiscal space available, mainly due to strong fiscal constraints facing, making it difficult to finance the finance constrains public policy and politics tax from a tax perspective. With this, a recent study by CEPAL (2013b, p. 17) provides for a reduction in official development assistance and social spending for development, which particularly affect countries like Mexico. It also argues that it has installed a stage and greater uncertainty for the next two years (until 2015) has complicated the task of accelerating progress towards achieving the commitments of the Millennium Declaration.

2.1. Fiscal Impact of the global crisis

It is widely documented by Zettelmeyer (2006), French-Davis (2009), Huerta (2009), Kohli, Loser and Sood (2010), Stiglitz (2010) and others, that in past three decades, Mexico has had a poor performance economic, largely due to the high vulnerability to external shocks,

usually by the free flow of capital and the unfavorable conditions offered by business changes accounting for the Mexican economy.

Moreover, the pro-cyclicality of fiscal policy, has led to financial crisis unsustainable and moments that offer low rates of investment and savings, together with adverse effects on labor productivity and income distribution (Pagés, 2010).

On the fiscal front, numerous studies have shown that the international crisis of 2008-2009, was generated in a cyclical force and regressive fiscal policy pro. The financial crisis exposed the fiscal imbalances of developed economies and for various reasons, this fiscal decoupling stuck to issue debt instead of increasing the tax base to international financial capital and foreign trade, to collect more taxes.

The reasons that led to the fiscal imbalance, ranging from flexibility to general systems of taxation to corporation tax, electoral unpopularity or indirect taxes on labor income, to the lax enforcement of tax laws. Either way, the financial crisis, can set a high price and situate debt to many countries in the era of indebtedness. It has been corroborated that the neoliberal model, present in the last thirty years has generated weak public finances of Mexico, which has meant limiting the tax bases as a result of widespread exemptions, special treatments and fiscal wide flexibility.

It is clear that the discussion on the problems faced by economic agents, (whether companies, families and public institutions) is widely related to the adverse economic and financial events that arose following the recent economic crisis. Based on data offered by the National Institute of Statistics, Geography and Informatics (INEGI), and analysis by Sánchez Díaz (2013), in the last ten years, our country has registered an unfavorable developments in the economic growth (See Figure 1).
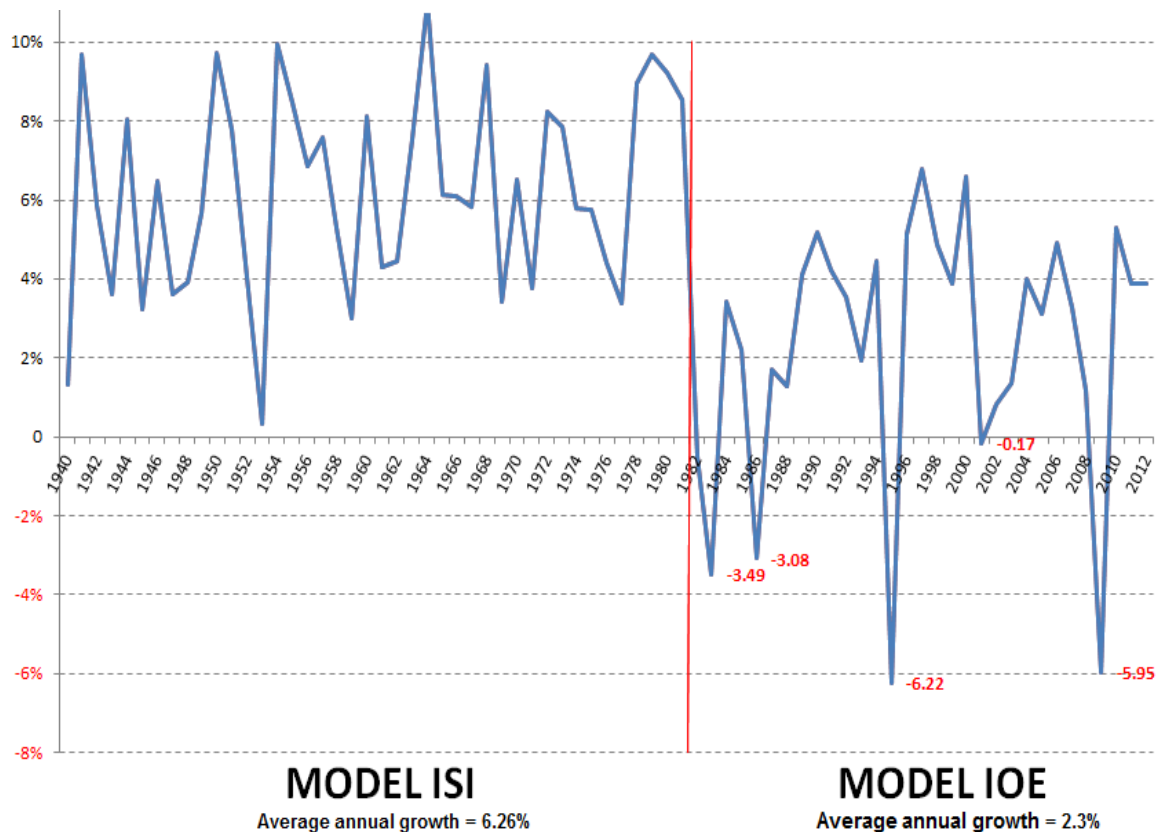
Figure 1: Mexico 1940-2012: Evolution of annual GDP growth rates under the ISI and EOI models (in%) (Diaz, 2013)

This Figure 1 we can see that in the years in which the industrialization model import substitution applied, is growing at annual average rates of 6.6%, in contrast with the current neoliberal model shows that after years of economic crisis in Mexico negative growth rates in 1983 had a rate of -3.49%, in 1987 a rate of -3.08 was recorded in 1995-a rate of 6.22, he had by 2002 a rate of -0.17% was recorded and is recorded the year 2009, a -6.54%.

We can see that in the years in which the ISI model is applied, not had negative rate, and the application of the model IOE, the economy grows below its powers, namely with the application of neoliberal economics Mexico just reaches the 1.95% average annual growth.

Undoubtedly, these results of poor economic performance, are attributed to the policies of trade liberalization that Mexico has adopted from the Washington Consensus, where the slowdown in aggregate demand has been constant, and the lack of investment in the productive sector has been a permanent.

It is clear that the neoliberal model negatively impacts the economic growth and that increase government revenue, while the Mexican government chooses the easy way fiscal policy: containment of public spending in order to maintain sound public finances, the higher tax rates consumption, new taxes, special schemes to finance capital and elimination of tariffs; prevents the state revenue available enough to invest in infrastructure, education and health resources, and therefore the development of the country are closed.

The lack of liquidity in the public finances of the country, largely due to the weak fiscal structure that prevents you spend and invest in the quantities demanded by the economic reality, thereby justifying the need to increase tax revenues and tax mainly in Mexico consumption, since the social and productive purposes claim and justify a significantly higher revenues without the Federal Government wants to appreciate and recognize that to those most affect this type of economic policy is to the most Mexicans.

So well, in terms of public revenues in accordance with those reported by Manrique (2005), when the model prevailing ISI, tax revenues in foreign trade, they provided to the government the 30% of the Gross Domestic Product (GDP) in 1960, and 20% of GDP in the early seventies, however, as a result of trade liberalization, in actuality these tax revenues do not represent the fifth of GDP.

With the poor results in the economic growth of Mexico, has been restricted productive activity and the creation and formalization of employment, the development of businesses and professionals, creating minor conditions to increase the taxable capacity of economic agents, reducing extreme poverty and the tendency of high inequality in income distribution is becoming longer.

3. Conclusions

Unlike what happens in developed countries, using fiscal policy to mitigate the pressures of the economic cycle, in Mexico, the pro-cyclical tax remains in force since its inception in the early 80's, just as they start applied the suggestions of the "Washington Consensus." Without prejudice, it is encouraging to decreased spending and sell public companies, without implying an increase in productive spending (capital).

Moreover, since the international financial crisis in 2008, Mexico, citizens, companies and especially the public sector have failed to recover, even when have shown greater resilience against adverse international context. In this sense, after less growth since 2009, with all that there was a recovery with low inflation and balanced fiscal accounts, the economic and financial situation in Mexico has remained until today, but you can not project for coming years to continue containing the spending public productive.

In summary, progress in the past decade were interrupted by the crisis in 2008, whose persistence has slowed progress toward the goals of economic development. Although the measures implemented in 2009 helped boost growth, with a view to have a positive incentive effect of the strategic sectors of the economy while generating more jobs, our country must continue to confront the high informality, reduced productivity and low income affecting a high percentage of the working population without access to quality jobs and social protection, or the encouragement of the productive sectors.

In this sense, rises the less ability to pay, and therefore the very low revenue capacity for the Mexican State, hence, there is an awareness that the reality facing Mexico, following the recent international crisis (2008-2009) is adversity, this requires several policy responses.

Regarding fiscal policy, it is essential to reconsider the results that the country has had on public finances and economic growth in the last thirty years.

It is from this reflection that as development actors slated should to participate: governments, financial institutions, multilateral institutions, analysts, academics and society as a whole, with the aim to refine policies of greater economic and financial scope to cushion future economic crisis, and to do this we need more progressive outlook and the fiscal policies, allowing incentives and raise aggregate fiscal capacity of the Mexican state demand.

In studies that have been conducted on the growth, a reduced economic capacity for the workers, professionals and entrepreneurs suggested, fosters a low rate of private savings, which would be a major growth impediment a particular country, then the stance of fiscal policy should be on changes in the tax system to promote increased savings rates. This can be achieved only by increasing the taxable capacity of economic agents, thereby fostering the restoration of the public sector.

After the failure of neoliberal policies on growth and development in emerging countries has begun to mention the need to implement economic policies against cyclical and progressive; since, our country continues to perform with fiscal discipline, the ability of THE fiscal politic, prosecutor for stabilizing the economy shrinks and tends to work pro-cyclically, i.e., to reduce productive public spending, is lost the chance that the government, through a policy of spending directed at employment, lost the industry or the agricultural sector to stabilize the economy.

In this sense, as a measure of the contemporary economy, to restore the public sector is preferable to implement a counter-cyclical policy, which although may incur fiscal deficit could at least ensure the implementation of spending on the productive sector so it is suggested to apply a counter-cyclical policy that seeks ways to increase profitability of private agents (generate taxable capacity) that seeks to solve pressing social needs that can guarantee full employment, and make a surplus in revenue capacity supported government.

Then, we consider that if this measure achieved restore the public sector, the virtuous circle of fiscal policy, which is in the expansion of productive public spending would be generated, since thereby be achieved encourage productive investment and employment and endowing private agents of taxable capacity, and in turn giving the government an area of opportunity to increase their revenue capacity.

Finally, we consider that well worth incurring fiscal deficit, as more productive public spending, given new opportunities to create jobs and further investment, having as a consequence an increase in the strength of economic activity. This would occur, provided it is able to generate taxable capacity in economic agents, which would imply a higher tax collection, which therefore represent greater revenue capacity.

For to promote progressive policies with long term vision is necessary to analyze both the past and the future of the economy, to identify faster and more effective to sustained and inclusive development paths, hence, we need a more dynamic financial activity, that moves at the pace of financial capital, i.e., taxing the entry and exit of international finance capital,

to allow more funding in the short term. The new goal is to raise taxes on international financial capital and not taxing consumption that affects the majority of Mexicans, for Mexico to be more self-sufficient.

So well, the question is Can Mexico follow the same steps similar Central American countries such as Brazil and Argentina? The answer is not obvious, since the capacity of states to raise depends largely on the tax and economic capacity of economic agents, who in the end are those who contribute.

If clear, one of the indicators of revenue capacity of any country, given the proper functioning of its tax administration, but especially for the taxable capacity of economic agents. This indicator appears to be the variable (taxable capacity) more accurate revenue capacity of states. But in times of economic or financial crisis, the tax capacity is affected, and therefore also the revenue capacity of the state.

4. Bibliography

1. Agosín, M., Fernández-Arias, E. and Jaramillo, F. (2009). Growing Pains: Binding Constraints to Productive Investment in Latin America. IADB. Washington. D.C.
2. Comisión Económica para América Latina y el Caribe - CEPAL (2010). La hora de la igualdad: Brechas por cerrar, caminos por abrir. Trigésimo tercer periodo de sesiones de la CEPAL. Brasilia.
3. Comisión Económica para América Latina y el Caribe - CEPAL (2011). Panorama de la gestión pública en América Latina, en la hora de la igualdad, Instituto Latinoamericano y del Caribe de Planificación Económica y Social (ILPES), Naciones Unidad. Santiago de Chile.
4. Comisión Económica para América Latina y el Caribe - CEPAL (2013a). Panorama fiscal de América Latina y el Caribe, reformas tributarias y renovación del pacto fiscal. Naciones Unidas, LC/L.3580. Santiago de Chile.
5. Comisión Económica para América Latina y el Caribe - CEPAL (2013b). Desarrollo sostenible en América Latina y el Caribe Seguimiento de la agenda de las Naciones Unidas para el desarrollo post-2015 y Río+20. Naciones Unidas. Colombia.
6. Ffrench-Davis, R. (2009). Growth Challenges for Latin America: What Has Happened, Why, and How to Reform the Reforms. Commission on Growth and Development. Working Paper, (51).
7. Furtado, C. (1968). Teoría y política del desarrollo económico. Editorial Siglo XXI. México. D.F.
8. Huerta, G.A. (2009). La liberalización económica y la estabilización macroeconómica: modelo fracasado de desarrollo. EconomiaUNAM, 16(18), 89-105.
9. Keynes, J.M. (1945). Teoría General de la Ocupación, el Interés y el Dinero. traducción español del Fondo de Cultura Económica. México DF.
10. Kohli, N., Loser, C. and Sood, A. (2010). Latin America, 2040: Breaking Away from Complacency: An Agenda for Resurgence. SAGE Publications. London. UK.
11. Kong, T. (2007). A Selective Review of Recent Developments in the Economic Growth Literature. Journal of Economic Surveys, 21(1), 1-33.
12. Martner, R., Podestá, A. and González, I. (2013). Políticas fiscales para el crecimiento y la igualdad. CEPAL - Serie Macroeconomía del Desarrollo N° 138. Retrivered 22.10.2013 from enhttp://www.cepal.org/cgibin/getProd.asp?xml=/publicaciones/xml/2/51412/P51412.xml&xsl=/publicaciones/ficha.xsl&base=/publicaciones/top_publicaciones.xsl.
13. Musgrave, R. and Buchanan, J. (1999). Public Finance and Public Choice: Two Contrasting Visions of the State. MIT Press Books. The MIT Press.
14. Myles, G.D. (2009). Economic Growth and the Role of Taxation-Theory. OECD Economics. Department Working Papers, (713).
15. Pagés, C. (2010). The Age of Productivity. Banco Interamericano de Desarrollo (BID). Palgrave Macmillan.
16. Pinto, A. (1965). Concentración del progreso técnico y de sus frutos en el desarrollo de América Latina. Fondo de Cultura Económica enero-marzo. México. D.F. El trimestre económico, 32(125).

17. Prebisch, R. (1950). The Economic Development of Latin America and its Principals Problems. SLA. New York. United Nations.
18. Prebisch, R. (2008). Hacia una Teoría de la Transformación. Revista de la CEPAL, (96), 27-71.
19. Rojas, S.L. (2009). Growing Pains in Latin America. Center for Global Development. Washington. D.C.
20. Sánchez, D.A. (2013). La restauración del sector público para el desarrollo en América Latina. Ponencia presentada en la 4a. Mesa Redonda del CAEC-UAS-272.
21. Stiglitz, J.E. (2010). Financial regulation. Business Day Journal. Retrivered 1.07.2011 from http://www.businessday.co.za/articles/Content.aspx?id=113288 (2 de 3) [01/07/2011 05:46:28 p.m.], 2010.
22. Tanzi, V. (2009). The Role of the State and Public Finance in the Next Generation. In Martner Ricardo (editor). Las finanzas públicas y el pacto fiscal en América Latina. CEPAL–Serie Seminarios y Conferencias, (54).
23. Zettelmeyer, J. (2006). Growth and Reforms in Latin America: A Survey of Facts and Arguments. IMF Working Papers, (06/210).

Samaneh Mohammadi [1]

RELATIONSHIP BETWEEN HUMAN CAPITAL AND ECONOMIC GROWTH EMPHASIZING SOCIALIST AND OIL-PRODUCING COUNTRIES

Abstract

This paper aims to analyze the effect of human capital on economic growth. Linear regression models with ordinary least squares method have been used for the analysis in which the dependent variable of Gross Domestic Product (GDP) per capita growth is decided according to real price and independent variables for human capital are enrollment rate in different education levels and also literacy rate. For control variables, socialist countries and petroleum exporting countries are fed into the regression as dummy variables. The cross-country data of this research are provided and calculated in a sectional manner according to the information and statistics of the World Bank. The results of this research are demonstrative of the positive and statistically meaningful influence of the variables of enrollment rate in secondary schools and literacy level on GDP growth. Countries with socialist backgrounds and petroleum exporting countries also have a positive and meaningful effect on GDP per capita growth.

Keywords

human capital, economic growth, socialism

1. Introduction

Theoretical and experimental studies have shown that human capital resource is also another main source for countries growth rate apart from their physical capital. Human capital includes different attributes like health, knowledge, skill, and other acquired abilities levels, increasing individual productivity and ending in economic growth at a large scale (Mousavi Jahromi, 2000). Adam Smith, the most renowned classical economist believes that education increases people abilities and, in turn, the ability growth calls not only more incomes for the ability owners but also benefits for the society from investigation in them. In Smith's thought, the developed abilities of work force, in fact as a capitalist means, incur increases in the production productivity level (Emadzadeh, 1995). The concept of human capital was first introduced by Schultz in the early 1960's. He won a Nobel prize for his research on education and human capital, better known as the father of human capital. In his eyes, humans acquired abilities are assumed the most important source for productivity growth and economic development. In his studies between 1929 and 1956, he showed that 20 to 40 percent of the US national income was aimed at educational investments (Schultz, 1961). Romer (1986) also divided production agents into physical capital and human capital (work, thought, idea, and knowledge force). He measured the human capital according to the number of education years and the education according to the number of the inventions

[1] Student of Economic Development and Planning , Islamic Azad University, Khomainishahr, Iran, e-mail: Samaneh.mohamadi@iaukhsh.ac.ir

registered in a country. The general concept of Romer analysis is that the human capital level, like education and scientific talent, is in solidarity with the growth rate of income per capita. Psacharopoulos (1986) has conducted comprehensive research in respect of the return rate of education investments in developed and developing countries. His findings resulted in a homogenous pattern of educational returns easily detectable in different places of the world. This pattern is based on that: 1. Developing countries, in comparison to advanced industrial countries, have a relatively higher educational return. 2. The highest rate of the private and social investment return of education is in coincidence with primary education. 3. Men's educational return in primary and higher education is more than women's while women have a higher return in secondary level in comparison. Manikiw, Romer, and Weil (1992) in the article "A Contribution to The Empirics of Economic Growth", first studied the Solo pattern and estimated it for different countries by means of sectional data, then added human capital as one of production agents to the pattern and estimated it for the same countries. In their analysis, work force and capital were used as independent variables. They used the enrollment rate in secondary education as a substitute for human capital and concluded that the human capital variable meaningfully affected the economic growth. Gemmell in his study ''Endogenous Growth, The Solow Model and Human Capital'', has investigated the relationship between human capital and production per capita growth rate. He estimated the MRW model for OECD countries and less-developed countries by means of cross-sectional data during the period of 1960-1985, using students enrollment rate as the human capital variable. The results were indicative that in most of the cases the influence of the secondary and higher education enrollment rate on the production per capita growth rate was statistically meaningful.

Ranis and Stewart (2000) in a study titled, "Dynamic Links Between The Economy and Human Development" look at the mutual relationship between economic growth and human development. It was carried out for 69 developing countries using ordinary least squares method, according to cross-sectional data. They believed that the relationship between economic growth and human development was mutual implying that education could increase economic growth and economic growth paved the path of human development in the society that was demonstrative of a positive and meaningful relationship between economic growth and human development and vice versa. In a word, this study shows that both of these variables could affect each other. Mir Mohammad Sadeghi (1996) in the study, "The Relationship of Education to Economic Growth: A Cross-Country Analysis" estimated the relationship between enrollment rate and Gross National Product (GNP) growth per capita by means of simple linear regression method using sectional data, for 98 countries. In this study, two dummy variables were used for the Organization of the Petroleum Exporting Countries (OPEC) and the East Asian Countries (EAC). The results of this research suggested that the primary and secondary school enrollment rate and GNP growth per capita had a positive and meaningful relationship and the relationship of secondary enrollment rate with economic growth was stronger and its regression better than that of primary enrollment rate. The dummy variable of OPEC changes the intercept of regression downwards in the model and the dummy variable of EAC pulls that upwards. Economic growth and development are among the preliminary and prominent goals of every economic systems, and therefore, the investigation of the factors affecting them is of high importance. The human capital of every country can directly or indirectly affect the economic growth of that country. Economic systems of countries, specially more capitalist or socialist ones, can

also have effects on economic growth. Osipian (2007) in his study Relationship Between Human Capital and Economic Growth in the Former Soviet Union analyzed the role of education in the economic development in the former socialist bloc and the meaningful level of human capital effects on the economic growth per capita in Russia and Ukraine. He used the higher education index with 5-year time lags. All of the independent variables coefficients in this estimation were statistically meaningful and positive. Socialism means the publicization of ownership and its entrustment to the government, thereby arranging a comprehensive economic plan and carrying it out even by force, if necessary (Namazi 2006).

2. Data and analysis method

2.1. Data

In the current study the gross domestic product per capita has been calculated for years 2000-2008 in real price based on the World Bank information and data (2010) . Then, the following method has been used for the calculation of the GDP per capita growth column between the years 2000-2008 (the World Bank, 2010: 396) .

$$\ln Q_i = a + bt \qquad\qquad (1)$$

Where, Q_i = GDP per capita in real price for the ith country, t=time (i.e. 2000-2008 in this study), b= GDP per capita growth rate.

The calculated growth per capita has been used as a dependent variable in the regression. Calculations were made for every country in Eviews program. The number of the countries participated in the estimation of regressions was 109 and 76 according to the availability of information and data. The data regarding the primary and secondary school gross enrollment rates was obtained from the information and statistics of the World Bank (2008) for the year 1991 and the data regarding the higher education gross enrollment were obtained from the information and statistics of the World Bank (2010) for 1994. It should be mentioned that enrollment rates have been used with a time lag. The data regarding the literacy rate variable for year 2000 for 76 countries was derived from the information and statistics of the World Bank (2010). Two dummy variables have also been used in this study. One of them is for the countries with socialist backgrounds (21 countries in equation (2) and 16 countries in equation (3)). These countries have experienced socialist systems in their history any way. The other dummy variable is assigned for the petroleum exporting countries including OPEC and non-OPEC countries (34 countries in equation (2) and 23 countries in equation (3)).

2.2. Analysis Method

In order to measure the human capital in this study, literacy level and enrollment rate indices have been used in two linear regression models with sectional data and ordinary least squares method that are shown as follows:

$$Q_i = \alpha + \beta_1 E_{1i} + \beta_2 E_{2i} + \beta_3 E_{3i} + \beta_4 D_1 + \beta_5 D_2 + u_i \qquad (2)$$

Where, Q_i= GDP per capita growth in real price for the ith country, E_{1i}= primary school gross enrollment rate for the ith country, E_{2i}= secondary school gross enrollment rate for the ith country, E_{3i}=higher education gross enrollment rate for the ith country, D_1= dummy index for countries with socialist background, D_2= dummy index for petroleum exporting countries.

Apart from equation (2) regression equation (3) is also estimated, which is similar to equation (2) with the difference that it uses the literacy rate instead of the enrollment rate.

$$Q_i = a + b_1 L_{1i} + b_2 D_1 + b_3 D_2 + u_i \qquad (3)$$

Where, Q_i= GDP per capita growth in real price for the ith country, L_{1i}= literacy rate among over 15-year-olds in the ith country, D_1= dummy index for countries with socialist experience, D_2= dummy index for petroleum exporting countries.

Given that in many studies based on cross-country data heteroskedasticity problem occurs, in the current study White test has been used, in Eviews program, in order to identify the occurrence of heteroskedasticity, which is one of the methods for heteroskedasticity identification. This test uses a secondary regression in which, in addition to the model variables, the squares and productions of the independent variables are also used and the F-statistic is also extracted. If F-static probability is smaller than 5%, the hypothesis of the non-existence of heteroskedasticity is disproved. This test was run for both of the models that the hypothesis was proved in equations (2) and (3). In other words, the heteroskedasticity problem was not found in any of the equations. In the current study, in addition to the foregoing test, Wald test was also used for the insertion of limitation on the regressions coefficients. In this test, by replacing zero for the coefficient of each variable its presence or its absence is approved. In equations (2) and (3) given the F-statistics and the Wald test result that is below 5%, the hypothesis of the zero equivalence of all the coefficients is disapproved in both of the equations. In other words, the presence of all of the variables in both of the regression equations is approved.

3. Results

The results of this research are represented as two separated descriptive and analytic results in the following.

3.1. Descriptive Results

The descriptive information concerning the under study samples and the coefficients used in equations (2) and (3) have been shown in Table 1.

Variables	Equation(2)				Equation(3)			
	Max	Min	Average	Standard Deviation	Max	Min	Average	Standard Deviation
GDP per capita growth, 2000-2008	15/7	- 1/3	3/55	2/56	15/7	0/2	4/04	2/53
Primary school gross enrollment rate, 1991	131	27	94/08	21/39				
Secondary school gross enrollment rate, 1991	119/5	5/1	62/79	32/14				
Higher education gross enrollment rate, 1994	90	1	21/78	18/64				
Literacy rate, 2000					100	16	80/61	21/10
Dummy variable of socialist countries	1	0	0/19	0/39	1	0	0/21	0/41
dummy variable of petroleum exporting countries	1	0	0/31	0/46	1	0	0/30	0/46

Table 1. The descriptive information of the coefficients used in equations (2) and (3)

As the information in table 1 shows the average of socialist countries is 19 percent in equation (2) and 21 percent in equation (3). The average of petroleum exporting countries is also 31 and 30 percent in equations (2) and (3), respectively. The average of enrollment rate in primary, secondary, and higher education is 94.08, 62.79, and 21.78 percent, respectively, in equation (2) and the average of literacy rate in equation (3) equals 80.61 percent. Also, the average of GDP per capita growth rate during the years 2000-2008 has been calculated 3.55 percent in equation (2) and 4.04 percent in equation (3).

3.2. Analytic Results

The estimation results of equations (2) and (3) have been shown in table 2.

Variables	Estimated coefficients of equation (2)	Estimated coefficients of equation (3)
Primary school gross enrolment rate, 1991	a [- 0/005] b(- 0/456)	
Secondary school gross enrolment rate, 1991	**[0/027] (2/434)	
Higher education gross enrolment rate, 1991	***[- 0/053] (3/143)	
Literacy rate, 2000		* [0/021] (1/695)
Dummy variable of socialist countries	***[3/185] (5/906)	***[3/095] (4/846)
Dummy variable of petroleum exporting countries	** [1/375] (3/039)	* [0/958] (1/786)
R^2	0/371	0/366
Adjusted R^2	0/340	0/340
F-Statistic	***12/160	***13/893
D-W	2/095	1/875
n	109	76
Intercept	** [2/440] (2/655)	* [1/393] (1/438)

***Meaningfulness probability at 1% level, **meaningfulness probability at 5% level, *Meaningfulness probability at 10% level
a- The numbers inside brackets represent the β coefficient for each variable
b- The numbers inside parentheses represent the t-statistic for each variable

Table 2. The estimated results of equations (2) and (3), dependent variable: GDP per capita growth

The estimated results of equation (2) (Table 2) show that the estimated coefficient for the secondary school enrollment rate is positive and statistically meaningful. But, the estimated coefficient for the primary school enrollment rate is not statistically meaningful. In equation (3) (Table 2) the literacy level variable coefficient is positive and statistically meaningful. The dummy variables of the countries with socialist system backgrounds and petroleum exporting countries are also positive and statistically meaningful in both equations (2) and (3). It is mentionable that the negativity of the variable coefficient of the higher education enrollment rate in equation (2) was not expected. The interactions of the independent variables in equations (2) and (3) were also added to the independent variables in other

regressions, however, all of their estimated coefficients were statistically nonmeaningful. The results of this study in terms of the effects of human capital on the economic growth rate are coincident with the studies by Manikiw, Romer, and Weil (1992), Jamal (1995), and Rise and Stewart (2000), in terms of the meaningfulness of the model coefficients. These results also show consistency with MirMohammad Sadeghi's researches (1996) except for about the primary school enrollment rate variable. The coefficient of this variable was statistically meaningful in MirMohammad Sadeghi's research (1996) while it is not meaningful in the present study. Also, the results of the present study are not consistent with Osipian's studies (2007) in terms of the positivity of the higher education enrollment coefficient.

4. Conclusion

Based on the results of this study it could be concluded that the effect of the secondary school enrollment rate and literacy level variables on GDP growth is positive and statistically meaningful. The estimated coefficient for higher education has also become meaningful with minus mark. The estimated coefficient for the primary school enrollment rate is not statistically meaningful. Also, the countries with socialist system backgrounds and the petroleum exporting countries have a positive and meaningful influence on the GDP per capita growth. However, the dummy variable of the countries with socialist background increases the intercept of the estimated regressions more than the dummy variable of the petroleum exporting countries.

5. Bibliography

1. Emadzadeh, M. 1995. Educational Economy. Published In Jahad Daneshgahi Isfahan. 2nd Edition. (In Persian)
2. Gemmall, N. 1995. Endogenous Growth: The Solow Model and Human Capital. Economic of Planning, 28(4): pp. 132-151.
3. Manikiw, N, Romer D, Weil D. 1992. A Contribution to The Empirics of Economic Growth. Quartery Jurnal of Economics, 107(2): pp. 112-128.
4. Mousavi, J. Y. 2000. Development Economy and Planning. Published by Payam Noor University Tehran. (In Persian)
5. Namazi, H. 2006. Economic Systems. Published by Enteshar Tehran. 3rd Edition. (In Persian)
6. Osipian, A. 2007. Human Capital Economic Growth Nexus in The Soviet Blok. Retrieved 06.2010 from http://mpra.ub.uni-muenchen.de/8463/1/mpra-paper-8463.pdf
7. Psacharopoulos, G. 1986. The Educational Composition of The Laber Force: An International Comparision. International Labor Review, 125(3): pp. 561-574.
8. Ranis G, Stewart, F. 2000. Dynamic Links Between The Economy and Human Development. In Policy Matters. Ed Ocampo , Jomo, Sarboland Khan. Published In Association With United Nations.
9. Romer P M. 1986. Increasing Returns and Long Run Growth. Journal of Political Economy, 94(5) 1002-1037.

10. Sadeghi J M. 1996. The Relationship of Education to Economic Growth: A Cross-Country Analysis. Working paper 9617. Cario: Economic Research Forum.
11. Schultz T W 1961. Investment in Human Capital. American Economic Review, 51(1): pp. 1-17.

Daniel Tomić

WHAT INFORMATION TECHNOLOGY MEANT FOR ECONOMIC PROSPERITY OF USA, JAPAN AND GERMANY?

Abstract

Technological progress and economic growth are deep related. It is primarily through technological improvements that humankind has been able to progress to the extent it has since the First Industrial Revolution. Technological advances have displaced existing economic structures and laid down fundaments for new economic forces and opportunities, all of which had a widespread welfare effect. Growth theory indeed assumes that changes in real output and productivity are result of technological shocks within the economy. By focusing on computer and information techonology, using ARIMA models and Beveridge-Nelson univariate decomposition this paper estimates the impact of technological shocks on GDP, GDP per capita and labour productivity growth of three world's strongest economies: USA, Japan and Germany. The paper confirms the thesis that information technology has been the key factor of improved productivity and growth performance of these economies.

1. Introduction

Historical pattern of technological progress strongly suggests that innovations that sprouted from technological developments, which are independent of society initiatives, have been an indispensable part of economic growth of developed countries. These technological improvements displaced existing economic structures and laid down fundaments for new economic forces and opportunities, all of which had a widespread welfare effect. Innovations have long been recognized as one of the key elements of economic development, though some scholars believe that its direct link to the concept of economic growth is rather controversial. Economic historians have stressed the role of technological innovations (together with other important factors such as institutional, political and economic climate, education, lower population growth, as well as efficient investment policy) as an underlying determinant of the process that designs economic growth path (Dosi, Freeman and Fabiani, 1994). Dichotomy between technological changes and technology adoption also explains the persistent productivity difference across countries and time (Gancia and Zilibott, 2009). Developed countries have recognized technology as the dominant factor influencing productivity growth, which enabled them to adequately generate and diffuse new knowledge into productive structures (helping the economic actors on other social levels in much broader sense). As a result, macro and microeconomic coordination, greater productivity and greater consumption were achieved in modern developed societies. In some developed countries, the impact of technological progress on

economic growth has been estimated at 60-70% as compared with other growth factors. Growth theory indeed assumes that changes in real output are result of technological shocks within the economy. These shocks embodied in technological innovations have permanent effect on real output and productivity growth, raising the standard of living over the time as the economy moves to an improved equilibrium point (Falatoon and Safarzadeh, 2006).

For the number of years economists were sceptical about effects of computer and information technology on aggregate productivity and economic growth, however new studies have shown that the surge of productivity (especially in the USA in the 1990s) has been largely the result of the adoption of new technologies (Edwards, 2001). The computer equipment manufacturing industry comprised only 0,30% of USA's value added in the period 1960-2007, but has generated 2,70% of economic growth and 25,0% of productivity growth (Jorgenson, Ho and Samuels, 2010). Since the 1960s and 1970s slogan 'Made in Japan' has been a synonym for high quality and high technology for consumers all around the globe, especially in the field of electronics (Fan and Watanabe, 2006). Germany's tryouts in high technology are as instructive as any lessons learned from that constitute the more closely studied success stories, from Silicon Valley and Route 128 to Japan, Taiwan and South Korea (Siebert and Stolpe, 2001). The so-called 'New Economy' associated with advances in computer, information and communication technology is often related to transformation of economies from industrial to information societies. Good examples include government promotion and regulation of technology development and information industries, information infrastructure, as well as prevailing development of information based talent and cultures. However, some state that the advances made by using these new industries are far from the benefits associated with the two industrial revolutions. Up until the end of the 1980s economists had trouble to distinguish actual benefits from such technologies. The potential of computer, information and communication prospect, however, was made clear in the 1990s. (Šimurina and Tolić, 2008).

This paper analyzes the impact of major technological innovations within the 'Third Industrial Revolution technologies (i.e. computer and information technology) on the real GDP, GDPpc and labour productivity growth of three developed countries (USA, Japan and Germany) by using the data for the years 1950-2013. Data are collected from the Conference Board *Total Economy Database*. The results are an indispensible part of a much larger study conducted by the author thus represents an analytical extent (comparison, reasoning, deliberation, etc.) on the conclusions drawn from Tomić (2012) and Škare and Tomić (2014).

2. Theoretical background and main empirical facts

Technological change is composed of many socio-economic relationships and therefore it is inevitably tied up with historical factors. The objective of this paper is not only to measure the implications of technological innovations on mankind well-being, but to observe and analyze them in a form that will provide distinctive international comparison. While on one hand we have to recognise the fact that though, generally speaking, technological progress increases productivity gains and welfare of people, it is, however, not an easy task to quantify and assess a precise contribution of technological progress; on the other hand, the non-rivalry of technology, as modelled in most of endogenous growth literature, implies that

higher population growth spurs technological change (Kremer, 1993). Thus, technological progress must be observed within economic (output and productivity growth) and social (population growth) domain.

The main question that dwells upon the economists is whether economic growth can be sustained in the long run. If it can then: what determines the long-run growth-rate; in what socio-economic environment can it be fostered; and which economic policy can be used to accelerate it. Naturally, macroeconomic management faces difficult question as to how best to promote rapid and sustainable economic growth in face of depleting non-renewable natural resources. As many scholars point out, advances in technology are the best chance mankind has to overcome the apparent limits to growth. By citing Schumpeter (1934), Sollow (1970), Romer (1990), Aghion and Howit (1992) and many others, Grossman and Helpman (1993) concluded that improvements in technology have been the real force behind perpetually rising standards of living. Technology has been widely identified as contributor to economic growth beginning from the empirical study by Denison in 1967, showing that it has been responsible for over 40% of economic growth in the USA and the UK. Simon Kuznets work (1966) too identifies the significance of technological change i.e. that productivity and economic growth are broadly assigned to technology development (Cypher and Dietz, 2004). Following the Neo-Classical growth models and pioneering work of Robert Solow (1956; 1957) we could conclude that technological change, is indeed expressed in relatively large 'residual factor' (Dosi, Freeman and Fabiani, 1994). But until recently, little progress was made in the formal modelling of technical change itself. As Gancia and Zilibott (2009) point out, despite the obvious importance of technology in explaining modern growth, quantifying the exact contribution of technical progress is not really easy, considering that technological progress is hard to observe and measure directly. New-Growth theory (Romer; 1986; Grossman and Helpman, 1991; Aghion and Howitt, 1992) does attempt to incorporate some measures of technological innovation, however it also provides some limitations on the ways the technology is represented (Dosi, Freeman and Fabiani, 1994). Furthermore, since innovative activity and technological progress have a positive effect on productivity growth, it means that Schumpeterian growth hypothesis which predicts that productivity growth is driven by the levels of research intensity in the economy, in fact holds (Rajabrata, 2011). Following endogenous technological approach some second-generation Schumpeterian growth models were developed (Aghion and Howitt, 1998; Howitt, 1999; Peretto and Smulders, 2002; Ha and Howitt, 2007).

Advancement in computer and information (plus communication) technology, often referred as ICT sector, is regularly labelled as 'Third Industrial Revolution'. Though there is no compelling evidence that these technological improvements constitute the next industrial revolution, its full potential is being revealed and materialised in the lower prices of information technology, reduction in the cost of capital, rapid productivity growth and significant improvement in organisational techniques. From new innovations like software, robotics, biotechnology and nanotechnology to improvements in manufacturing systems, technology has made economies and more efficient and productive (Škare and Tomić, 2014). Computer and information technology has been an important element of growth dynamics of the most of the developed countries in last few decades. Furthermore, computer derived technology became an important element in explaining cross-country income differences. Considering that technological progress is the fundamental force underlying long-run GDP

growth, we can conclude that it can also explain why some countries have been so much more productive than the others (Tomić, 2012). For example, Cypher and Dietz (2004) by following various studies concluded that the level of technological capability of information technology was positively correlated with the pace of economic expansion of OECD countries over the period 1965-1990. The share of GDP devoted to the research and development in the private sector in less developed countries lags far behind what is spent in the OECD developed economies, suggesting that there remains a gap in technological effort and capability between even the highest tier less developed economies and the developed countries. In following pages we conclude that focus on technological entrepreneurship enabled USA to pioneer new technical advances. USA's approach comprised new and tight industrial networks of small and larger firms, research universities, venture capital etc. that concentrated around high-tech districts like Silicon Valley in California and Route 128 around Boston (Florida and Kenney, 1990). Most research suggests that levels of information technology investments by companies did contribute substantially to the increased labour productivity growth in Japan. Jorgenson and Motohashi (2003) point out that the contribution of information technology to economic growth was strikingly similar in the USA and Japan in the second half of 1990s. Several empirical studies have suggested that the research productivity of the German innovation system is much higher in comparison with most European countries (Siebert and Stolpe, 2001). Again, we have to acknowledge that USA and Japan have been exchanging on the first and second place of the annual list of countries with most inventions for a long time, with Germany being always in the top behind these two economic giants.

3. Methodology and data

In order to test effects of technological progress on growth and productivity of selected countries we have applied methodology used by Falatoon and Safarzadeh (2006). Similar methodology was used by Škare and Tomić (2014). Their approach is based on Neo-Classical growth models of Solow (1956) and Swan (1956) who assume that real GDP per unit of labour is a function of capital per unit of labour and technology:

$$Y/N = f(A, K/N) \tag{1}$$

where Y is real GDP, N is labour unit, K is capital input and A is technological improvement. Since growth theory assumes that in equilibrium real GDP of unit of labour grows at the rate of technological growth, it means that with technological innovation of A, at the so-called steady-state, real GDP will grow at the rate of innovation growth ($Á$). If we consider technological innovations as supply shocks which have a permanent effect on the trend of GDP, a decomposition of such variable on its permanent and irregular components could reveal impact of technological improvement on the growth rate of real GDP between two 'path breaking' innovations. As to ensure appropriate decomposition of the deviations of the real GDP growth from its long-run growth into its deviations due to demand shocks and technological improvement within time, Falatoon and Safarzadeh based their modelling on the equation:

$$\acute{Y}_t = \acute{A}_t + \acute{N}_t \tag{2}$$

such that the trait represents the rate of change of the respective variable. If $\acute{Y}^*$ and $\acute{N}^*$ represent potential values, equation (2) can be reformulated to interpret both, deviation of real GDP growth from its long run and growth rate of potential real GDP per unit of growth for effective labour so we get:

$$(\acute{Y}_t^* - \acute{Y}_t) = \alpha\ [\acute{Y}_t^* - (\acute{A}_t + \acute{N}_t^*)] \qquad\qquad (3)$$
$$(\acute{N}_t^* - \acute{N}_t) = (1 - \alpha)\ [\acute{Y}_t^* - (\acute{A}_t + \acute{N}_t^*)] \qquad\qquad (4)$$

Equations (1) and (2) should be interpreted as follows; an increase in the growth rate of technological improvement depending on the value of α will accelerate the rate of real GDP while positively impacting on the rate of growth of real output; but with the time passing by, the excess output gap will become smaller so the effect of the technology shock will eventually fade away, pushing the rate of growth to its long-rung potential (Falatoon and Safarzadeh, 2006).

In order to evaluate the permanent trend in the growth and productivity variables we have to extract conditional expectation of the limiting value of the forecast function derived from ARIMA models, similar to the above mentioned authors. An ARIMA model is appropriate for this kind of analysis since it predicts a value in a response time series as a linear combination of its own past values, past errors (shock or innovations) and current and past values of other time series. Besides, ARIMA procedure provides a comprehensive set of tools for univariate time series model identification, parameter estimation and forecasting, and in that way it offers great flexibility. To identify appropriate ARIMA models we have to recognize its elements p, d and q. Lags of the differenced series in the forecasting equation are called auto-regressive terms (p), lags of the forecast errors are called moving average terms (q), and a time series which needs to be differenced to be made stationary is said to be an integrated version (d) of a stationary series. Based on those elements we can estimate proper ARIMA model. In the literature on trend/cycle decomposition, Beveridge and Nelson (BN) approach was recognized as a model based method for decomposing a univariate or multivariate time series into permanent and transitory components. Beveridge and Nelson (1981) showed how to decompose ARIMA ($p,1,q$) i.e. proposed a definition of the permanent component of an $I(1)$ time series y_t with drift μ as the limiting forecast as horizon goes to infinity, adjusted for the mean rate of growth over the forecast horizon,

$$TD_t + BN_t = \lim_{h\to\infty} y_{t+h/t} - \delta h \qquad\qquad (5)$$

where TD_t represents deterministic trend. The stochastic part of permanent component (7), BN_t is referred as the BN trend. The implied cycle (C) at the time t is then

$$C_t = y_t - TD_t - BN_t \qquad\qquad (6)$$

so Beveridge and Nelson suggested that if $\varDelta y_t$ has Wold representation $\varDelta y_t = \delta + \psi^*(L)\varepsilon_t$ then BN_t follows a pure random walk without drift (Zivot, 2005, pp. 5):

$$BN_t = BN_t{-}1 + \psi^*(1)\varepsilon_t \qquad\qquad (7)$$

To conclude, the long-horizon conditional forecast used to calculate the BN trend corresponds to an estimate of the permanent component of an integrated time series. This forecast will be different at each period as additional information becomes available.

Data on growth and productivity variables (real GDP, real GDPpc, real labour productivity (LP) per person and per hour) for mentioned countries has been collected from the Conference Board *Total Economy Database* for the period 1950-2013. Variables are converted to 2013 price level with 2005 EKS PPPs in order to obtain real category. Data span is chosen based on the assumption that commercial usage of computer and subsequent technologies started immediately after the II World War. Likewise Falatoon and Safarzadeh (2006), we also divided the sample periods into sub-periods based on the major technological improvements in computer and subsequent industries over the last 60 years, with classification being selected by the *rule-of-thumb*. In order to evaluate trend perspective, we estimated growth rates for all the variables and for all sub-periods. To estimate adequate ARIMA models we performed logarithmic transformation on the variables and tested the presence of a unit root. For this purpose we used Augmented Dickey Fuller test (1979), Phillips-Perron test (1988) and Kwiatkowski-Phillips-Schmidt-Shin test (1992). Generally (though with some exceptions), all tests confirmed the presence of unit root for all the variables and for all the countries in a whole and in its sub-periods. Graphical displays of the observed variables also suggest that they are not stationary in levels. In conclusion, variables reveal a non-stationary behaviour. This means that we have to apply appropriate degree of integration before we run ARIMA models.

Now that we know all the characteristics of our variables, we can estimate ARIMA models for all the countries. Due to several facts (small sample, loss of degrees of freedom, similar results in whole period and when divided in sub-periods), ARIMA models were estimated for a whole period and then divided into its sub-periods (as growth rates). The model selection was based on Schwartz Bayesian Criterion being the most restrictive one. For each model we checked for serial correlation in residuals. ARCH tests indicated no problem of autocorrelation and there were no problems of normality in residuals. Since all the variables had to be differenced in order to obtain stationarity and we wanted to gain some flexibility in moving average terms so we can filter out the noise and more accurately estimate local mean, ARIMA (1,1,1) models were estimated for all the countries[1]. The permanent trend in the variable (as a measure of economic prosperity impact of technological progress) was presented as the conditional expectation of the limiting value of the forecast function derived from the obtained ARIMA models. For each sub-period growth rates were calculated so that the economic prosperity impact of innovation could be measured as a geometric mean[2] of the permanent trend component of the decomposed series for that sub-period. Systematisation of the results by the country can be found in the Appendix[3].

---

[1] Except for the USA when assessing the lnGDP: ARIMA (1,1,2) and lnGDPpc: ARIMA (2,1,1).
[2] Geometric mean is an important tool for calculating portfolio performance for many reasons, but one of the most significant is it takes into account the effects of compounding.
[3] For detailed insight into data analysis, tests and results please contact the author.

4. Economic growth and the ICT

Since the adaptation of new technologies, ICT is being credited for relatively strong acceleration in productivity and output growth in the USA, Japan and Germany. Producers and users of computers, semiconductors and other ICT equipment have been making sizeable efficiency gains, boosting aggregate total factor productivity growth. That has happened in the period when many other developed industrial economies have not experienced a pickup in productivity growth (Gust and Marquez, 2002). Namely the delay in the adaptation of new high-tech principles in those countries was translated into slower output and productivity growth in comparison to these three economic pillars. During the observed period, inclined by the commercial usage of computer and subsequent industries, average GDP growth was well over 3% and average GDPpc growth above 2%. After the II World War, Japan had an incredible growth path (in average GDP growth 4,80%, GDPpc growth 4,06%) whereat Computer and information related industries contributed the most to the positive co-movements of other economic indicators (aggregate income effect, investment, research and development, employment etc.). Therefore, Japan had benefited the most from these industries. Interestingly, Computer and subsequent industries had a stronger long-term impact effect on the European economies, than on the US economy. We also evaluated the effects of the increase in labour productivity over the observed period (which was followed by the fall in hours engaged in the production process). Labour productivity increase per person and per hour was ranging from 1,68% to 1,87% in the USA, from 3,80% to 4,11% in Japan and from 2,61% to 3,54% in Germany. However, we must not ignore the fact that there has been a slowdown in growth and productivity since 1970s due to a decrease in the rate of technological development. Labour productivity per hour and per person (as well as total employment) grew, however hours employed in production fell substantially which also contributed to that fact. This is especially noticeable in Japan and Germany where both real output and productivity growth was falling over the years. The proximate reason for the decline in the rate of technological development can be found in a decline in fertility of R&D and limited reach of technological improvements in the service sector (Blanchard, 2003). This statement is not so much true for the US that relied on the role of regulatory practices in influencing the diffusion of ICT. As Gust and Marquez (2002) noticed, European countries and Japan have participated in recent wave of invention and innovation thus having full access to the newer technologies. However, they have arguably been slower in applying them due to relatively inflexible and more costly labour markets. The decline of growth rates can be seen in *Figure 1*, pointing slowdown in labour productivity in Japan, relative deceleration of output and productivity growth rates in Germany and stable dynamics in the USA. Non-the-less, ICT sector proved to be an important source of new growth paths.
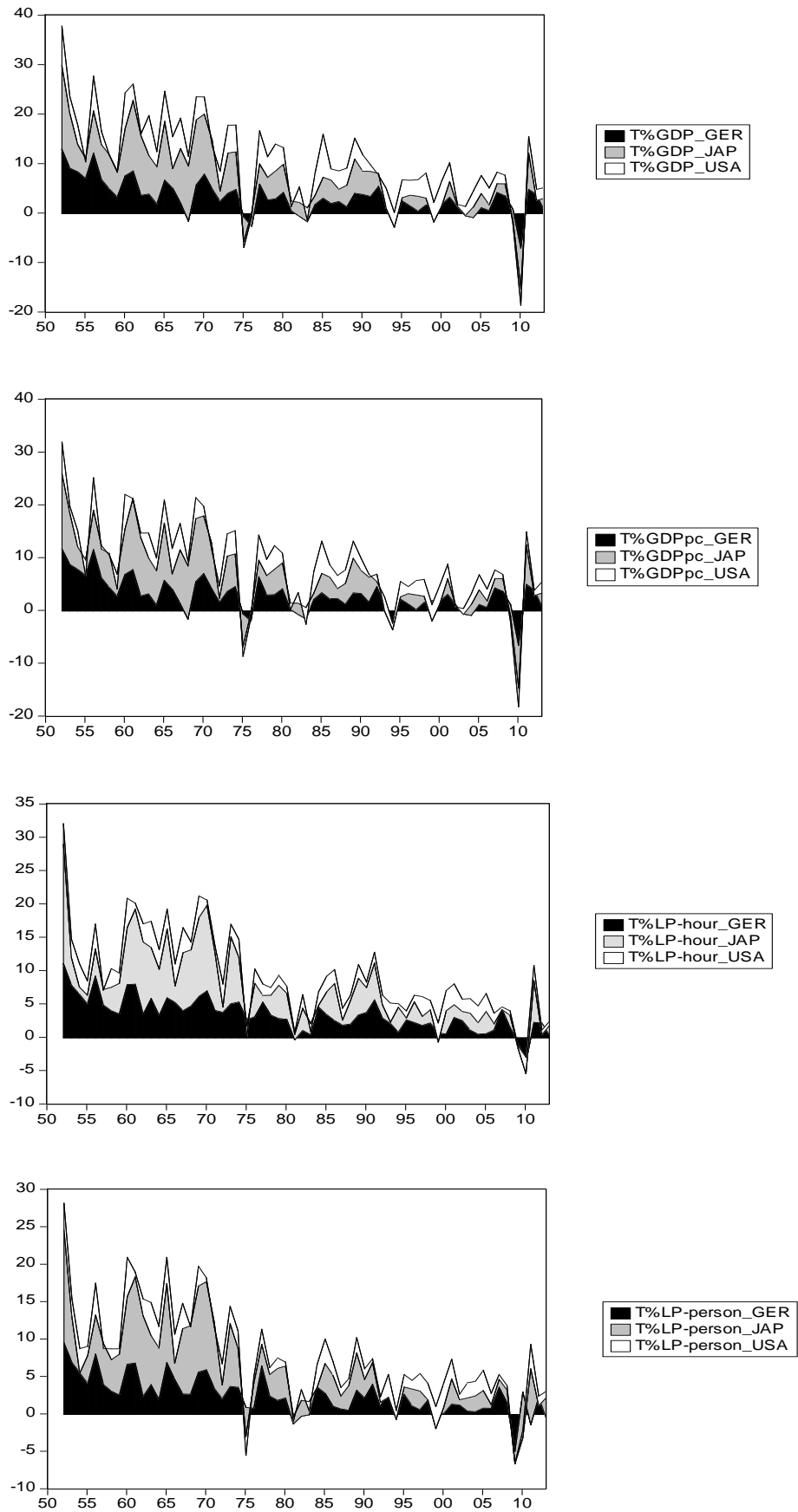
Figure 1. *Real output and productivity growth due to technological progress*
Source: Author's calculations

Results suggest that the technological progress in main innovation industries was the highest contributing part of the long-run growth of GDP and GDPpc, as well of labour productivity in the observed period. The industry that gave the highest relative contribution to the average output growth in the 20th century was the Computer industry with an average GDP growth rate of 3,51%, average GDPpc growth of 2,09,%, LP per person growth of 2,15% and LP per hour of 2,45% for the USA (estimated by technological improvements), meaning that technological progress of that industry was in fact entirely integrated in improved standard of living. This was even more so true for Germany (average GDP growth rate of 5,62%, average GDPpc growth of 4,99,%, LP per person growth of 4,52% and LP per hour of 5,55%) and especially Japan (average GDP growth rate of 8,62%, average GDPpc growth of 7,54,%, LP per person growth of 6,95% and LP per hour of 6,64%). Subsequent industries, closely related to the Computer Industry, likewise showed significant influence. Together, their average and cumulative impact effect on the GDP growth within technological domain was 3,06% and 9,16% for USA, 4,50% and 13,49% for Japan, and 3,08% and 9,24% for Germany. Interestingly, we find weak correlation between GDP and productivity growth rates among these countries over the time and variables, meaning that the growth paths were piebald (see *Table 3*).

The contribution of new technologies to GDP and productivity growth in Japan conspicuously increased up until the 1980s, but then dramatically decreased in the 1990s. Though it played essential role in sustaining growth, in the 1990s technological progress made a marginal contribution to the economy (Fan and Watanabe, 2006), as Japan entered its post-bubble and economic recession period as its growth rate dropped to around 1% in the period 1990-2013. Despite that fact, Japan's success in exporting high-tech products has been impressive. There are few basic reasons why Japan was so powerful in ICT development: (1) patent system was designed to promote technological catch-up and diffusion through incremental innovation, (2) large companies are active in multiple high-tech industries, (3) close internal linkages between innovation and manufacturing i.e. strong technological synergy and (4) important role of government in promoting technological capability and capacity. Many scholars have attributed the strong economic performance of the USA in the 1900s and 2000s to intense productivity growth. Most of studies support the view that the productivity gains after 1990 were linked to ICT developments, although this effect was somewhat weaker than in earlier period when GDP and productivity growth was much higher. Established climate of entrepreneurship plus development of technological and managerial talent, networks of new small and some old larger firms as well as research facilities enabled works, firms and business complexes to respond quickly to ever changing market conditions which generated a constant flow of innovations putting USA in such manner in the centre of technological advances that provided stable output and productivity growth over time. Germany on the other hand remained content with maintaining comparative advantages in its traditional industries - engineering based in the after war period with growth rates exceeding 5%, both in real GDP and labour productivity. As new development opportunities concentrated around high-tech sectors, Germany as a country endowed with capital and skilled labour force (scientists, researchers, engineers, etc.) needed to focus on the new scope: diffusion of ICT knowledge and equipment from public sector to private industry and back. As Lehrer (2000) pointed, reorientation of the German economy towards high-tech has come to be widely regarded as a condition *sine qua non* for prosperity, economic growth and even the preservation of its traditional industries. The results showed up quickly in the

WHAT INFORMATION TECHNOLOGY MEANT FOR ECONOMIC PROSPERITY OF USA, JAPAN AND GERMANY?

95

patent statistics, favourable conditions for high-tech entrepreneurship which was harmonized with competitiveness in the traditional industries and followed with reallocation of major resources from old industries to new ones and so on. Furthermore, Siebert and Stolpe (2001) argue that not only German, but European income elasticity as well, in relation to employment of additional R&D scientists and engineers is high, if employed in Germany, because the technological innovation in Germany tends to create the maximum knowledge spill-over effect for other European economies. Indeed, Germany has fully participated in the upsurge of patenting since the mid-1990s. We can conclude that technological progress by all main contributing (computer and subsequent) industries assured permanent welfare effect that generated political, social and economic power of the USA, Japan and Germany worldwide. These countries developed certain line of technological advancement by investing in complementary inputs such as knowledge, science and research that contributed over the time to each country's specific capability to effectively facilitate growth. Thus we agree with Cypher and Dietz (2004) in their conclusion that precisely these areas of social investment that can spell the difference between successful and failed development and are the necessary precondition for future economic prosperity.

5. Beyond conclusion

The significance of technological improvement to economic growth and development has been empirically verified over and over again. Each theoretical model, even the neoclassical growth model, has confirmed that basic factor of production cannot explain all of economic growth and that the 'residual' which often constitutes technology is the factor that can explain the differing development paths of nations. Technological advancement reduces costs and increase productive efficiency and thus rejects the Malthusian thesis of deprivation and hunger. Therein, we have showed that technological progress in the observed period was in fact entirely incorporated in the improved living standard of selected countries, thereby having enormous welfare effect which conceptually has designed subsequent growth. But technological change was a historically ephemeral event which went through the phase of discovery, implementation and obsolescence. Having that in mind, we can be sure that a new maiden technology will soon arise as a part of new post-modern period of economic growth.

6. Bibliography

Beveridge, S., Nelson, C. R. (1981). A new approach to the decomposition of economic time series into permanent and transitory components with particular attention to measurement of the business cycle. *Journal of Monetary Economics*, No. 7, pp. 151–174.

Blanchard, O. (2003). Makroekonomija. Mate d.o.o., Zagreb.

Conference Board (2013). *Total Economy Database.* Available at: https://www.conference-board.org/data/economydatabase/.

Cypher, J. M., Dietz, J. L. (2004). *The Process of Economic Development*. Routledge, Taylor and Francis Group, London and New York.

Dosi, G., Freeman, C., Fabiani, S. (1994). *The Process of Economic Development: Introducing Some Stylized Facts and Theories on Technologies, Firms and Institutions*. Oxford University Press.

Edwards, S. (2001). Information Technology and Economic Growth in the Emerging Economies. *University of California*. Available at:
http://www.anderson.ucla.edu/faculty/sebastian.edwards/NewEco_Edwards_new1.pdf.

Falatoon, H., Safarzadeh, M. R. (2006). Technological Innovations and Economic Prosperity: A Time Series Analysis. *RISEC*, Vol. 53, No. 2, pp. 240-248.

Fan, P., Watanabe, C. (2006). Promoting industrial development through technology policy: Lessons from Japan and China. *Technology in Society*, Vol. 28, pp. 303-320.

Florida, R., Kenney, M. (1990). High-technology restructuring in the USA and Japan. Environment and Planning, Vol. 22, pp. 233-252.

Gancia, G., Zilibotti, F. (2009). Technological Change and the Wealth of Nations. Annual *Review of Economics*, Vol. 1, No. 1, pp. 93-120.

Grossman, G. M., Helpman, E. (1993). Endogenous Innovation in the Theory of Growth. *Working Paper No. 4527*, National Bureau of Economic Research.

Jorgenson, D. W., Ho, M., Samuels, J. (2011). Information Technology and U.S. Productivity Growth: Evidence from a Prototype Industry Production Account. *Journal of Productivity Analysis*, Vol. 36, No. 2, pp. 159-175.

Gust, C., Marquez, J. (2002). International Comparison of Productivity Growth: The Role of Information Technology and Regulatory Practices. *International Finance Discussion Papers No. 727*, Board of Governors of the Federal Reserve System.

Jorgenson, D. W., Motohashi, K. (2003). Economic Growth of Japan and the United States in the Information Age. *RIETI Discussion Paper Series 03-E-015*, Research Institute of Economy, Trade and Industry.

Kremer, M. (1993). Population Growth and Technological Change: One Million B.C. to 1990. *The Quarterly Journal of Economics*, Vol. 108, No. 3, pp. 681-716.

Mokyr, J. (2005). Long-term economic growth and the history of technology, in Ph. Aghion and S. Durlauf (eds.). *Handbook of Economic Growth*, pp. 1113-1180. Elsevier.

Rajabrata, B. (2011). Population growth and endogenous technological change: Australian economic growth in the long run. *MPRA Paper No. 30839*, Munich Personal RePEc Archive.

Schumpeter, J. A. (1947). *Capitalism, Socialism and Democracy*, 2nd edition. New York: Harper.

Shanmuganathan, S. (2008). *Modelling Technological Progress and Economic Growth at Wilder Scales*. Available at:
http://www.geoinformatics.org/publications/MODSIM07_ModelingTechs41_Shammuganathan_.pdf.

Siebert, H., Stople, M. (2001). Technology and economic performance in the German economy. *Kiel Working Paper No. 1035*, Kiel Institute of World Economics.

Solow, R. M. (1957). Technical Change and the Aggregate Production Function. *The Review of Economics and Statistics*, Vol. 39, No. 3, pp. 321-320.

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economic*, Vol., 70, No. 1, pp. 65-94.

Šimurina, J., Tolić, I. (2008). Dynamics of the technological progress in economic development. *Economic Research*, Vol. 21, No. 3, pp. 12-24.

Škare, M., Tomić, D. (2014). Examining the Link between Innovation, Productivity and Growth: A Global View. *Amfiteatru Economic Journal*, Vol. 16, No. 36, pp. 606-624.

Tomić, D. (2012). Relationship between Technological Progress and Economic Growth; Historical Overview. *31st International Conference on Organizational Science Development: Quality. Innovation. Future*. Portorož, Slovenia, March 21-23, str. 1290-1299.

Zivot, E. (2005). *Trend-Cycle Decomposition. Lecture Notes on Trend-Cycle decomposition*. Available at: http://faculty.washington.edu/ezivot/econ584/notes/trendcycle.pdf.

Appendix

Table 1. Agregate results

USA	Industry	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1950 - 1972	Computer	3,86	2,35	2,30	2,56	3,51	2,09	2,15	2,45
1973 - 1989	Silicon Chips	3,19	2,19	1,11	1,32	3,20	2,23	1,14	1,33
1990 - 2013	Information	2,46	1,41	1,63	1,72	2,45	1,49	1,64	1,70
Average		**3,17**	**1,98**	**1,68**	**1,87**	**3,06**	**1,93**	**1,64**	**1,83**

JAP	Industry	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1950 - 1972	Computer	9,35	8,14	7,53	7,31	8,62	7,54	6,95	6,64
1973 - 1989	Silicon Chips	3,91	3,07	2,87	3,31	3,82	3,00	2,93	3,41
1990 - 2013	Information	1,13	0,99	1,01	1,71	1,05	0,92	0,96	1,69
Average		**4,80**	**4,06**	**3,80**	**4,11**	**4,50**	**3,82**	**3,61**	**3,91**

GER	Industry	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1950 - 1972	Computer	6,04	5,36	4,79	5,92	5,62	4,99	4,52	5,55
1973 - 1989	Silicon Chips	2,16	2,18	1,97	3,03	2,04	2,09	1,91	2,93
1990 - 2013	Information	1,53	1,37	1,08	1,67	1,58	1,41	1,07	1,70
Average		**3,24**	**2,97**	**2,61**	**3,54**	**3,08**	**2,83**	**2,50**	**3,40**

1 GDP growth, **2** GDPpc growth, **3** LP per person growth, **4** LP per hour growth, **5** GDP growth due to technological progress, **6** GDPpc growth due to technological progress, **7** LP per person growth due to technological progress, **8** LP per hour growth due to technological progress

* average growth rates

** possible slight differences in aggregation due to a rounding-up problem

Source: **Author's calculation. Systematization based on Falatoon and Safarzahed (2006).**

Table 2. Results of ARIMA models

USA
lnGDP ARIMA (1,1,2)

```
        coefficient  std. error  t-ratio   p-value
  ---------------------------------------------------------
  const    0,0310011   0,00333871   9,285   1,61e-020 ***
  phi_1   -0,799968    0,299147    -2,674   0,0075    ***
  theta_1  0,969718    0,300267     3,230   0,0012    ***
  theta_2  0,234266    0,137865     1,699   0,0893    *
```
Mean dependent var   0,030946   S.D. dependent var   0,022351
Mean of innovations -0,000043   S.D. of innovations 0,021708
Log-likelihood   151,8360   Akaike criterion   -293,6719
Schwarz criterion -282,9563   Hannan-Quinn   -289,4574
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,0133012) = 0,908183
Test for normality of residual - with p-value = 0,812486

lnGDPpc ARIMA (2,1,1)

```
        coefficient  std. error  t-ratio   p-value
  ---------------------------------------------------------
  const    0,0199494   0,00110639   18,03   1,11e-072 ***
  phi_1    0,887680    0,0871895    10,18   2,41e-024 ***
```

theta_1   -0,841838   0,137640   -6,116   9,58e-010 ***
theta_2   -0,158162   0,127676   -1,239   0,2154
Mean dependent var   0,019291   S.D. dependent var   0,022116
Mean of innovations 0,001259   S.D. of innovations 0,021240
Log-likelihood   152,4964   Akaike criterion   -294,9929
Schwarz criterion   -284,2772   Hannan-Quinn   -290,7784
Test for normality of residual - with p-value = 0,217295
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,471082) = 0,49249

lnLPperson ARIMA (1,1,1)
         coefficient   std. error   t-ratio   p-value
  ----
 const   0,0172063   0,00243942   7,053   1,75e-012 ***
 phi_1   0,816590   0,215287   3,793   0,0001   ***
 theta_1   -0,716790   0,248260   -2,887   0,0039   ***
Mean dependent var   0,017085   S.D. dependent var   0,013170
Mean of innovations -0,000206   S.D. of innovations 0,012881
Log-likelihood   184,7527   Akaike criterion   -361,5054
Schwarz criterion   -352,9328   Hannan-Quinn   -358,1337
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,386182) = 0,534313
Test for normality of residual - with p-value = 0,329251

lnLPhour ARIMA (1,1,1)
         coefficient   std. error   t-ratio   p-value
  ----
 const   0,0189272   0,00286726   6,601   4,08e-011 ***
 phi_1   0,898841   0,100843   8,913   4,95e-019 ***
 theta_1   -0,752320   0,132178   -5,692   1,26e-08 ***
Mean dependent var   0,018857   S.D. dependent var   0,010674
Mean of innovations -0,000380   S.D. of innovations 0,010106
Log-likelihood   199,9536   Akaike criterion   -391,9071
Schwarz criterion   -383,3346   Hannan-Quinn   -388,5355
Test for normality of residual - with p-value = 0,128183
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,709967) = 0,399455

JAP
lnGDP ARIMA (1,1,1)
         coefficient   std. error   t-ratio   p-value
  ----
 const   0,0501978   0,0244337   2,054   0,0399   **
 phi_1   0,954164   0,0472648   20,19   1,26e-090 ***
 theta_1   -0,547281   0,155980   -3,509   0,0005   ***
Mean dependent var   0,045837   S.D. dependent var   0,040171
Mean of innovations -0,002429   S.D. of innovations 0,024898
Log-likelihood   142,6179   Akaike criterion   -277,2358
Schwarz criterion   -268,6632   Hannan-Quinn   -273,8641
Test for normality of residual - with p-value = 0,00164531
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,190018) = 0,662902

lnGDPpc ARIMA (1,1,1)
         coefficient   std. error   t-ratio   p-value
  ----
 const   0,0426046   0,0189774   2,245   0,0248   **
 phi_1   0,935271   0,0606922   15,41   1,40e-053 ***
 theta_1   -0,533612   0,167429   -3,187   0,0014   ***
Mean dependent var   0,039207   S.D. dependent var   0,036888
Mean of innovations -0,001901   S.D. of innovations 0,024814
Log-likelihood   142,9607   Akaike criterion   -277,9213
Schwarz criterion   -269,3488   Hannan-Quinn   -274,5497

Test for normality of residual - with p-value = 0,00396876
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,264912) = 0,606765

lnLPperson ARIMA (1,1,1)

```
        coefficient  std. error  t-ratio   p-value
  ---------------------------------------------------------
  const    0,0392079   0,0171020    2,293   0,0219   **
  phi_1    0,934035    0,0582016   16,05    5,88e-058 ***
  theta_1  -0,529493   0,162314    -3,262   0,0011   ***
```

Mean dependent var 0,036809 S.D. dependent var 0,033765
Mean of innovations -0,001685 S.D. of innovations 0,022553
Log-likelihood   148,9845 Akaike criterion   -289,9690
Schwarz criterion -281,3965 Hannan-Quinn   -286,5974
Test for normality of residual - with p-value = 0,00913348
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,254406) = 0,613989

lnLPhour ARIMA (1,1,1)

```
        coefficient  std. error  t-ratio    p-value
  ---------------------------------------------------------
  const    0,0429885   0,0149627    2,873   0,0041   ***
  phi_1    0,893557    0,0745403   11,99    4,13e-033 ***
  theta_1  -0,288445   0,160191    -1,801   0,0718   *
```

Mean dependent var 0,039904 S.D. dependent var 0,030923
Mean of innovations -0,001414 S.D. of innovations 0,019772
Log-likelihood   157,2401 Akaike criterion   -306,4801
Schwarz criterion -297,9076 Hannan-Quinn   -303,1085
Test for normality of residual - with p-value = 0,013269
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 3,61074) = 0,0574077

GER

lnGDP ARIMA (1,1,1)

```
        coefficient  std. error  t-ratio   p-value
  ---------------------------------------------------------
  const    0,0412113   0,0246512    1,672   0,0946   *
  phi_1    0,981020    0,0259469   37,81    0,0000   ***
  theta_1  -0,739453   0,0873928   -8,461   2,65e-017 ***
```

Mean dependent var 0,032023 S.D. dependent var 0,029703
Mean of innovations -0,003953 S.D. of innovations 0,022339
Log-likelihood   149,3537 Akaike criterion   -290,7075
Schwarz criterion -282,1349 Hannan-Quinn   -287,3359
Test for normality of residual - with p-value = 0,25527
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 1,00041) = 0,317212

lnGDPpc ARIMA (1,1,1)

```
        coefficient  std. error  t-ratio   p-value
  ---------------------------------------------------------
  const    0,0382826   0,0217035    1,764   0,0778   *
  phi_1    0,979730    0,0273508   35,82    5,23e-281 ***
  theta_1  -0,757927   0,0837825   -9,046   1,48e-019 ***
```

Mean dependent var 0,029253 S.D. dependent var 0,027855
Mean of innovations -0,003805 S.D. of innovations 0,021946
Log-likelihood   150,5353 Akaike criterion   -293,0706
Schwarz criterion -284,4981 Hannan-Quinn   -289,6990
Test for normality of residual - with p-value = 0,416945
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 1,04107) = 0,307573

lnLPperson ARIMA (1,1,1)

```
        coefficient  std. error  t-ratio   p-value
  ---------------------------------------------------------
```

```
 const     0,0292974  0,0201097   1,457   0,1451
 phi_1     0,987377   0,0178799  55,22    0,0000    ***
 theta_1  -0,743160   0,0804514  -9,237   2,53e-020 ***
 Dummy    -0,0439401  0,00901468 -4,874   1,09e-06  ***
```
Mean dependent var 0,025662 S.D. dependent var 0,022588
Mean of innovations -0,002962 S.D. of innovations 0,014410
Log-likelihood   176,7951 Akaike criterion   -343,5901
Schwarz criterion   -332,8744 Hannan-Quinn   -339,3756
Test for normality of residual - with p-value = 0,0560599
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,0021587) = 0,962942

lnLPhour ARIMA (1,1,1)

```
          coefficient  std. error  t-ratio  p-value
  ----------------------------------------------------------
 const     0,0376084  0,0230648   1,631   0,1030
 phi_1     0,987078   0,0184424  53,52    0,0000    ***
 theta_1  -0,674729   0,101086   -6,675   2,48e-011 ***
```
Mean dependent var 0,034473 S.D. dependent var 0,022390
Mean of innovations -0,002618 S.D. of innovations 0,013311
Log-likelihood   181,6775 Akaike criterion   -355,3550
Schwarz criterion   -346,7824 Hannan-Quinn   -351,9834
Test for normality of residual - with p-value = 0,247082
Test for ARCH of order 1 - with p-value = P(Chi-Square(1) > 0,376163) = 0,539664

Source: **Author's calculation.**

Table 3. Correlations between the countries by variables

Correlation	T%GDP_GER	T%GDP_JAP	T%GDP_USA
T%GDP_GER	**1**	0.69	0.48
T%GDP_JAP	0.69	**1**	0.41
T%GDP_USA	0.48	0.41	**1**

Correlation	T%GDPpc_GER	T%GDPpcJAP	T%GDPpc_USA
T%GDPpc_GER	**1**	0.65	0.41
T%GDPpc_JAP	0.65	**1**	0.36
T%GDPpc_USA	0.41	0.36	**1**

Correlation	T%LP-hour_GER	T%LP-hour_JAP	T%LP-hour_USA
T%LP-hour_GER	**1**	0.64	0.35
T%LP-hour_JAP	0.64	**1**	0.29
T%LP-hour_USA	0.35	0.29	**1**

Correlation	T%LP-person_GER	T%LP-person_JAP	T%LP-person_USA
T%LP-person_GER	**1**	0.55	0.40
T%LP-person_JAP	0.55	**1**	0.27
T%LP-person_USA	0.40	0.27	**1**

Source: **Author's calculation.**

INSTRUCTIONS TO AUTHORS

The official language for writing the paper is English. All papers have to be written in .doc or .docx format (MS Office Word 97-2003 or higher). Bibliography must be listed as an autonomous final chapter. Specific units of sources must be numbered and listed in alphabetical order by the author surnames or by the publication title in the event of anonymous authors.

Lenght: Up to 10 pages
Font: Times New Roman
Size: 12
Alignment: both-side
Margins: 2,5 cm all around
Spacing: single

Paper must include:
- ❖ Title
- ❖ Name of Author(s)
- ❖ Author(s) Institution and Institutional Address
- ❖ Author(s) email Address
- ❖ Abstract (Body Text)
- ❖ Keywords (3-5 Keywords in Alphabetical Order)
- ❖ Introduction
- ❖ Chapters
- ❖ Subchapters
- ❖ Conclusion
- ❖ Literature

TITLE OF PAPER
[FONT TIMES NEW ROMAN, SIZE 12, BOLD]

Author 1 Name and surname [font Times New Roman, size 12, bold]
Organisation, Country
Email [font Times New Roman, size 12, italic]

Author 2 Name and surname [font Times New Roman, size 12, bold]
Organisation, Country
Email [font Times New Roman, size 12, italic]

ABSTRACT [font Times New Roman, size 12, italic, bold]
Body text [font Times New Roman, size 10, italic]

Keywords: *Keyword1, Keyword2, Keyword3,... (in Alphabetical order) [font Times New Roman, size 12, italic]*

1 INTRODUCTION [FONT TIMES NEW ROMAN, SIZE 12, BOLD]
Body text goes here [font Times New Roman, size 12]

*****