Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

ABOUT THE JOURNAL

Journal of Business, Economics and Finance (JBEF) is a peer-reviewed, quarterly and publically available journal. The journal aims to provide a research source for all practitioners, policy makers and researchers working in the area of business, economics and finance. The Editor of JBEF invites all manuscripts that include theoretical and/or implementive research on topics related to the interest areas of the Journal.

ABSTRACTING AND INDEXING

CALL FOR PAPERS

The next issue of JBEF will be published in March, 2016.
JBEF wellcomes manuscripts via e-mail.
e-mail: jbef@pressacademia.org
web : www.pressacademia.org/journals/jbef

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

PressAcademia

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

CONTENT

Title and Author/s **Page**

PressAcademia

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

CONTENT

Title and Author/s **Page**

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

VOLATILITY AND BUSINESS CYCLE PROPERTIES OF FOREIGN FINANCIAL AID INTO DEVELOPING COUNTRIES

DOI: 10.17261/Pressacademia.2016116549

Elif Akben-Selcuk[1], Duygu Undeger-Soguktas[2]

[1]Kadir Has University. elif.akben@khas.edu.tr

[2]Bogazici University. duyguundeger@gmail.com

ABSTRACT

The objective of this study is to investigate the volatilities and business cycle characteristics of three components of foreign financial aid into developing countries, namely emergency, program and project aid from the viewpoint of both recipients and donors. Results show that emergency aid inflows are more volatile than both program and project aid in both African and non-African countries and program aid is found to be more volatile than project aid in both subsamples. Although the volatility of total aid inflows is lower than component-wise volatilities, it is still higher than the volatility of GDP for recipient countries. The volatility of donors' total aid outflows is also found to be greater than the volatility of their GDP. Results further showed that total aid is acyclical for the African countries in the sample. The same finding applies to emergency aid, project aid, and program aid. For the non-African countries, project aid inflows were found to be procyclical. Emergency aid and program aid were acyclical while total aid inflows to the countries outside Africa were found to be procyclical/acyclical. The final result that emerged from the analysis is that donors give foreign aid in an acyclical fashion to the recipients in the sample.

Keywords: Foreign financial aid, developing countries, business cycle, volatility

JEL Classification: F35, F40, F44

1. INTRODUCTION

The objective of the present study is to investigate the volatilities and the cyclical behaviors of three components of foreign financial aid (namely emergency, program and project aid) flows into the developing countries from the standpoint of both recipient countries and donor countries. The issue is significant because these empirical characteristics are important in explaining the impact of foreign aid on the welfare of the countries and on their financial and economic development. Although it is well established that high volatility of aid can be very welfare-reducing, not much attention has been paid to the cyclical behavior of foreign aid. Also, the different business cycle characteristics of different aid components have not been analyzed separately in the foreign financial aid literature.

The remainder of the paper is organized as follows. Section 2 provides a review of literature on foreign financial aid. Section 3 discusses the data employed in this study and the methodology. Empirical findings are provided on Section 4. The final section concludes.

2. LITERATURE REVIEW

The majority of the academic studies on foreign aid focused the effect of foreign financial aid levels on the economic growth rates in recipient countries. In terms of their findings, these studies can be grouped into three categories. The first group contains studies which demonstrated a significant positive relationship between foreign financial aid and growth in recipient countries (Dalgaard et al., 2004; Dalgaard & Hansen,

2001; Dayton-Johnson & Hoddinott, 2003; Durbarry et al. 1998; Economides et al., 2008; Gounder, 2001, 2002; Hadjimichael et al., 1995; Hansen & Tarp, 2001; Hudson & Mosley, 2001; Lu & Ram, 2001; Svensson, 1999). In the second group, several researchers claimed that there is no significant relationship between foreign aid levels and growth rates of recipients (Boone, 1994, 1996; Easterly, 1999; Mosley et al., 1987; Singh, 1985). This could be due to the crowding out of private saving and higher public consumption levels caused by foreign aid (Jepma, 1997). Finally, studies in the third group found that several characteristics of recipient countries such as institutional quality, inflation, budget balance or exports, moderate foreign aid-growth relationship (Burnside & Dollar, 2000, 2004; Collier & Dehn, 2001; Collier & Dollar, 2002; Kudlyak, 2002).

The literature also contains studies which argued that it is not the level but the volatility of foreign aid that matters. In one such study, Lensink and Morrissey (2000) found that there is no significant relationship between foreign aid level and growth if uncertainty of aid is controlled for. The authors further demonstrated that uncertainty about foreign aid has a negative impact on growth in recipient countries. The finding that the volatility of foreign aid reduces its benefits for recipients was supported by several other studies including Arellano at al. (2005), Pallage and Robe (2003), Pallage at al., (2004), and Torsvik (2005). Similarly, Gemmell and McGillivray (1998) found that decreases in foreign aid levels caused higher taxes and/or lower public spending in the recipient countries.

Although there is a voluminous literature on foreign aid effectiveness, the cyclical properties of foreign aid received relatively less attention. In their study, Pallage and Robe (2000) investigated the business cycle characteristics of foreign aid for the period between 1969 and 1995. They found that for recipient countries in their sample, aid flows were highly procyclical, meaning that when the economic activity is high in the recipient country, foreign aid inflows are also high. The authors further found that volatility of foreign aid was higher than the volatility of the recipients' GDP, which in turn was more volatile than the donors'. In another study, Hamann and Bulir (2001) examined the volatility and the cyclical behavior of foreign financial aid between 1975-1997 and found that aid is significantly more volatile compared to domestic revenues. They also found that aid is procyclical, and the procyclicality of aid together with high aid volatility tends to reduce welfare in recipient countries. Furthermore, Barrett (2001) examined U.S. food aid and could not find a relationship between food aid and fluctuations in per capita food availability in the recipient country. Later on, Gupta et al. (2004) found that food aid is overwhelmingly acyclical across all regions.

As is clear from the preceding discussion, although there is a large literature on the effectiveness of foreign financial aid, the issue of volatility and cyclical properties of foreign aid flows received relatively less attention. The present study will attempt to complement the literature on the business cycle properties of foreign financial aid.

3. DATA AND METHODOLOGY

The cyclical behavior of various components of foreign aid received by developing countries for the period between 1990 and 2004 is analyzed from the viewpoint of both the recipients and donors. The aid data is obtained from the Organization for Economic Cooperation and Development (OECD) Creditor Reporting System (CRS) database, which is a major source of information on the sectoral and geographical distribution of official development assistance (ODA). As the CRS database has data for the years between 1990 and 2004, the business cycle characteristics of various components of aid is investigated during this period. The recipient countries are chosen according to data availability. Thus, the sample of recipient countries consists of 56 countries, 33 of which are located in Africa. The donors in the sample are chosen from OECD countries that are members of the Development Assistance Committee (DAC). Due to the lack of sufficient data, three of them are excluded from the sample.

Using aggregate aid in examining the cyclicality and volatility of aid is problematic due to the different characteristics of various components of aid. Certain kinds of aid display by definition more volatility than the others, such as emergency aid, which is given in times of disasters. Therefore, a high volatility of aid may be due to a change in the composition of aggregate aid rather than a real volatility in aid flows. Also, a positive correlation among various components of foreign aid may cause a high volatility in the aggregate aid although individual components display low volatility in themselves. To overcome this problem, three major categories

of foreign aid, namely project aid, program aid and emergency aid, are investigated in terms of their volatility and cyclicality. The remaining aid components do not lie in the scope of this paper. The project aid is defined as aid tied to specific investment projects. The program aid is defined as aid given for any purpose. The emergency aid is defined as aid given in times of disasters.

The CRS database comprises data on ODA categorized by the sector of destination of individual aid activities. Aid for social infrastructure, economic infrastructure, agriculture and multi sector are categorized as the project aid. Commodity aid/general program assistance is categorized as the program aid. Emergency assistance is categorized as emergency aid. The aid disbursements in CRS database namely ODA/OA grants, ODA/OA grants like, ODA/OA loan and equity investments are added up in order to get the total ODA figure. The aid data is annual and in current US dollars.

For the recipients' side, annual aid data (for each of the three components) is first converted into per capita terms using population figures obtained from World Development Indicators (WDI) database. Then, per-capita-aid series are deflated using the Implicit Import Deflator (base year is 2000), computed using the data on WDI database. GDP series for recipient countries are also obtained from WDI database and are transformed into constant US dollars in per capita terms using the same technique.

For donors' side, annual aid figures are first converted into local currency using the foreign exchange rates data from OECD Statistical Compendium and then transformed into per capita terms and deflated using the local GDP deflator of each donor retrieved again from OECD Statistical Compendium. Annual GDP data of donors are in current local currency and obtained from OECD Statistical Compendium. GDP series are converted into constant (2000 prices) local currency in per capita terms using the same technique as employed in transforming aid series of donors.

Business cycles are defined as the deviations of output from trend (Kydland & Prescott, 1990; Lucas, 1977). Therefore, when dealing with cyclical properties of foreign aid, aid and GDP series are detrended using the Hodrick and Prescott (1980) filter which extracts the growth component x^g and the cyclical component $x^c = x - x^g$ of any series x, by minimizing the following loss function (Gupta et al., 2004; Pallage & Robe, 2001).

$$\sum_t x_t^{c^2} + \lambda \sum_t \left(\left(x_{t+1}^g - x_t^g \right) - \left(x_t^g - x_{t-1}^g \right) \right)^2$$

The smoothing constant λ is chosen to be 100 which is conventional for annual data. The logarithms of the series are used, as percentage deviations from the trend are of concern.

To find out the cyclical properties of various aid components, the correlations between the cyclical components of aid and GDP are calculated. A negative correlation means that aid flows are countercyclical whereas a positive correlation means aid flows are procyclical. In case of procyclicality, the correlations between the GDP series and aid series shifted backward (aid leads GDP) and forward (aid lags GDP) for one year are also calculated to identify when the highest correlation with the current period appears (Pallage & Robe, 2001).

4. FINDINGS AND DISCUSSIONS

Over the period 1990-2004, the following findings are identified: First, foreign aid components such as project, program and emergency aid are not found to be an important component of recipient countries' income. In Africa, the average fraction of all three components of aid to GDP is 1.92% and outside of Africa this fraction is even smaller, 0.82% (See Table 1).

Donors, on average, give 0.0355% of their GDP as aid (total of project, program and emergency aid) to the recipients in the sample during the period 1990-2004. They give almost half of this amount to African countries. The most generous donor in the sample is Japan who gives on average 0.0955% of its GDP as foreign aid (See Table 2).

According to Table 3, which displays the volatility of cyclical component of GDP, recipient countries' GDP is much more volatile than that of donors. It is also shown that African recipients' GDP volatility is higher than that of the non-African recipients. The volatilities are calculated as the standard deviations of the cyclical components. For the African countries in the sample, the volatility of GDP is 11.1% on the average over the years 1990-2004. For the non-African countries, this figure is 8.4% and for donors it is 1.95% on the average.

Table 4 shows that aid flows (all three components separately) are more volatile than GDP series. The volatility of emergency aid flows on average is 169% for African and 176% for non-African countries. For program aid, the volatility of aid series is 126% for African and 99% for non-African sample on the average. The volatility of project aid on the average is 61% for African and 53% for non-African recipients. Emergency aid is more volatile than both program and project aid in both African and non-African countries as expected, and program aid is found to be more volatile than project aid in both subsamples. For the African subsample, the volatility of aid total of these three components is 65%, which is much lower than the volatilities of emergency and program aid. For non-African recipients in the sample, the same result is obtained. Although the volatility of aid total of all three components is lower than the component-wise volatilities, it is still much higher than the volatility of GDP for both African and non-African subsamples. Average volatility of GDP is 11.1% for African and 8.4% for non-African subsample, whereas average volatility of total aid is 65% and 54% for African and non-African subsamples, respectively.

According to Table 5, the volatility of donors' aid outflows given to the recipients in the sample is 89% on average, which is greater than the volatility of total aid inflows (total of all three components of aid) received by the recipient countries in the sample, which is 65% for African subsample and 54% for the other recipients.

When the correlation between aid total of all three components and African countries' GDP is considered, total aid is found to be procyclical for 12 countries out of 33 (36%), countercyclical for 3 countries (9%) and acyclical for the remaining 18 countries (55%). For half of the countries with procyclicality, aid flows lag the business cycle. No leads are observed for the African sample. In the sample consisting of countries outside Africa, aid is procyclical for 10 out of 23 countries (43%), countercyclical for 3 countries (13%), and acyclical for the remaining 10 countries (43%). For 3 of the countries with procyclicality, aid flows lead the cycle. For 5 countries, aid flows lag the cycle while for 2 of them the highest correlation between aid flows and GDP is contemporaneous (see Table 6).

Table 7 shows that for 28 out of 56 recipient countries in the sample, a significant relationship between emergency aid flows and GDP of the recipient countries is found. For 45% of African recipients (15 out of 33), the cyclical component of emergency aid receipts is positively correlated with the cyclical component of GDP. For 9 of these countries aid flows lag the cycle and for 2 of them aid flows lead the cycle. For the remaining 4 countries, the highest correlation is contemporaneous. Emergency aid is countercyclical for 3% of non-African recipients (1 country) and acyclical for the rest (52%). For 7 out of 23 (30%) non-African recipients, aid is procyclical and leads are observed for 3 of them. Aid is countercyclical for 5 countries (22%) and acyclical for the remaining 11 countries (48%).

When the correlation between program aid inflows and African countries' GDP is considered, program aid is found to be procyclical for 7 countries (21%), countercyclical for 3 countries (9%) and acyclical for the remaining 23 countries (70%). In the sample consisting of countries outside Africa, aid is procyclical for 4 out of 23 countries (17%), countercyclical for 2 countries (9%), and acyclical for the remaining 17 countries (74%).

For 32 out of 56 countries, a significant correlation between project aid receipts and GDP is found. For 39% of African recipients, project aid is procyclical (13 countries). Project aid is countercyclical for 3 of African recipients (9%) and acyclical for 14 of them (42%). On the other hand, for 61% of non-African recipients (14 out of 23 countries) project aid is procyclical. For 2 of these countries outside Africa (9%) project aid is countercyclical and for 7 of them (40%) project aid is acyclical.

According to Table 8 that follows, for 8 out of the 18 donors (44%), the cyclical component of donor GDP is negatively and significantly correlated with the cyclical component of total aid (total of program, project and emergency aid) given to the recipients in the sample, whereas only one donors' aid is found significantly

procyclical (6%). For the remaining 9 donors (50%), a significant relationship between their business cycles and aid given to the recipient countries could not be found.

5. CONCLUSION

In this paper, the cyclical characteristics of various components of foreign aid flows, namely emergency, program and project aid, were examined. Although it is well established that high volatility of aid can be very welfare-reducing, not much attention has been paid to the cyclical behavior of foreign aid. Also, the different business cycle characteristics of different aid components have not been analyzed in the foreign aid literature.

Results showed that all three components of foreign aid inflows to the recipients in the sample demonstrate higher volatility than the recipients' GDP for both African and non-African countries. Although the volatility of aid total of all three components is lower than the component-wise volatilities, it is still much higher than the volatility of GDP for both African and non-African subsamples. According to the empirical evidence presented in this paper, decomposing foreign aid makes sense. Total aid flows demonstrate lower volatility than emergency and program aid flows, and slightly greater volatility than project aid. Therefore, just looking at the variability of aggregate aid may be misleading when determining the empirical characteristics of foreign aid.

The high volatility of project aid inflows, given the high volatility of GDP of the recipients, is disturbing due to the welfare-reducing effects of highly volatile aid. However, the pattern of project aid disbursements can be improved by a higher degree of compliance to the projects' conditions by the recipients. Then the aid disbursements may show a smoother pattern. There are also cases where the recipients have less control such as external shocks to the country. These shocks may temporarily prevent recipients from taking necessary steps to comply with the projects' conditions. Therefore, they lose aid disbursements which are tied to the achievement of specific improvements. However, this problem can be solved by improved project design which allows recipients more flexibility.

Total aid was found to be acyclical for the African countries in the sample. The same finding applies to emergency aid, project aid, and program aid. For the non-African countries, project aid inflows were found to be procyclical. This evidence together with the high volatility indicates that project aid enhances the economic instability in the recipient countries instead of eliminating it. For non-African recipients, emergency aid and program aid were acyclical while total aid inflows were found to be procyclical/acyclical. The final result that emerged from the analysis is that donors give foreign aid in an acyclical fashion to the recipients in the sample. That means that donors' act of disbursing aid and their business cycles do not coincide.

REFERENCES

Arellano, C., Bulir, A., Lane, T., & Lipschitz, L. 2005. "The dynamic implications of foreign aid and its variability". IMF Working Paper No. 05/119. Available at SSRN: http://ssrn.com/abstract=874986

Barrett, C. B. 2001. "Does food aid stabilize food availability?". *Economic Development and Cultural Change, 49*(2), 335-349.

Boone, P. 1994. *The impact of foreign aid on savings and growth*. London School of Economics and Political Science, Centre for Economic Performance.

Boone, P. (1996). "Politics and the effectiveness of foreign aid". *European Economic Review*, *40*(2), 289-329.

Bulir, A., & Hamann, A. J. 2006. *Volatility of development aid: From the frying pan into the fire?* (Vol. 6). International Monetary Fund.

Burnside, C., & Dollar, D. 2000. "Aid, growth, the incentive regime, and poverty reduction". *The World Bank: Structure and Policies*, *3*, 210.

Burnside, C., & Dollar, D. 2004. "Aid, policies, and growth: reply". *American Economic Review*, 94(3), 781-784.

Collier, P., & Dehn, J. 2001. *Aid, shocks, and growth* (Vol. 2688). World Bank Publications.

Collier, P., & Dollar, D. 2002. "Aid allocation and poverty reduction". *European Economic Review*, *46*(8), 1475-1500.

Dalgaard, C. J., Hansen, H., & Tarp, F. 2004. "On the empirics of foreign aid and growth". *The Economic Journal*, *114*(496), F191-F216.

Dalgaard, C. J., & Hansen, H. 2001. "On aid, growth and good policies". *Journal of Development Studies*, *37*(6), 17-41.

Dayton-Johnson, J., & Hoddinott, J. 2003. "Aid, policies, and growth, redux". *Halifax: Department of Economics, Dalhousie University. Mimeo*.

Durbarry, R., Gemmell, N., & Greenaway, D. 1998. *New evidence on the impact of foreign aid on economic growth*. Centre for Research in Economic Development and International Trade, University of Nottingham.

Easterly, W. 1999. "The ghost of financing gap: testing the growth model used in the international financial institutions". *Journal of Development Economics*, *60*(2), 423-438.

Economides, G., Kalyvitis, S., & Philippopoulos, A. 2008. "Does foreign aid distort incentives and hurt growth? Theory and evidence from 75 aid-recipient countries". *Public Choice*, *134*(3-4), 463-488.

Gemmell, N., & McGillivray, M. 1998. *Aid and tax instability and the government budget constraint in developing countries*. Centre for Research in Economic Development and International Trade, University of Nottingham.

Gounder, R. 2001. "Aid-growth nexus: empirical evidence from Fiji". *Applied Economics*, *33*(8), 1009-1019.

Gounder, R. 2002. "Political and economic freedom, fiscal policy, and growth nexus: some empirical results for Fiji". *Contemporary Economic Policy*, *20*(3), 234-245.

Ghura, D., Mühleisen, M., & Nord, R. 1995. *Sub-Saharan Africa: growth, savings, and investment, 1986-93* (Vol. 118). International Monetary Fund.

Gupta, S., Clements, B., & Tiongson, E. R. 2004. "Foreign aid and consumption smoothing: evidence from global food aid". *Review of Development Economics*, *8*(3), 379-390.

Hamann, M. A. J., & Bulir, M. A. 2001. *How volatile and unpredictable are aid flows, and what are the policy implications?* (No. 1-167). International Monetary Fund.

Hansen, H., & Tarp, F. 2001. "Aid and growth regressions". *Journal of Development Economics*, *64*(2), 547-570.

Hodrick, R., & Prescott, R. 1980. "Postwar U.S. business cycles: An empirical investigation". Discussion paper no. 451, Carnegie-Mellon University, Pittsburgh, PA.

Hudson, J., & Mosley, P. 2001. "Aid policies and growth: In search of the Holy Grail". *Journal of International Development*, *13*(7), 1023-1038.

Jepma, C. 1997. "On the effectiveness of development aid". *World Bank, unpublished*.

Kudlyak, M. 2002. "Foreign aid and growth: do the transition economies have a different story to tell". *Economic Education and Research Consortium, Ukraine, processed*.

Kydland, F. E., & Prescott, E. C. 1990. "Business cycles: Real facts and a monetary myth". *Quarterly Review, 14*(2), 3-18.

Lensink, R., & Morrissey, O. 2000. "Aid instability as a measure of uncertainty and the positive impact of aid on growth". *The Journal of Development Studies*, *36*(3), 31-49.

Lu, S., & Ram, R. 2001. "Foreign aid, government policies, and economic growth: Further evidence from cross-country panel data for 1970-1993". *Economia Internazionale/International Economics*, *54*(1), 15-29.

Lucas, R. E. 1977. "Understanding business cycles". In *Carnegie-Rochester conference series on public policy* (Vol. 5, pp. 7-29). North-Holland.

Mosley, P., Huson, J., & Horrell, S. 1987. "Aid, the public sector and the market in less developed countries". *Economic Journal, 97*(6), 16-64.

Pallage, S., & Robe, M. A. 2001. "Foreign aid and the business cycle". *Review of International Economics*, *9*(4), 641-672.

Pallage, S., & Robe, M. A. 2003. "On the welfare cost of economic fluctuations in developing countries". *International Economic Review*, *44*(2), 677-698.

Pallage, S., Robe, M. A., & Bérubé, C. 2004. "On the potential of foreign aid as insurance". *Cahier de recherche/Working Paper*, *4*, 04.

Singh, R. D. 1985. "State intervention, foreign economic aid, savings and growth in LDCs: Some recent evidence". *Kyklos*, *38*(2), 216-232.

Svensson, J. 1999." Aid, growth and democracy". *Economics and Politics*, *11*(3), 275-297.

Svensson, J. 2003. "Why conditional aid does not work and what can be done about it?". *Journal of Development Economics*, *70*(2), 381-402.

Torsvik, G. 2005. "Foreign economic aid: should donors cooperate?". *Journal of Development Economics*, *77*(2), 503-515.

APPENDIX

Table 1: Ratio of Foreign Aid Received to Recipient GDP (%)

Recipients (African)		Recipients (Non-African)	
Benin	2.59	Bangladesh	0.70
Botswana	0.40	Bolivia	1.91
Burkina Faso	2.89	Costa Rica	0.16
Burundi	2.27	Dominican Rep.	0.20
Cameroon	1.04	Ecuador	0.39
Cape Verde	3.36	El Salvador	0.78
Chad	1.93	Guatemala	0.47
Congo, DR	0.71	Guyana	2.47
Congo, Rep.	0.67	Haiti	1.08
Cote d'Ivoire	1.01	Honduras	1.33
Egypt	0.79	India	0.28
Gabon	0.44	Indonesia	0.80
Gambia	1.79	Jordan	3.27
Ghana	2.79	Malaysia	0.17
Guinea-Bissau	5.38	Mexico	0.03
Kenya	1.69	Pakistan	0.62
Lesotho	1.82	Panama	0.10
Madagascar	1.22	Paraguay	0.50
Malawi	5.22	Peru	0.43
Mali	3.56	Philippines	0.94
Mauritania	3.10	Sri Lanka	1.74
Mauritius	0.32	Thailand	0.46
Morocco	0.69	Uruguay	0.08
Nigeria	0.12		
Rwanda	3.67		
Senegal	2.36		
Seychelles	0.35		
Sudan	0.55		
Swaziland	0.56		
Tanzania	3.54		
Togo	1.60		
Tunisia	0.88		
Zambia	3.95		
Average	**1.92**	**Average**	**0.82**

Table 2: Ratio of Foreign aid Given to Donor GDP (%)

Donor	Given to African countries	Given to non-African countries	Given to all countries
Australia	0	0.011	0.011
Austria	0.007	0.026	0.032
Belgium	0.02	0.009	0.029
Canada	0.015	0.019	0.034
Denmark	0.023	0.015	0.037
Finland	0.035	0.018	0.053
France	0.038	0.014	0.053
Germany	0.02	0.029	0.048
Ireland	0.011	0.001	0.013
Italy	0.008	0.004	0.012
Japan	0.012	0.084	0.095
Netherlands	0.024	0.02	0.043
New Zealand	0.001	0.002	0.003
Norway	0.025	0.012	0.037
Sweden	0.054	0.036	0.09
Switzerland	0.008	0.006	0.014
United Kingdom	0.011	0.011	0.022
United States	0.005	0.005	0.01
Average	**0.0176**	**0.0179**	**0.0355**

Table 3: Volatility of GDP (%) (donors and recipients)

Donors		Recipients (African)		Recipients (Non-African)	
Australia	4.54	Benin	10.7	Bangladesh	5.9
Austria	1.28	Botswana	3.6	Bolivia	3.1
Belgium	1.18	Burkina Faso	12.0	Costa Rica	4.4
Canada	2.07	Burundi	9.8	Dominican Rep.	10.7
Denmark	1.33	Cameroon	11.3	Ecuador	12.3
Finland	4.11	Cape Verde	2.8	El Salvador	4.5
France	1.45	Chad	18.8	Guatemala	4.3
Germany	1.17	Congo, DR	42.4	Guyana	5.9
Ireland	3.7	Congo, Rep.	18.8	Haiti	18.2
Italy	1.06	Cote d'Ivoire	8.0	Honduras	6.1
Japan	1.1	Egypt	6.5	India	5.6
Netherlands	1.91	Gabon	8.4	Indonesia	16.2
New Zealand	1.74	Gambia	2.5	Jordan	6.8
Norway	1.56	Ghana	13.4	Malaysia	8.8
Sweden	2.44	Guinea Bissau	7.0	Mexico	13.3
Switzerland	1.65	Kenya	9.3	Pakistan	5.2
UK	1.37	Lesotho	5.0	Panama	7.2
US	1.42	Madagascar	11.5	Paraguay	13.3
		Malawi	20.8	Peru	7.1
		Mali	10.8	Philippines	6.6
		Mauritania	7.8	Srilanka	3.8
		Mauritius	2.6	Thailand	10.9
		Morocco	3.7	Uruguay	13.6
		Nigeria	15.7		
		Rwanda	24		
		Senegal	12.8		
		Seychelles	7.2		
		Sudan	16.3		
		Swaziland	3.5		
		Tanzania	10.2		
		Togo	14		
		Tunisia	1.9		
		Zambia	11.8		
Average volatility	**1.95**	**Average volatility**	**11.1**	**Average volatility**	**8.4**

Table 4: Volatility of Aid Inflows to Recipients (%)

Recipients (African)					Recipients (Non-African)				
	Emergency aid	Program aid	Project aid	Total aid		Emergency aid	Program aid	Project aid	Total aid
Benin	195.6	99.6	32.3	43	Bangladesh	185.1	120.3	29.5	34
Botswana	234.8	0.0	53.4	53	Bolivia	102.4	131.8	32.7	31
Burkina Faso	217.1	159.9	161.0	165	Costa Rica	176	96.3	56.7	56
Burundi	137.0	215.7	120.0	107	Dominican Rep.	242.1	43.8	56.1	56
Cameroon	265.8	169.8	38.9	52	Ecuador	184.8	102.2	48.9	49
Cape Verde	73.2	54.7	56.8	35	El Salvador	155.3	44.7	59.9	31
Chad	217.5	79.4	53.1	134	Guatemala	131.1	63.6	28.6	30
Congo, DR	169.0	175.1	106.2	90	Guyana	243.5	101.7	76.8	44
Congo, Rep.	62.8	173.6	95.9	117	Haiti	193.8	62.8	62.8	89
Cote d'Ivoire	233.4	113.9	58.3	60	Honduras	219.4	83.4	31.8	32
Egypt	304.4	180.3	43.4	48	India	118.5	219	29.9	28
Gabon	214.2	241.7	80.1	113	Indonesia	95.6	175.9	28.9	36
Gambia	141.3	84.0	55.8	60	Jordan	57.4	105.9	36.3	60
Ghana	264.8	59.5	25.7	21	Malaysia	104.5	0	97.9	98
Guinea Bissau	96.0	175.6	31.5	30	Mexico	157.9	192.5	97.3	97
Kenya	124.4	154.4	16.7	22	Pakistan	59.3	110	35.8	42
Lesotho	93.3	59.4	46.3	50	Panama	171.4	71.6	160.2	187
Madagascar	185.1	106.4	47.3	55	Paraguay	197.8	0	61.4	61
Malawi	142.8	195.9	38.9	47	Peru	228.2	109.1	37.2	55
Mali	185.9	85.3	57.6	64	Philippines	313.8	52.9	38.3	37
Mauritania	216.9	132.8	27.6	36	Srilanka	203.3	138.8	24.7	19
Mauritius	6.2	3.2	118.7	119	Thailand	184.7	252.9	28.1	29
Morocco	219.5	109.1	22.1	23	Uruguay	332.3	0	49.6	50
Nigeria	305.7	268.9	82.5	63					
Rwanda	99.8	71.5	54.1	65					
Senegal	238.3	160.3	31.5	38					
Seychelles	0.0	168.8	123.5	115					
Sudan	79.6	184.1	93.9	74					
Swaziland	65.0	15.1	31.5	33					
Tanzania	171.8	74.9	29.4	35					
Togo	159.4	117.1	111.0	111					
Tunisia	174.5	134.7	30.1	30					
Zambia	268.8	119.6	30.5	31					
Average volatility	**169**	**126**	**61**	**65**	**Average volatility**	**176**	**99**	**53**	**54**

Table 5: Volatility of Aid Outflows by Donors (%)

Donor	Volatility
Australia	89
Austria	57
Belgium	90
Canada	55
Denmark	266
Finland	98
France	29
Germany	21
Ireland	94
Italy	50
Japan	53
Netherlands	162
New zealand	168
Norway	150
Sweden	29
Switzerland	67
UK	47
US	87
Average	**89**

Table 6: Correlations between Total Aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Benin	0.036		-0.026		-0.5	*	Bangladesh	**0.551**	**	-0.329	*	-0.596	**
Botswana	0.164		**0.401**	*	0.414		Bolivia	-0.378	*	-0.264		-0.283	
Burkina Faso	-0.295		-0.113		0.158		Costa Rica	0.237		-0.185		-0.543	**
Burundi	-0.285		0.129		**0.62**	**	Dominican Rep.	-0.923	***	-0.037		**0.473**	**
Cameroon	0.262		0.103		-0.143		Ecuador	0.244		**0.366**	*	0.128	
Cape Verde	-0.223		0.004		**0.433**	*	El Salvador	-0.119		-0.211		-0.066	
Chad	-0.442	*	-0.268		0.022		Guatemala	0.073		0.109		-0.058	
Congo, DR	0.708	***	**0.78**	***	0.467		Guyana	0.165		-0.305		0.213	
Congo, Rep,	0.11		**0.406**	*	0.056		Haiti	-0.053		**-0.513**	**	-0.293	
Cote d'Ivoire	0.011		-0.045		0.224		Honduras	0.284		0.522	**	**0.738**	***
Egypt	-0.631	**	**-0.815**	***	-0.532		India	0.101		0.103		0.101	
Gabon	0.347		-0.15		-0.715	***	Indonesia	-0.062		-0.155		0.122	
Gambia	0.395		0.465	**	**0.563**	**	Jordan	0.459	**	**-0.549**	**	0.41	
Ghana	0.005		-0.012		-0.195		Malaysia	0.413	*	**0.632**	***	0.627	**
Guinea-Bissau	-0.263		0.055		-0.006		Mexico	-0.721	***	-0.338		0.194	
Kenya	-0.388		**-0.62**	***	-0.642	***	Pakistan	-0.203		0.393		**0.47**	*
Lesotho	0.248		-0.033		-0.27		Panama	-0.512	**	-0.106		**0.368**	*
Madagascar	-0.05		**0.409**	*	-0.133		Paraguay	**0.401**	*	0.16		0.088	
Malawi	-0.174		-0.322		**0.388**	*	Peru	-0.415	*	**-0.563**	**	-0.266	
Mali	-0.228		-0.293		-0.298		Philippines	**0.494**	**	0.059		0.127	
Mauritania	0.405		**-0.666**	**	-0.573	**	Sri Lanka	-0.313		0.222		-0.162	
Mauritius	-0.129		-0.318		-0.038		Thailand	0.189		0.291		**0.337**	*
Morocco	0.347		**0.366**	*	-0.485	**	Uruguay	-0.008		-0.2		-0.635	***
Nigeria	-0.375		0.043		**0.406**	*							
Rwanda	-0.156		0.167		0.293								
Senegal	-0.228		-0.125		0.001								
Seychelles	-0.084		-0.194		-0.243								
Sudan	0.362		0.359		0.224								
Swaziland	-0.058		-0.066		**0.422**	*							
Tanzania	-0.397	*	0.109		0.238								
Togo	-0.099		-0.167		-0.284								
Tunisia	0.578	**	**0.69**	***	0.197								
Zambia	-0.115		-0.003		0.179								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Table 7: Correlations between Individual Aid Components and Recipient GDP

Panel A: Correlations between Emergency Aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Benin	-0.067		-0.069		-0.04		Bangladesh	0.236		**0.471**	*	-0.047	
Botswana	-0.13		0.109		0.063		Bolivia	0.167		0.144		-0.175	
Burkina Faso	-0.26		0.067		**0.541**	**	Costa Rica	0.269		0.196		0.077	
Burundi	-0.145		0.196		**0.385**	*	Dominican Rep.	-0.199		0.141		-0.348	*
Cameroon	0.081		**-0.352**	*	0.112		Ecuador	-0.559		**-0.55**	**	-0.068	
Cape Verde	-0.276		-0.132		-0.15		El Salvador	-0.472		-0.093		-0.285	
Chad	-0.38		-0.52		**0.423**	**	Guatemala	-0.115		-0.034		-0.109	
Congo, DR	0.243		0.329		0.304		Guyana			-0.088		-0.208	
Congo, Rep,	0.037		-0.099		**0.573**	**	Haiti	0.158		-0.027		0.278	
Cote d'Ivoire	**0.381**	*	0.085		-0.35	*	Honduras	0.464		**0.453**	*	0.033	
Egypt	0.274		0.028		-0.095		India	-0.461		0.043		0.258	
Gabon	0.164		-0.095		-0.185		Indonesia	-0.252		**-0.448**	**	-0.1	
Gambia	**0.627**	**	0.193		-0.103		Jordan	-0.076		0.209		0.034	
Ghana	0.159		**0.455**	**	0.061		Malaysia	**0.428**	*	0.2		-0.108	
Guinea-Bissau	0.308		0.102		-0.558	**	Mexico	0.228		**0.377**	*	-0.12	
Kenya	-0.483	*	-0.027		0.128		Pakistan	**0.393**	*	0.169		-0.177	
Lesotho	-0.367	*	-0.06		-0.333		Panama	0.031		**-0.495**	**	0.1	
Madagascar	-0.315		0.074		0.152		Paraguay	-0.716	***	**-0.557**	**	-0.129	
Malawi	-0.344	*	0.058		-0.172		Peru	-0.516	**	**-0.771**	***	-0.37	*
Mali	0.2		**0.699**	***	0.157		Philippines	**0.597**	**	0.595	***	0.442	*
Mauritania	-0.045		-0.098		**0.811**	***	Sri Lanka	0.075		**0.544**	**	0.436	*
Mauritius							Thailand	0.166		-0.159		-0.479	**
Morocco	-0.359	*	-0.19		**0.468**	**	Uruguay	0.031		-0.084		0.173	
Nigeria	-0.125		-0.159		-0.145								
Rwanda	-0.338	*	-0.235		**0.507**	**							
Senegal	0.167		0.085		**0.478**	**							
Seychelles													
Sudan	0.202		**0.597**	*	0.352								
Swaziland	-0.032		-0.032		-0.298								
Tanzania	0.012		-0.235		-0.028								
Togo	0.177		**0.448**	**	0.005								
Tunisia	-0.002		-0.214		**0.501**	**							
Zambia	-0.023		-0.282		0.116								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Panel B: Correlations between Program Aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Benin	0.092		0.172		-0.175		Bangladesh	0.31		-0.191		-0.344	*
Botswana							Bolivia	0.163		-0.129		-0.502	**
Burkina Faso	0.385	*	**-0.47**	**	-0.208		Costa Rica	0.061		-0.218		-0.529	**
Burundi	0.155		0.45	*	**0.862**	***	Dominican Rep.	0.161		0.03		-0.178	
Cameroon	0.077		-0.158		-0.036		Ecuador	-0.367	*	-0.162		-0.014	
Cape Verde	-0.295		-0.222		0.232		El Salvador	-0.24		-0.274		-0.245	**
Chad	-0.047		-0.143		-0.08		Guatemala	-0.043		-0.304		-0.182	
Congo, DR	0.421	*	**0.757**	***	0.705	***	Guyana	0.196		-0.094		0.116	
Congo, Rep,	0.203		-0.026		-0.123		Haiti	-0.145		0.077		0.329	
Cote d'Ivoire	-0.134		-0.252		0.115		Honduras	0.021		-0.243		-0.104	
Egypt	-0.223		**-0.341**	*	-0.028		India	-0.231		**-0.522**	**	-0.106	
Gabon	**0.374**	*	0.192		-0.483	**	Indonesia	0.037		**-0.564**	**	-0.379	*
Gambia	**0.455**	*	0.027		-0.619	***	Jordan	**0.486**	*	-0.409		0.227	
Ghana	-0.107		0.144		-0.285		Malaysia						
Guinea-Bissau	0.076		-0.087		-0.09		Mexico	0.061		0.328		0.172	
Kenya	0.133		0.154		-0.258		Pakistan	-0.124		0.193		**0.397**	*
Lesotho	-0.218		-0.288		0.151		Panama	0.12		-0.08		-0.285	
Madagascar	-0.043		-0.005		0.074		Paraguay						
Malawi	0.327		-0.318		0.142		Peru	-0.149		-0.302		-0.179	
Mali	0.069		**-0.559**	**	-0.216		Philippines	**0.432**	*	-0.182		-0.423	*
Mauritania	0.219		-0.317		-0.383		Sri Lanka	0.154		-0.193		-0.304	
Mauritius	-0.089		-0.221		-0.102		Thailand	-0.123		0.069		**0.364**	*
Morocco	**0.505**	**	0.256		0.084		Uruguay						
Nigeria	-0.374	*	-0.032		**0.608**	**							
Rwanda	0.182		-0.196		-0.389	*							
Senegal	0.08		-0.206		0.228								
Seychelles	**0.439**	*	-0.333	*	-0.211								
Sudan	-0.061		0.16		-0.086								
Swaziland	0.301		-0.32		-0.101								
Tanzania	-0.323		-0.097		0.261								
Togo	0.244		0.269		0.175								
Tunisia	0.077		-0.041		-0.212								
Zambia	0.034		-0.332		-0.276								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Panel C: Correlations between Project aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Recipient	0.26		**-0.362**	*	-0.794	***	Bangladesh	**0.587**	**	-0.313		-0.624	*
Benin	0.18		0.429	*	**0.437**	*	Bolivia	-0.416	*	-0.23		-0.023	
Botswana	-0.318		-0.026		0.164		Costa Rica	0.174		-0.102		-0.423	*
Burkina Faso	-0.294		0.058		**0.511**	**	Dominican Rep.	-0.92	***	-0.034		**0.473**	**
Burundi	**0.439**	*	0.436	*	-0.096		Ecuador	0.212		0.319		0.127	
Cameroon	-0.325		-0.044		0.168		El Salvador	**0.508**	**	0.235		0.16	
Cape Verde	0.062		-0.219		-0.209		Guatemala	0.275		0.269		0.154	
Chad	0.702	***	**0.722**	***	0.456	*	Guyana	0.183		-0.13		**0.488**	*
Congo, DR	0.075		**0.502**	**	0.311		Haiti	**0.463**	*	-0.042		-0.648	***
Congo, Rep,	0.028		0.195		0.327		Honduras	0.133		0.598	**	**0.81**	***
Cote d'Ivoire	-0.455	*	**-0.712**	***	-0.713	***	India	0.235		0.189		0.13	
Egypt	-0.154		-0.31		-0.131		Indonesia	0.316		0.395	*	**0.471**	**
Gabon	0.401	*	0.478	**	**0.622**	***	Jordan	-0.147		0.267		**0.407**	*
Gambia	0.123		0.049		0.159		Malaysia	0.415	*	**0.635**	***	0.624	***
Ghana	0.103		-0.273		0.202		Mexico	-0.721	***	**-0.337**	*	0.194	
Guinea-Bissau	-0.287		**-0.523**	**	-0.623	***	Pakistan	-0.167		**0.519**	**	0.359	
Kenya	0.21		-0.024		-0.301		Panama	-0.61	***	0.361	*	**0.615**	***
Lesotho	-0.098		**0.376**	*	-0.264		Paraguay	**0.4**	*	0.16		0.088	
Madagascar	-0.026		-0.024		0.154		Peru	-0.585	**	**-0.514**	**	0.117	
Malawi	-0.094		-0.038		-0.415	*	Philippines	**0.456**	*	0.078		0.182	
Mali	**0.637**	**	0.346		-0.253		Sri Lanka	-0.223		-0.2		-0.244	
Mauritania	-0.129		-0.318		-0.036		Thailand	0.248		0.361	*	**0.432**	*
Mauritius	0.304		**0.391**	*	-0.536	**	Uruguay	-0.01		-0.2		-0.632	***
Morocco	-0.548	**	-0.248		0.282								
Nigeria	-0.162		**0.391**	*	0.283								
Rwanda	-0.2		0.317		-0.14								
Senegal	0.023		0.222		-0.116								
Seychelles	**0.666**	*	-0.132		-0.294								
Sudan	-0.109		-0.136		**0.397**	*							
Swaziland	-0.405	*	0.216		0.221								
Tanzania	-0.175		-0.171		-0.339								
Togo	**0.739**	***	0.37	*	-0.014								
Tunisia	0,044		0,311		0,323								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Table 8: Contemporaneous Correlation between Total Aid (x) and Donor GDP

Donor	x	
Australia	-0.786	***
Austria	-0.308	
Belgium	0.332	
Canada	-0.805	***
Denmark	0.207	
Finland	0.222	
France	-0.152	
Germany	-0.341	*
Ireland	-0.373	*
Italy	-0.477	**
Japan	0.231	
Netherlands	0.524	**
New Zealand	0.029	
Norway	-0.443	**
Sweden	-0.363	*
Switzerland	-0.223	
United Kingdom	0.186	
United States	-0.514	**

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

STOCHASTIC FRONTIER ANALYSIS OF HOSPITAL EFFICIENCY: DOES THE MODEL SPECIFICATION MATTER?

DOI: 10.17261/Pressacademia.2016116550

Emre Atilgan[1]

[1]Trakya University, Turkey. emreatilgan@trakya.edu.tr

ABSTRACT

In this study, the technical efficiency of outpatient service production of hospitals is analyzed by using the Stochastic Frontier Analysis (SFA) with different model specifications. The purpose of the study is to present the effects of different SFA model specifications on the distribution of efficiency score and/or production function parameter estimates. In the analysis, the data of 429 Turkish MoH hospitals for the years 2012, 2013 and 2014 is used. The results of this paper suggest that different SFA specification, i.e. using Cobb-Douglas or Translog production technology and/or using an error component model or technical efficiency effects model, shifts the production function parameter estimates and the mean efficiency scores. On the other hand, the efficiency scores estimated by different model specifications are found to be highly correlated both in magnitude and rank order.

Keywords : Stochastic Frontier Analysis, Hospital Efficiency, Technical Efficiency, Outpatient Services, Production Function

JEL Classification : D22, D24, I11

1. INTRODUCTION

In recent years, the hospital efficiency analysis has become a popular subject for both researchers and policy makers. Turkey Ministry of Health (MoH) has introduced a new hospital management system in the final leg of the Health Transformation Program (HTP) with new tools for hospital performance assessment. The recent vintage was the enactments of the Public Hospital Associations (PHA), which are basically the regional hospital unions that were announced in 2011 and have been in operation since fall 2012.

This new management model introduced a new performance assessment policy for the PHAs and affiliated hospitals. The Turkish Public Hospitals Institution (PHI), which is the highest institution that rules all the public hospitals, has begun to use a Balanced Score Card approach to assess the managerial performance of the PHAs. In this assessment model, production efficiency scores of hospitals, which are estimated using the Stochastic Frontier Analysis (SFA) became a key factor. The efficiency scores are began to be estimated in four dimensions; that is hospital's outpatient, inpatient, surgery and emergency service productions. With respect to efficiency scores taken from those four different service production, hospital administrators are reviewing contracts or in case of poor performance scores, their contracts are terminated (Atilgan, 2015).

There is a debate in literature that whether the parametric techniques like SFA or the non-parametric techniques like Data Envelopment Analysis (DEA) is appropriate to analyze hospital efficiency. DEA attempts to determine the absolute economic efficiency of organizations against some imposed benchmark, and seeks to evaluate the efficiency of an organization relative to other organizations in the same industry (Worthington, 2004). The ease of implementation of DEA, given its nonparametric basis, substantial freedom is given on the specification of inputs and outputs, the formulation of the production correspondence relating inputs to outputs, and so on (Worthington, 2004), makes the method preferable for the researchers. On the other hand, SFA has an advantage that lies in the fact that it introduces a term representing noise, measurement error, and exogenous shocks beyond the control of the production unit, which is not predictable in DEA. This, in turn,

allows the decomposition of deviations from the efficient frontier into two components, inefficiency and noise. Thus, SFA provides an objective way of determining the best practices by calculating a theoretical best-practice frontier (instead of one based on actual firms, as in DEA) and locating firms with respect to that frontier (Rosko and Mutter, 2008). Besides these advantages, SFA has some drawbacks that it requires more structured information, i.e. information about the production/cost technology, distributional assumptions for inefficiency term etc. and therefore the results of SFA is dependent on model specifications. With this regard, the assessment of PHAs and affiliated hospitals could also be affected by SFA model specification.

In this study, the technical efficiency of outpatient care production of hospitals is analyzed by SFA with different model specifications in order to present the effects of different SFA model specifications on the distribution of efficiency score and/or production function parameter estimates. With the results of the study, it is aimed to suggest a theoretical information for policy makers and researchers on appropriate hospital efficiency assessment.

The rest of the paper is organizes as follows. In the second section a brief literature review on SFA model specification is given. In section three, research design and methods are introduced with the model specifications and the data used in the analysis. In the section four, the results of the estimations are given. Then the paper concludes with discussions.

2. LITERATURE REVIEW

Inefficiency of a firm is determined by the deviations from the firm's production and/or cost frontiers. Econometric measurement of the inefficiency is then related with the estimation of that deviation. The parametric methods developed prior to SFA, like the deterministic model of Aigner and Chu (1968), Winsten's (1957) Adjusted Ordinary Least Squares method, Afriat's (1972) and Richmond's (1974) Adapted Ordinary Least Squares method, associated the inefficiency with all the deviations from the specified production limits. The main shortcoming of these approaches is they assume that the frontier is not affected by random cases. Stochastic Frontier Analysis was developed independently by Aigner et al. (1977) and Meeusen and Van den Broeck (1977) in order to overcome the main shortcoming of previous efficiency estimation methods. The purpose of SFA is to decompose variations from the best practice production/cost frontier into a random or classical error and a deterministic error, which is assumed to represent production/cost inefficiency.

Since the abovementioned pioneer studies of SFA, some other special cases of SFA empirical models are developed. As broadly described by Coelli et al. (2005) and Kumbhakar and Lovell (2000), an SFA empirical model may vary in five major ways: i. choice of cost function, ii. assumptions about the distribution of the composed error, iii. inclusion and exclusion of variables, iv. use of one-stage or two-stage estimation approach, v. use of cross-section or panel estimation technique.

The basic SFA specification, which decompose variations from the best practice production/cost frontier into a random or classical error and inefficiency, is so called as the Error Components (EC) model. The error components model with panel data, i.e. Battese and Coelli (1992) model, is as follows:

$$Y_{it} = X_{it}\beta + (V_{it} - U_{it}) \quad (1)$$

Where $i = 1, \dots n$ represent the ith firm and $t = 1, \dots N$ represents the time, Y_{it} andX_{it} are respectively the output and inputs of the ith firm; β is the unknown parameters. In the Equation (1), V_{it} is the random error assumed to be distributed $V_i \sim iid\ N(0, \sigma_v^2)$ and $U_{it} = U_i \exp(-\eta(t - T)$ represents the inefficiency of the firm where $U_i$are assumed to be distributed as $U_i \sim iid\ N(\mu, \sigma_U^2)$.

The general specification of error component SFA model can be described as special cases by imposing restrictions to the model in Equation (1). Imposing restrictions to the distribution of inefficiency part of the composite error term or/and using panel data are also practicable. The composite error term could be assumed to have a half-normal distribution, gamma (Greene, 1980a, 1980b) and a more general distribution such as the truncated normal (Stevenson, 1980) in SFA studies. The general specification of error component SFA model can be described as special cases by imposing restrictions to the model in Equation (1). By restricting $\eta = 0$, the time invariant models of Battese and Coelli (1988) (balanced panel data) and Battese, Coelli and Colby (1989) (unbalanced panel data) can be obtained. The restriction of $\mu = 0$ with the aforementioned assumptions, gives

the Pitt and Lee (1981) model specification.

The other well-known SFA specification is the Technical Efficiency (TE) effects model of Battese and Coelli (1995), in which both the efficiency scores of the firms and the firm-specific variables which may influence the firms' efficiency scores can be estimated in one-step. The SFA production function of TE effects model is as described in Equation (1). The difference of TE model from EC model is, in TE model the inefficiency term U_{it} is assumed to be distributed as $U_{it} \sim N(m_{it}, \sigma_u^2)$, where $m_{it} = z'_{it}\delta + e_i$ and z'_{it} is a vector of variables which may influence the efficiency of a firm, δ is a vector of parameters to be estimated.

As of now, there are no theoretical reasons for the selection of distributional forms for u. While Coelli et al. (2005) indicate that the truncated normal distribution assumption has a potential to partially alleviate the distribution problem, Rosko (2001) and Rosko and Mutter (2008) both reported that varying assumptions about the distribution of the deterministic error has had little impact on estimated inefficiencies in health care inefficiency literature.

SFA empirical models also vary by production/cost technology definitions. Hospital production efficiency estimation with SFA requires the estimation of the production function, thus the functional form or the technology of the production frontier has to be defined. In the hospital SFA efficiency studies, the production/cost function technology definition range from Homothetic function (Folland and Hofler, 2001), Leontief (Li and Rosenman, 2001), Box-Cox transformed stochastic frontier (Linna, 1998) and Ad-Hoc functions (Chirikos, 1998/1999; Chirikos and Sear, 2000), to more common and mainly used forms like Translog (Chirikos, 1998; Deily et al., 2001; Deily and McKay, 2005,2006; McKay et al., 2002/2003; Rosko, 1999, 2001a, 2001b, 2003; Rosko and Chillingerian, 1999; Rosko and Proenca, 2005; Zuckerman et al., 1994) and Cobb-Douglas (Carey, 2003; Chirikos, 1998; Rosko, 2001a, 2001b; Rosko and Proenca, 2005; Vitaliano and Toren, 1996).

The Cobb-Douglas assumes that all firms had the same production elasticities, the same scale elasticities, and unitary elasticities of substitution, which quite restrictive and for most studies is trying to compare regulated operators (Coelli et al., 2003).Therefore, translog production technology, which characterizes a flexible functional form, is commonly used by the researchers to avoid modeling errors or/and to get flexibility in the specification of input and output relations without having a-priory assumptions (Rosko and Mutter, 2008).

3. DATA AND METHODOLOGY

3.1. Model Specifications

In this study six different SFA models are described to estimate the efficiency hospital outpatient care services. The unrestricted model, i.e. Translog TE Model, is describes as Battese and Coelli (1995) specification. The other models are described by imposing some restrictions to the reference models. The Translog TE model is as follows:

$$lnY_{it} = \alpha_0 + \sum_{i=1}^{4} \alpha_i lnx_{it} + \frac{1}{2}\sum_{i=1}^{4}\sum_{k=1}^{4} \beta_{ik} lnx_{it} lnx_{kt} + \psi_i \mathrm{E}_{ik} + v_{it} - u_{it} \quad (2)$$

Where $i = 1, \dots n$ represent the ith hospital and $t = 1, \dots N$ represents the time, Y_{it} andX_{it} are respectively the output and inputs of the ith firm; β is the unknown parameters.

In the unrestricted CE models defined in this study, V_{it} is the random error assumed to be distributed $V_i \sim iid\ N(0, \sigma_v^2)$ and $U_{it} = U_i \exp(-\eta(t - T)$ represents the inefficiency of the firm where $U_i$are assumed to be distributed as $U_i \sim iid\ N(\mu, \sigma_U^2)$.

In the unrestricted TE models the inefficiency term U_{it} is assumed to be distributed as $U_{it} \sim N(m_{it}, \sigma_u^2)$, where $m_{it} = z'_{it}\delta + e_i$ and z'_{it} is a vector of variables which may influence the efficiency of a firm, δ is a vector of parameters to be estimated.

The other five models are as follows with the restrictions:

- Cobb – Douglas CE-Restricted Model: $\beta_{ik} = 0, \eta = 0, \mu = 0$ and δ=0

- Cobb – Douglas CE-Unrestricted Model: $\beta_{ik} = 0$ and δ=0
- Cobb – Douglas TE Model: : $\beta_{ik} = 0$
- Translog CE-Restricted Model: $\eta = 0$, $\mu = 0$ and δ=0
- Translog CE-Unrestricted Model: δ=0

3.2. Data and Variables

A panel data on 429 acute-care hospitals for the years, 2012, 2013 and 2104 was used and the sample was consisted of only Turkey MoH general hospitals including the teaching hospitals. To ensure the data homogeneity, the hospitals which had incomplete input and output data and those with less than 25 beds were excluded from the sample. The description of the variables used in the models are presented in Table (1) with summary descriptive statistics.

Input and Output Variables

The output variable OUTPAT is the total number of outpatient admissions including emergency service admissions. Four different inputs are used in the models. Three of them represents the labor input used in the hospitals. PHSY is the total number of physicians, including general practitioners, specialist doctors for non-teaching hospitals. Full time employed residents are accounted in PHSY for the teaching hospitals, as the residents also take a part in the production process of the inpatient care services. The other labor input variable ANCI is the total number of ancillary (allied) medical staff. The last labor input variable ADTECH is the total number of the other employees, which consists from administrative and technical staff, including the contracted personnel. The variable BED, being a proxy for capital input, is the total number of the hospital beds.

Control Variables

The inputs used in the hospitals are heterogeneous in terms of quality. In the production functions, two different control variables are used to capture the input quality differences in both of the models. SPEC is the ratio of specialists in total the number of physicians, and TECH is the technology index of the hospital that represents the use of high-tech diagnostics in the hospitals. The index consists of CT, MRI, CT Simulator, SPECT-CT, PET-CT/PET scanners. Any of those scanners presents in a hospital makes a contribution of one point to the index, thus TECH takes the values between 0 – 5 (i.e. if any hospital has all the high-tech diagnostics, then the TECH index value would be 5).

Inefficiency Effects

SFA hospital efficiency studies also aim to estimate the impact of hospital-specific and environmental factors, which are thought to influence the efficiency of production/cost. In this study, eight different inefficiency effects variables - hospital-specific and environmental characteristics mostly beyond the influence of managerial actions- are defined in the stochastic frontier regression models. Three of them are hospital-specific factors and the rest five variables account the effect of hospital environment on the efficiency.

TEACH is a dummy variable for teaching hospitals. ROLE is an index of hospitals defined on the basis of MoH's hospital role classification. In the MoH's hospital classification scheme, general hospitals are classified into E, D, C, B, A2 and A1 groups. The sample of the study does not have any E group hospital. Therefore, the variable ROLE takes to values of 1, 2, 3, 4, and 5 for the hospital role groups D, C, B, A2 and A1 respectively. The last hospital specific efficiency effects variable EMRG is the rate of inpatient admissions from the emergency services. This variable represents the effect of demand uncertainty on the technical efficiency scores. DEVINX is a socio – economic development index of the provinces that hospitals are located, calculated in the study of MoD (2013).

Table 1: Variable Definitions and Summary Statistics

Variable	*Definition*	*Mean*	*S.D.*	*Min.*	*Max.*
Outputs					
OUTPAT	Total number of outpatient admissions.	55372.77	66375.77	518.00	375967.00
Inputs					
PHSY	Total Number of Physicians	86.28	126.73	4.00	872.00
ANCI	Total Number of Ancillary Medical Staff	300.27	349.95	36.00	6670.00
ADTECH	The total number of other employees (Administrative and technical staff, including the contracting out personnel)	291.94	302.66	23.00	1661.00
BED	Total Number of Beds	213.35	227.26	25.00	1480.00
Control Variables					
SPEC	The ratio of specialists in total number of physicians	0.76	0.14	0.17	1.00
TECH	Technology index of the hospital	1.29	1.09	0.00	5.00
Inefficiency Effects					
TEACH	Dummy variable for teaching hospitals	0.11	0.31	0.00	1.00
ROLE	Role Index of Hospital (1-5)	2.79	1.16	1.00	5.00
EMRG	The rate of inpatient admissions from emergency services	0.34	0.12	0.05	0.76
DEVINX	Development index value of hospital location (Province)	0.65	1.51	-1.73	4.52

4. RESULTS

In the models, all the production function variables are expressed in deviations from their sample means for ease of simplicity. This is simply a change in the units of measurement and does not change the underlying data; however, it has the advantage that the estimated first-order parameters in the translog function can now be directly interpreted as estimates of the production elasticities, evaluated at the sample means (Coelli et al., 2003:57-59). The maximum-likelihood estimates of the models are given in Table (2).

Table 2: Model Estimation Results

Variables	Cobb-Douglas			Translog		
	EC Model		TE Model	EC Model		TE Model
	Restricted	Unrestricted		Restricted	Unrestricted	
Const.	0.228*	0.505*	-0.17*	0.285*	0.425*	-0.048
PYSY	0.300*	0.265*	0.49*	0.318*	0.278*	0.470*
ANCI	0.076*	0.107*	0.01	0.137*	0.145*	0.083*
OTHER	0.498*	0.455*	0.48*	0.424*	0.397*	0.442*
BED	-0.061*	-0.004	-0.17*	-0.035	0.012	-0.136*
PYSY*PYSY	-	-	-	0.027	0.001	-0.086
PYSY*ANCI	-	-	-	-0.048	-0.038	0.034
PYSY*OTHER	-	-	-	0.217*	0.224*	0.286*
PYSY*BED	-	-	-	-0.166*	-0.150*	-0.254*
ANCI*ANCI	-	-	-	-0.156*	-0.138*	-0.123
ANCI*OTHER	-	-	-	-0.096	-0.035	-0.058
ANCI*BED	-	-	-	0.313*	0.211*	0.149
OTHER*OTHER	-	-	-	-0.250*	-0.293*	-0.259
OTHER*BED	-	-	-	-0.111	-0.116	-0.065
BED*BED	-	-	-	0.013	0.108	0.180
SPEC	0.268*	0.152*	0.46*	0.229*	0.238*	0.340*
TECH	-0.020*	-0.013*	-0.02	-0.020*	-0.011	-0.019*
Inefficiency Effects						
δ_0	-	-	1.21*	-	-	1.944*
δ_{TEACH}	-	-	2.72	-	-	3.521*
δ_{ROLE}	-	-	-0.70	-	-	-0.966*
δ_{EMRG}	-	-	-2.15	-	-	-5.997*
δ_{DEVINX}	-	-	-0.07	-	-	-0.199*
σ_U^2	0.227*	0.084*	0.24*	0.193*	0.067*	0.379*
$\gamma = \sigma_u^2 / \left(\sigma_u^2 + \sigma_v^2\right)$	0.957*	0.911*	0.88*	0.951*	0.894*	0.919*
Mu (μ)	-	0.553*	-	-	0.490*	-
Eta (η)	-	0.008	-	-	0.035*	-
Log-likelihood	517.105	600.983	112.03	566.014	637.858	146.469
Scale Elasticity $(\epsilon_{Y,X})$	0.813	0.823	0.81	0.844	0.832	0.859

* significant at the 0.05 level

The production function parameter estimates are vary between the models, in both magnitude and significance aspects. All the first order parameters of PHYSY, ANCI and OTHER are found to be positive and significant (p<0.05) in all six different models. The parameter of input BED is found to be negative and/or not significant in the models, implying that Bed is not a well-behaved input or there is an excess BED input usage in the production function. Although the estimates of first order parameters, or the output elasticities of the inputs varies between models, the scale elasticity of production, which is the simply the sum of first order parameter, is found to be similar in all models. The estimated scale elasticities in all models suggest that there is diseconomies of scale or negative returns to scale in outpatient service production of hospitals.

In the Cobb – Douglas TE model all the inefficiency effects variables are not significant. On the other hand all these variables are found to be significant in Translog TE model specification with having same signs compared to Cobb – Douglas TE model. The estimated parameters of the inefficiency effects variables suggest that the efficiency is increases with an increase in hospital ROLE level. The rise in EMRG and DEVINX also contributes hospital efficiency. On the other hand TEACH is negatively associated with efficiency, implying that teaching hospitals are expected to be more inefficient that other hospitals. The variance of inefficiency term of the composite error term (σ_U^2) is found significant in all models. Gamma, ($\gamma = \sigma_u^2/(\sigma_u^2 + \sigma_v^2)$), which shows the ratio of the deviation from frontier caused by inefficiency, is found to be over 90% and significant in all models.

Table (3) presents the distribution of the mean efficiency scores by selected hospital characteristics. The mean efficiency of all sample hospitals are highest in the Translog-TE model. Both in Cobb – Douglas and Translog production technologies, mean efficiency scores are highest in the TE effects model definitions and lowest in unrestricted EC model specifications. This ranking of mean efficiency scores obtained from different models, does not change with the hospital characteristics.

Table 3: Mean Efficiency Estimations by Hospital Characteristics

	Cobb-Douglas			Translog		
	EC Model		TE	EC Model		TE
	Restricted	Unrestricted	Model	Restricted	Unrestricted	Model
All Sample	0.683	0.563	0.862	0.708	0.598	0.881
Teaching Status						
Teaching Hospitals	0.642	0.518	0.753	0.686	0.581	0.805
Other Hospitals	0.688	0.568	0.875	0.710	0.600	0.890
Hospital Capacity (Beds)						
25-99	0.653	0.540	0.850	0.692	0.582	0.881
100-199	0.719	0.601	0.885	0.711	0.609	0.887
200-399	0.723	0.593	0.891	0.727	0.616	0.893
400+	0.670	0.540	0.828	0.722	0.604	0.858
ROLE Group						
A1	0.642	0.518	0.753	0.686	0.581	0.805
A2	0.726	0.594	0.913	0.757	0.638	0.913
B	0.746	0.623	0.900	0.739	0.632	0.899
C	0.655	0.542	0.853	0.679	0.573	0.874
D	0.604	0.487	0.834	0.674	0.558	0.884

Teaching hospitals are found to be more inefficient than other hospitals in all models. This result is also parallel with the findings of inefficiency effect variable TEACH. The most efficient hospitals are found to have a bed capacity in the range of 200-399. The mean efficiency increases from role groups D to B and A2 (which also related with hospital capacity in terms of beds), than decreases in A1 role group which is the group of Teaching hospitals. The results suggest an optimum hospital capacity should be around 200-400 beds in order to have more efficient outpatient care production.

While different model specifications affect the mean efficiency levels of hospitals, these scores are found to be highly correlated regardless of the model used. As presented in the Table (4) and Table (5), both the Pearson and the Spearman rank-order correlations of means efficiency estimates of different models are highly correlated and all the correlations are significant. The highest correlations are obtained between Cobb – Douglas and Translog production technologies when the other restrictions are same, i.e. between Cobb – Douglas-TE vs. Translog-TE or between Cobb – Douglas-EC Restricted vs. Translog-EC Restricted.

Table 4: Pearson Correlation of Efficiency Scores by Different Model Specifications

	Cobb-Douglas Restricted	Cobb-Douglas Unrestricted	Cobb-Douglas TE Effects	Translog Restricted	Translog Unrestricted	Translog TE Effects
Cobb-Douglas Restricted	1.00	,982**	,807**	,951**	,956**	,779**
Cobb-Douglas Unrestricted		1.00	,757**	,927**	,960**	,728**
Cobb-Douglas TE Effects			1.00	,761**	,726**	,955**
Translog Restricted				1.00	,985**	,793**
Translog Unrestricted					1.00	,750**
Translog TE Effects						1.00

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Spearman Rank-Order Correlation of Efficiency Scores by Different Model Specifications

	Cobb-Douglas Restricted	Cobb-Douglas Unrestricted	Cobb-Douglas TE Effects	Translog Restricted	Translog Unrestricted	Translog TE Effects
Cobb-Douglas Restricted	1.000	,995**	,888**	,943**	,953**	,878**
Cobb-Douglas Unrestricted		1.000	,871**	,936**	,954**	,861**
Cobb-Douglas TE Effects			1.000	,824**	,814**	,943**
Translog Restricted				1.000	,994**	,899**
Translog Unrestricted					1.000	,880**
Translog TE Effects						1.000

**. Correlation is significant at the 0.01 level (2-tailed).

5. CONCLUSION

The results of this paper suggest that different SFA production function definitions have various effects on model findings. Firstly, the production function or the frontier parameter estimates are considerably affected by model specifications. In different model specifications, the output elasticities of inputs changes both in magnitude and significance. On the other hand, it is found that different model specifications does not change the embowered production characteristics as regardless of the model specification, the scale elasticities estimates suggest that there exist diseconomies of scale or negative returns to scale in outpatient service production in hospitals. This finding is supported by the analysis of mean efficiency distribution along with different hospital characteristics. The teaching hospitals, which have a greater hospital production capacity in terms of bed (also in terms of other inputs) are found to be less efficient than the other hospitals. The optimal hospital capacity to serve outpatient care is found around 200-399 beds.

The other important finding of this paper shows that SFA model specification also affects the mean efficiency scores of hospitals. On the other hand, these scores are highly correlated with respect to model specifications. Therefore, even the SFA specification changes the estimated efficiency score of a single hospital, the rank of the hospital in term of efficiency is not effected by model definitions.

The results and interpretations of this study is limited within the framework of data set used. The potential weakness of the study is, due to lack of data, output and input variables could not be weighted in terms of case-mix and quality in the analysis. Therefore, the readers should consider the possibility of the results to be biased, before making further comments and statements about these findings.

REFERENCES

Afriat, S.N. 1972, "Efficiency estimation of production functions", *International Economic Review*, 13(3), pp.568–598.

Aigner, D.J. & Chu, S.F. 1968, "On estimating the industry production function", *American Economic Review*, 58(4), pp.826–839.

Aigner, D.J., Lovell, C.A.K. & Schmidt, P. 1977, "Formulation and estimation of stochastic frontier production function models", *Journal of Econometrics*, 6(1), pp.21–37.

Atilgan, E. 2015, "The Technical Efficiency of Outpatient Services In Turkish Public Hospitals: A Stochastic Frontier Estimation", *International Healthcare Management Conference (IHMC)*, Gümüşhane, Turkey (June 2015)

Battese, E. & Coelli, T. J. 1988, "Prediction of firm level technical inefficiencies with a generalized frontier production function and panel data", *Journal of Econometrics*, 38, pp.387-399.

Battese, G. E. & Coelli, T. J. 1992, "Frontier Production Function, technical efficiency and panel data: with application to Paddy Farmers in India", *Journal of Productivity Analysis,* 3, pp.153-169.

Battese, G. E., Coelli, T. J. & Colby, T.C. 1989, "Estimation of Frontier Production Functions and the Efficiencies of Indian Farms Using Panel Data from ICRISAT's Village Level Studies", *Journal of Quantitative Economics*, 5(2), pp.327-48.

Battese, G.E. & Coelli, T. J. 1995, "A model for technical inefficiency effects in a stochastic frontier production function for panel data", *Empirical Economics*, 20, pp.325–332.

Carey, K. 2003, "Hospital cost efficiency and system membership", Inquiry, 40, pp.25-38.

Chirikos, T. & Sear, A. 2000, "Measuring hospital inefficiency: A comparison of two approaches", *Health Services Research*, 34, pp.1389-1408.

Chirikos, T. 1998, "Identifying efficiently and economically operated hospitals: The prospects and pitfalls of applying frontier regression techniques", *Journal of Health Politics, Policy and Law*, 23, pp.879-904.

Chirikos, T. 1998/1999, "Further evidence that hospital production is inefficient". *Inquiry*, 35, pp.408-416.

Coelli, T. J., Estache, A., Perelman, S. & Trujillo, L. 2003, "A primer on efficiency measurement for utilities and transport regulators", *WBI Development Studies.*

Coelli, T. J., Rao, D. S. P., O'Donnell, C. J. & Battese, G. E. 2005, *"An introduction to efficiency and productivity analysis",* Springer Science & Business Media.

Deily, M. & McKay, N. 2005, "Comparing high- and low-performing hospitals using risk-adjusted excess mortality and cost inefficiency", *Health Care Management Review*, 30, pp.347-360.

Deily, M. & McKay, N. 2006, "Cost inefficiency and mortality rates in Florida hospitals", *Health Economics*, 15, pp.419-431.

Deily, M., McKay, N. & Dorner, F. 2001, "Exit and inefficiency: The effects of ownership type", *Journal of Human Resources*, 35, pp.734-747.

Folland, S. & Hofler, R. 2001, "How reliable are hospital efficiency estimates? Exploiting the dual to homothetic production", *Health Economics*, 10, pp.683-698.

Greene, W. H. 1980a, "Maximum likelihood estimation of econometric frontier functions", *Journal of Econometrics,* 13(1), pp.27-56.

Greene, W. H. 1980b, "On the estimation of a flexible frontier production model", *Journal of Econometrics,* 13(1), pp.101-115.

Kumbhakar, S. & Lovell, C. 2000, *"Stochastic Frontier Analysis",* Cambridge: Cambridge University Press.

Li, T. & Rosenman, R. 2001, "Cost efficiency in Washington hospitals: A stochastic frontier approach using panel data", *Health Care Management Science*, 4, pp.73-81.

Linna, M. 1998, "Measuring hospital cost efficiency with panel data models", *Health Economics*, 7 (5), pp.415-427.

McKay, N., Deily, M. & Dorner, F. 2002/2003, "Ownership and changes in hospital inefficiency, 1986-1991", I*NQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 39, pp.388-399.

Meeusen, W. & Van den Broeck, J. 1977, "Efficiency estimation from Cobb-Douglas production functions with composed error", *International Economic Review,* 18(2), pp.435–444.

Pitt, M. M. & Lee, L. F. 1981, "The measurement and sources of technical inefficiency in the Indonesian weaving industry", *Journal of Development Economics*, 9, pp.43-64.

Richmond, J. 1974, "Estimating the Efficiency of Production", *International Economic Review,* 15(2), pp.515–521.

Rosko, M. & Chilingerian, J. 1999, "Estimating hospital inefficiency: Does case mix matter?" *Journal of Medical Systems*, 23, pp.57-71.

Rosko, M. & Mutter, R. 2008, "Stochastic Frontier Analysis of Hospital Inefficiency: A Review of Empirical Issues and an Assessment of Robustness", *Medical Care Research and Review,* 65(2), pp.131–166.

Rosko, M. & Proenca, J. 2005, "Impact of network and system use on hospital X-inefficiency", *Health Care Management Review,* 30, pp.69-79.

Rosko, M. 1999, "Impact of internal and external environmental pressures on hospital inefficiency", *Health Care Management, Science*, 2, pp.64-78.

Rosko, M. 2001a, "Cost efficiency of U.S. hospitals: A stochastic frontier approach", *Health Economics*, 10, pp.539-551. doi: 10.1002/hec.607

Rosko, M. 2001b, "Impact of HMO penetration and other environmental factors on hospital X-inefficiency", *Medical Care Research and Review,* 58, pp.430-454.

Stevenson, R. E. 1980, "Likelihood functions for generalized stochastic frontier estimation", *Journal of Econometrics,* 13(1), pp.57-66.

Vitaliano, D. & Toren, M. 1996, "Hospital cost and efficiency in a regime of stringent regulation", *Eastern Economic Journal*, 22, pp.161-173.

Winsten, C.B. 1957, "Discussion on Mr. Farrell's Paper", *Journal of the Royal Statistical Society: Series A (General)*, 120(3), pp.282–284.

Worthington, A. 2004, "Frontier efficiency measurement in health care: a review of empirical techniques and selected applications", *Medical Care Research and Review*, 61, pp.135-170.

Zuckerman, S., Hadley, J. & Iezzoni, L. 1994, "Measuring hospital efficiency with frontier cost functions", *Journal of Health Economics*, 13, pp.255-280.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

THE IMPACT OF ENTREPRENEURIAL INTENSITY ON JOB STRESS: THE MEDIATING ROLE OF ROLE AMBIGUITY WITH EVIDENCE FROM TOP 1.000 INDUSTRIAL ORGANIZATIONS OF TURKEY

DOI: 10.17261/Pressacademia.2016116550

Gultekin Altuntas[1], Nevzat Demir[2], Aral Noyan[3]

[1]Istanbul University. altuntas@istanbul.edu.tr

[2]Firat Plastics and Rubber Industry Inc. n.demir@firat.com

[3]Istanbul Yeniyuzyil University. aral.noyan@gnail.com

ABSTRACT

There are two principal questions were addressed in this study: (a) Does an entrepreneurial intensity (i.e. degree and frequency of entrepreneurial actions inside an organization) contribute to an individual's level of job stress? (b) Does role ambiguity mediate the effect of entrepreneurial intensity on an individual's level of job stress? The data for the study have been taken from the top 1.000 industrial organizations of Turkey as of 2015, a typical example of an emerging economy. The findings reveal that entrepreneurial intensity (both degree and frequency of entrepreneurship) consistently contributes to lower role ambiguity and an individual's level of job stress. It also demonstrates that role ambiguity positively affects an individual's level of job stress and partially mediates the relationship between the frequency of entrepreneurship and his/her level of job stress. Based on the results, some managerial implications for practice and useful suggestions for future research are set forth

Keywords: Entrepreneurial intensity, role ambiguity, job stress, industrial organizations, Turkey.

JEL Classification: C91, L26, M12

1. INTRODUCTION

Entrepreneurship has been widely associated with and heavily studied with a perspective of the creation of something new or improved (i.e. raw materials, products, services, processes, managerial techniques and technologies or a combination of them) with an allocation of required resources (i.e. of money, time, knowledge, effort, experience) by taking a manageable level of risk (i.e. of financial, social and psychological) to get a reward (i.e. of monetary, personal satisfaction, independence and financial freedom at personal level, value creation for various stakeholders and shareholders at organizational level and economic growth and development at national level) independently for an individual / a group of individuals or within a given organization (Schumpeter, 1934; Hisrich and Peters, 2002; Hamel, 2007; Morris, 1998; Morris, Kuratko an Covin, 2010; Vozikis et al., 1999; Wennekers and Thurik, 1999; Rocha, 2004; Deepti, Shilpa and Kayita, 2015; Foss, Foss and Klein, 2007; Foss et al., 2007; Altuntaş, 2010).

In addition to the use of wealth creation for, entrepreneurship within an organization, which may take various forms and differ significantly compared one to another, is also a need to cope with the constant change in internal and external organizational context, to become more competitive and 'healthy' and even to survive (Morris, Kuratko an Covin, 2010; Allens, 2009; Zahra, 1991; Altuntaş and Dönmez, 2010). With respect to the level of entrepreneurship, an organization can be placed on a continuum ranging from conservative one to entrepreneurial (Covin and Slevin, 1990; Barringer and Ireland, 2008), which involves a radical change in patterns of internal organizational behaviors (Monsen and Boss, 2009). In other words, the level and frequency of entrepreneurial behaviors to determine an organization's point on that continuum, are empirically assessed

in different industries with the entrepreneurial intensity (EI) construct in (Urban and Sefalafala, 2015). Such an entrepreneurial context in an organization (that individuals inside are expected to be innovative while creating something "new" or 'improved', to take risks of a possible loss and to behave proactively while predicting the change) can be "characterized in periods of relatively high pressure, stress, uncertainty, and ambiguity" (Schindehutte, Morris and Allen, 2006: 349) if "managerial roles are not carefully designed and orchestrated" (Ketchen, Ireland and Snow, 2007).

With this perspective in hand, this paper attempts to analyze the relationship among entrepreneurial intensity, role ambiguity and job stress with required quantitative methods via appropriate statistical tools from an emerging economy perspective after an extensive relevant literature review.

2. LITERATURE REVIEW

2.1. Entreprenurial Intensity

Entrepreneurial intensity (EI) is defined as the level to what extent both the degree and frequency of entrepreneurship are evidenced within a given organization (Morris and Sexton, 1996; Morris, 1998; Morris and Kuratko, 2002; Morris, Kuratko and Covin, 2010) or the point on which an organization places itself along a continuum ranging from conservative one to entrepreneurial (Covin and Slevin, 1990; Barringer and Ireland, 2008). Whatever definition is made, there is still doubt what is 'entrepreneurial' in an organization and what establishes its underlying nature or where the best place is in that continuum, but the most prominent and researched constructs to describe entrepreneurship are innovativeness, risk–taking and proactiveness (Morris, 1998; Rauch et al. 2009). Although some scholars add 'autonomy' (Lumpkin and Dess, 1996), competitive aggressiveness (Lumpkin and Dess, 1996; Venkatraman, 1989a; 1989b), corporate venturing and self–renewal (Antoncic and Hisrich, 2001) to the constructs in hand, they have not been able get widespread acceptance due to difficulties in terms of operationalization in measurement or viewing some constructs as parts of others (Kraus, 2013; Antoncic and Hisrich, 2003; Scheepers, Hough and Bloom, 2007; Knight, 1997). For the sake of simplicity and making the research consistent with the prior ones, this study employs a view of an entrepreneurial event as the one, which consists a combination of innovativeness, proactiveness and risk–taking in line with Morris and Sexton (1996). From this perspective, an entrepreneurial event varies in an organization in terms of the "degree of entrepreneurship", or how much innovativeness, risk–taking, and proactiveness is involved within that event (Kuratko, Hornsby and Goldsby, 2007).

In respect to innovativeness as an organizational mindset (Damanpour, 1991; Kraus, 2013), the degree of entrepreneurship refers to an organization's tendency of the embodiment of new, novel, unique, original and creative ideas, –to produce new or improved raw materials, products, services, processes, managerial techniques and technologies or a combination of them,– which it continuously seeks, engages in, supports and develops through experimentation (Drucker, 1985; Schumpeter, 1934; Covin and Miles, 1999; Stevenson and Gumpert, 1985; Luecke, 2003; Knight, 1987; Sathe, 1989; Dess and Lumpkin, 2005; Neely and Hii, 1991; Mueller and Thomas, 2001; Damanpour, 1991; Kraus, 2013; Chang and Lin, 2011). From this perspective, it is inferred that whatever innovation is made is all about creation, development and application of new ideas and behaviors to unique or improved outputs (Damanpour, 1991; Morris and Kuratko, 2002). Thus, an innovation, which triggers risk–taking and proactive market–leading behaviors (Covin and Slevin, 1991; Khan and Manopichetwattana, 1989), is useful in case it contributes to organizational performance, effectiveness and 'health' and the only sustainable core competence to survival of the organization (Altuntaş, 2010; Koçel, 2005: 314).

With regard to risk–taking, the degree of entrepreneurship is defined as the level of willingness to what extent of an organization allocates its crucial resources which it has and/or controls to the realized large and risky entrepreneurial opportunities in uncertain times with a reasonable chance to costly failure as well as success to get high yield (Miller and Friesen, 1978: 923; Chang and Lin, 2011: 2). Thus, it represents a tendency of an organization to engage resource in high–risk strategies and projects with highly uncertain returns (Wiklund and Shepherd, 2005) or of a manager to take bold or cautious actions to achieve superior performance (Chang and Lin, 2011: 2). Regardless of either an individual or an organization, risk–taking in this sense does not necessarily mean that it is an action without thinking or caring the consequences of return or loss, but rather controlled,

calculated and managed one as a result of an investment decision or a strategy under uncertainty regarding an initiative, products and services and processes, which an entrepreneur does not perceive as risky (Keh, Foo and Lim, 2002; Covin and Slevin, 1989; 1991; Cornwall and Perlman, 1990; Certo, Moss and Short, 2009). In sum, an organization requires to take 'reasonable' risks as well as to be proactive (Covin and Slevin, 1989), since its risk–avoidance with a change in market conditions may result in a loss of sustainable competitive advantage or worse withdrawal from the market in the middle or particularly long–run (Slater and Narver, 1995).

With an aspect of proactiveness as opposed to reactiveness, the degree of entrepreneurship is described as to what extent an organization is knowledgeable about its current customer preferences, can anticipate the change in future demand to identify any possible opportunity and take required actions upon identified opportunities with a 'hands–on' mentality earlier before its competitors to stay ahead of competition particularly with a first–mover advantage (Kraus, 2013; Rauch et al., 2009; Chang and Lin, 2011; Lumpkin and Dess, 1996). As seen, proactiveness is all about a challenging strategy, which an organization follows to take the lead, initiative and risks to seize the opportunities in terms of new products, services, technologies and managerial techniques without falling behind the change in its surrounding environment (Covin and Slevin, 1989; 1991; Bateman and Crant, 1993; Lumpkin and Dess, 1996; Antoncic and Hisrich, 2001; Lee, Lee and Pennings, 2001; Miller, 1987). In this respect, proactiveness requires an organization to develop whatever is necessary to transform an entrepreneurial concept into an innovation with a focus on future such as anticipating problems, demands and changes, developing a plan to take precautions and implementing it perseveringly with taking the responsibility (Kraus, 2013; Lumpkin and Dess, 2001; Chang and Lin, 2011; Morris and Kuratko, 2002).

To better understand EI, it is also important to ask the question of how many entrepreneurial (innovative, proactive and risky) events take place within an organization over a given period of time, which is referred as the "frequency of entrepreneurship" in order to produce new products, services and business processes (Kuratko, Morris and Covin, 2011; Morris and Sexton, 1996; Kuratko, Hornsby and Goldsby, 2007; Chang and Lin, 2011; Scheepers, Hough and Bloom, 2007; Erasmus and Scheepers, 2008).

2.2. Role Ambiguity

EI is influenced by an organization's both external and internal organizational context (Zahra, 1991) since it is embedded in its vision, strategies, objectives, structures and operations (Morris, Kuratko and Covin, 2008) and involves a radical change in patterns of internal organizational behaviors (Monsen and Boss, 2009). With this perspective from top to bottom, entrepreneurial decisions made in an organization require individuals to behave proactively, to be innovative and to take risks since they engage in predicting the "unknown" future, creating something "new" and taking responsibility of a possible "loss", in which high level of pressure, ambiguity cannot be avoided (Teoh and Foo, 1997; Baird and Thomas, 1985; Antoncic and Hisrich, 2003; Lumpkin and Dess, 1996; Chauhan, 2014; Schindehutte, Morris and Allen, 2006: 349). Thus, individuals, in organizations where the need for loose intra–organization boundaries arise (Hornsby et al., 1990; 1993) and there is a high degree and frequency of entrepreneurial events, are expected to perform a number of boundary–spanning tasks, which they are neither trained to do nor expected to have to do (Monsen and Boss, 2009) which requires them to have a high tolerance for ambiguity since they are more likely to engage in creative and novel ways of doing things (Teoh and Foo, 1997). Such an organizational climate that individuals are required to think strategically and act entrepreneurially with a lack of clearly defined tasks and objectives make them feel ill–equipped to handle with the situation or perceive their role to be unclear and ambiguous in other words, which role ambiguity is created (Monsen and Boss, 2009; Demirci, 2013; Upson, Ketchen and Ireland, 2007). With this perspective role ambiguity is often defined as "the degree to which clear information is lacking" about the expectation associated with a role, the method for fulfilling known role expectations and the consequences of role performance (Yongkang et al., 2014). Thus, we propose that

H1: The higher the frequency of entrepreneurship, the higher the role ambiguity in an organization.

H2: The higher the degree of entrepreneurship, the higher the role ambiguity in an organization.

2.3. Job Stress

In today's world of rapid change and the never–ending flow of information, 'stress' has become a more often topic of discussion and research, due to its results in changes of an individual's daily life in terms of social interaction and level of wellbeing as well as of an organization with a loss in productivity. Stress is defined as being a physical reaction to unexpected and sudden changes and the individual's ability to use the resources available to meet the new challenges in general. In an organizational climate where employees overwork or their roles within the organization are "vague and unclear", or there is a high level of role overload, role conflict and role ambiguity in other words, higher levels of job stress, job–related tension and job dissatisfaction are experienced (Eatough et al., 2011; Kemery et al., 1985; Fogarty, 1996). Combined with role conflict (i.e. employees meet with conflicting goals or demands by managers), role overload and role ambiguity contribute the level of an individual's stress which leads to an increase in compensation claims, absenteeism, reduced productivity, health insurance costs, medical expenses for stress–related illnesses, higher employee turnover (Jimmieson et al., 2004; Fogarty, 1996; Beehr et al., 2000; Savery and Luks, 2000; O'Driscoll and Beehr, 1994; Stoedeur, D'hoore and Vandenberghe, 2001). It is also stated before that "the entrepreneurial context can be characterized in periods of relatively high pressure, stress, uncertainty, and ambiguity" (Schindehutte, Morris and Allen, 2006: 349). Thus, we propose that

H3: The higher the role ambiguity, the higher the job stress in an organization.

H4: The higher the frequency of entrepreneurship, the higher the job stress in an organization.

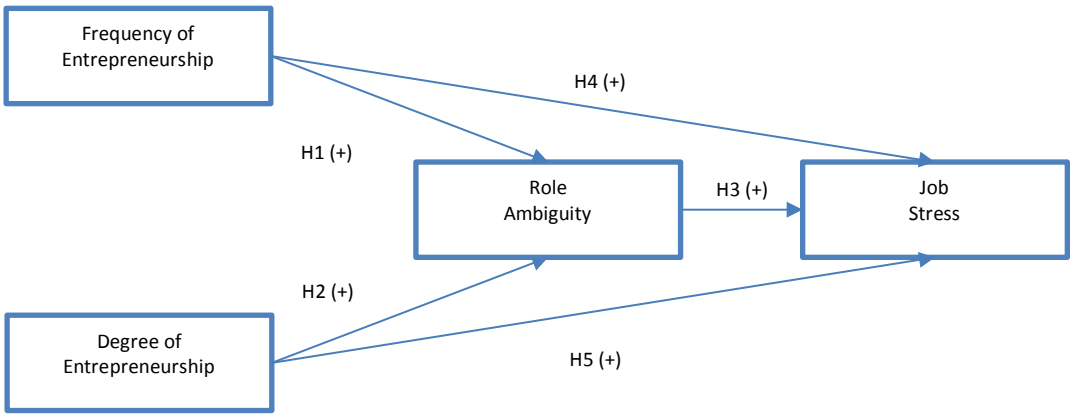
H5: The higher the degree of entrepreneurship, the higher the job stress in an organization.

3. METHODOLOGY AND DATA

3.1. The Purpose and Model

As stated before, the purpose of this descriptive study is to analyze the relationship among entrepreneurial intensity, role ambiguity and job stress with required quantitative methods via appropriate statistical tools. Hence the conceptual model proposed in the study is presented in Figure 1.

Figure 1: The Conceptual Model



3.2. The Sample

To examine the proposed relationships, a research design has been employed with a questionnaire, which was e–mailed to or was filled through a phone conversation by managers of the top 1.000 Industrial Organizations of Turkey, which were announced by Istanbul Chamber of Industry as of June, 2015 without any sampling procedure with a response rate of 45,5% yielding 455 usable questionnaires in August, 2015. The industrial organizations had been established mainly by domestic capital (78%), before the year of 1980 (65,7%), with a number of employees more than 250 (93,6%) and a gross sales volume over 20 million USD (49,9%). The key

informants were mainly women (56,7%), aged between 31 – 40 (68,3%) with a bachelor's degree (94,7%), had an experience between 1 – 5 years (47%) in the organization 1 – 5 years (46,6%) in the industry.

3.3. The Scale

The questionnaire is developed with measures of entrepreneurial intensity (adapted from Covin and Lumpkin (2011); Covin, Green and Slevin (2006) and Kuratko, Morris and Covin (2011)), role ambiguity (adapted from Rizzo, House and Lirtzman (1970)) and job stress (adapted from Kaplanoglu (2014)) with 45 items in total as well as some variables used for classification. Five–point Likert scales are used for all items to measure the constructs based on perceptions of managers to ensure the homogeneity of the instrument.

3.4. Validity and Reliability

The measurement items have been translated once from English to Turkish and once from Turkish to English by academics and revised by practitioners to address face and content validity as well as wording flow and clarity. For preliminary tests, an exploratory factor analysis (with a principal components method using a direct oblimin rotation) have been conducted, which leaves several items (with factor loadings below 0.35) dropped from the original scales to purify the construct measures (see Table 1). Values for measurement of sampling adequacy in line with KMO were 0.819, 0.500, 0.736, 0.789 respectively within the permissible thresholds and all were significant in accordance with Bartlett's Test of Sphericity.

Table 1: Measurement Model of Constructs

Constructs	Factor Loadings*				Cronbach's Alpha
*Frequency of Entrepreneurship (in last two years)** (Total Variance Explained = 78,533%)*					α = 0.93
Frequency of product improvements or developments.	0.91				
Frequency of new product introductions completely new to the market.	0.89				
Frequency of new service introductions compared to major competitors.	0.89				
Frequency of new service introductions completely new to the market.	0.87				
Frequency of significantly revised or improved services.	0.87				
Frequency of new product introductions compared to major competitors.	0.86				
*Degree of Entrepreneurship** (Total Variance Explained = 54,929%)*					***
We offer more new product/services to the market compared to competitors.		0.74			
We continuously improve our methods/processes of production and services.		0.74			
*Role Ambiguity** (Total Variance Explained = 88,331%)*					α = 0.94
I know that I have divided my time properly.			0.95		
I feel certain about how much authority I have.			0.94		
I know exactly what is expected of me.			0.89		
*Job Stress** (Total Variance Explained = 55,116%)*					α = 0.88
My job tension gets me slim.				0.83	
I work under pressure.				0.81	
I am frequently asking myself if it is worth this much effort.				0.76	
My job directly affects my health.				0.76	
I feel tense as a result of my job.				0.75	
I have to think about too many things at once.				0.69	
I am still thinking of my work before falling asleep.				0.68	
I feel anxious about the decision I make even if it is true.				0.65	

* Item loadings below 0.35 have been discarded.

** KMO values for sampling adequacy of each construct were in permissible thresholds ranging from 0.500 to 0.819 and were significant in accordance with Bartlett's Test of Sphericity at 0.05 level.

*** When a scale is composed of two items, there is still doubt about which reliability statistics (of Cronbach's Alpha Coefficient, Pearson Correlation Coefficient or Spearman–Brown's Formula) is an appropriate measure to report (Please see Eisinga, te Grotenhuis and Pelzer (2013) for details). Although Cronbach's Alpha Coefficient is below widely accepted limit of 0.60, these two–items are significantly correlated at 0.05 significance level. Thus, the scale composed of this two–items is regarded as 'reliable'.

3.5. Descriptive Results

Construct means, standard deviations, and correlations are presented in Table 2. The scores on each of the four constructs are normally distributed. Participants perceive the level of entrepreneurial intensity within their organizations to be moderately high in respect to frequency (Mean = 3.96; Std. Dev. = 0.92) and degree (Mean = 4.45; Std. Dev. = 0.40) of entrepreneurship with averages over the midpoint of the scale. Overall, participants report highly low levels of role ambiguity (Mean = 1.50; Std. Dev. = 0.60) and job stress (Mean = 1.85; Std. Dev. = 0.63).

The largest correlation coefficient among independent variables appeared as –0.23. Frequency entrepreneurship has a weak and positive relationship with degree of entrepreneurship ($r = 0.11$; $p < 0.05$); a weak and negative relationship with role ambiguity ($r = –0.22$; $p < 0.01$) and job stress (0.23; $p < 0.01$). In addition, degree of entrepreneurship is in weak and negative relationships with role ambiguity ($r = –0.12$; $p < 0.01$) and job stress ($r = –0.14$; $p < 0.01$) respectively. However, role ambiguity is weakly and positively related to job stress ($r = 0.20$; $p < 0.01$).

Table 2: Descriptive Statistics and iInter-Construct Correlations

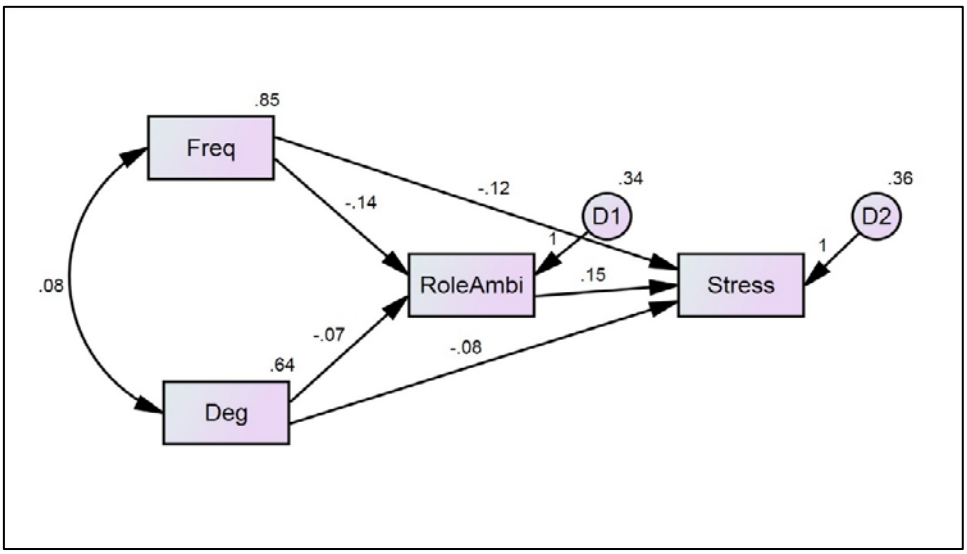
Constructs		Mean	Std. Dev.	1	2	3	4
1	*Frequency of Entrepreneurship*	3.96	0.92	1.00			
2	*Degree of Entrepreneurship*	4.45	0.40	0.11*	1.00		
3	*Role Ambiguity*	1.50	0.60	–0.22**	–0.12*	1.00	
4	*Job Stress*	1.85	0.63	–0.23**	–0.14**	0.20**	1.00

* Correlation is significant at the 0.05 level (2–tailed).
** Correlation is significant at the 0.01 level (2–tailed).

3.6. Effect Estimates

Only unstandardized effects of coefficients in the final 'saturated' model are discussed here (Figure 2 and Table 3). All path coefficients in the model are statistically significant ($p < 0.05$) and some of which are not in the hypothesized directions.

Figure 2: Structural Path Estimations



Frequency of entrepreneurship is found to exert a weak and negative direct impact on job stress (b = –0.12; p < 0.05) and a weak and negative direct impact on role ambiguity (b = –0.14; p < 0.05), which in turn has a weak and positive direct impact on job stress (b = 0.15; p < 0.05). In addition, degree of entrepreneurship is reasoned to reflect weak and negative direct impacts on both role ambiguity (b = –0.07; p < 0.05) and job stress (b = –0.14; p < 0.08). Frequency of entrepreneurship has also an indirect effect on job stress (b = –0.02; p < 0.05) does as degree of entrepreneurship on job stress (b = –0.11; p < 0.05). Sobel test confirms that role ambiguity statistically significant has a partial mediation effect on the relationship between frequency of entrepreneurship and job stress (p < 0.01). However, Sobel test disclaims that there is any mediation effect of role ambiguity on the relationship between degree of entrepreneurship and job stress (p = 0.11).

Table 3: Structural Path Estimations

Structural Paths			H_0	Result	Coefficient	Sig.
Direct Effects						
	of	on				
	Frequency of Entrepreneurship	Role Ambiguity	H_1	Not Supported	–0,14	*
	Degree of Entrepreneurship	Role Ambiguity	H_2	Not Supported	–0,07	*
	Role Ambiguity	Job Stress	H_3	Supported	0,15	*
	Frequency of Entrepreneurship	Job Stress	H_4	Not Supported	–0,12	*
	Degree of Entrepreneurship	Job Stress	H_5	Not Supported	–0,08	*
Indirect Effects (through Role Ambiguity)						
	of	on				
	Frequency of Entrepreneurship	Job Stress	H_6	Not Supported**	–0.02	*
	Degree of Entrepreneurship	Job Stress	H_7	Not Supported	–0.11	Not Sig.

* Note: p < 0.05
** Since the relationships among three variables are in different directions.

4. DISCUSSION AND IMPLICATIONS

Based on extant literature of entrepreneurship, organizational behavior and human resources management, it is examined that direct and indirect effects of entrepreneurial intensity on role ambiguity and job stress in a scope of the top 1.000 industrial organizations of Turkey in this study. Having been developed a conceptual model, it was tested with a use of 455 usable questionnaires in August, 2015. Findings suggest that frequency and degree of entrepreneurship is negatively related to role ambiguity and job stress in contrary to our hypothesis and prior work of Schindehutte, Morris and Allen (2006) although role ambiguity and job stress are positively correlated to each other as expected. Individuals in entrepreneurial organizations are expected to bear greater uncertainty, to cope with transformational and high frequency change, to handle with loose and ever shifting boundaries among different units, decide quickly among multiple competing alternatives with insufficient information (Hayton, 2005: 24; Rafferty and Griffin, 2006; Buttner, 1992). Thus, what might be the case of a negative relationship between entrepreneurial intensity and role ambiguity? Individuals might learn how to overcome associated with disruptive innovations and new business models (Ireland, Hitt and Sirmon, 2003), have developed a better self–efficacy traits (Rutherford and Holt, 2007) and/or experienced the need for on–going adaption process to change before (Schindehutte and Morris, 2001) or be working under the positive impact of entrepreneurial managers (Pearce, Kramer and Robbins, 1997) in an organization with a culture supporting change and creativity (Upson, Ketchen and Ireland, 2007), all of which decrease role ambiguity. It is also known that numerous and 'tangled' communication channels inside an entrepreneurial organization, which resembles a bowl of spaghetti (Cornwall and Perlman, 1990) are the key to organizational change (Clarke, 1994). "The more, the better" approach in terms of communication might be helping individuals overcome their fears of entrepreneurship since "open routine communication practices are positively related to corporate entrepreneurship" (Agnieszka and Agnieszka, 2015). Furthermore, since the population is the top 1.000 industrial organizations of Turkey, it is expected to follow some kind of formalization and centralization processes which reduce role ambiguity (Organ and Greene, 1991; Caruana, Morris and Vella, 1998) although they inhibit entrepreneurial intensity inside the organization if not balanced.

In addition, it might be the case (a study limitation in fact) that individuals' risk aversion behaviors are to be transformed into an organizational–level or they work at different levels of hierarchy, which needs them perform distinct behaviors (Monsen and Boss, 2009).

When it comes to the relationship between entrepreneurial intensity and job stress, it is expected for individuals in an entrepreneurial context to have a relatively high level of stress (Schindehutte, Morris and Allen, 2006: 349). Furthermore, entrepreneurs were found to have higher level of stress associated with workload compared to white collar, blue collar and professional groups (Harris, Saltstone and Fraboni, 1999). Thus, what might be the case of a negative relationship between entrepreneurial intensity and job stress? It might be due to the interaction among the variables of entrepreneurship, job satisfaction, affective commitment and job stress. As stated in person–organization fit studies before, a closer match between the individual and the organizational environment will result in a higher level of job satisfaction and affective commitment, which leads to a higher level of motivation and organizational performance as in entrepreneurial start–ups (Markman and Baron, 2003; Rutherford and Holt, 2007; Rutherford, Holt and Clohessy, 2009). Furthermore, the level of job satisfaction might increase due to a formal training on entrepreneurship (Hindle and Cutting, 2002). Thus, due to a negative correlation between either job satisfaction or affective commitment and job stress (Kuo, 2015), we might find that entrepreneurial intensity is in a negative relationship with job stress.

Based on the findings of this study, we may suggest some managerial implications. First of all, it seems that an entrepreneurial context is likely to create some 'soft' favorable outcomes such as a lower level of role ambiguity and job stress. As opposed to prior expectations we had in the literature review section, entrepreneurial intensity seems to creating or even lowering the level of 'role ambiguity' (Monsen and Boss, 2009). Regardless of size, age or industry, if managerial roles are 'carefully' designed and orchestrated or when individuals have gradually higher levels of tolerance for ambiguity to cope with an ongoing change in the environment, we expect a lower level of role ambiguity in an entrepreneurial organization. It also appears that managers should create an entrepreneurial climate (by taking into consideration a balance between the degree and frequency of entrepreneurial actions) to decrease the level of job stress among employees.

Based on the earlier findings and discussions in this study, we makes several suggestions for future research. Although this study reports some enlightening results to promote a better understanding of the relationships among entrepreneurial intensity, role ambiguity and job stress, it needs to be explored more using qualitative and quantitative studies regarding those variables observed. In addition, information on personality type and previous experience in an entrepreneurial organization should be collected and used as a moderator on the relationships among entrepreneurial intensity, role ambiguity and job stress. It is also important for the variables of job satisfaction and affective commitment to be included in such a study, which we believe have some potential intervening effects on entrepreneurial intensity, role ambiguity and job stress.

REFERENCES

Agnieszka, Z. & Agnieszka, W. 2015, "Routines do matter: role of internal communication in firm-level entrepreneurship," *Baltic Journal of Management,* vol. 10, no. 1, pp.119–139.

Allens, R. K. 2009, "*Launching new ventures: An entrepreneurial approach,"* Houghton Mifflin Company Boston New York.

Altuntaş, G. 2010, "The relationship between entrepreneurship and strategic management: A new model and test of strategic entrepreneurship," Unpublished dissertation. Istanbul University, the Institute of Social Sciences.

Altuntaş, G. & Dönmez, D. 2010, "The relationship between entrepreneurial orientation and organizational performance: Evidence from the hotel industry in Çanakkale Region," *Journal of Journal of the School of Business Administration, Istanbul University,* vol. 40, no. 2, pp. 278–303.

Antoncic, B. & Hisrich, R. D. 2001, "Intrapreneurship: Construct refinement and cross–cultural validation," *Journal of Business Venturing,* vol. 16, no. 5, pp. 495–527.

Antoncic, B. & Hisrich, R. D. 2003, "Clarifying the intrapreneurship concept," *Journal of Small Business and Enterprise Development,* vol. 10, no. 1, pp. 7–24.

Baird, I. S. & Thomas, H. 1985, "Toward a contingency model of strategic risk taking," *Academy of Management Review,* vol. 10, no. 2, pp. 230–243.

Barringer, B. C. & Ireland, R. D. 2008, "*Entrepreneurship: Successfully launching new ventures,"* 2nd Edition, Upper Saddle River, NJ: Pearson/Prentice–Hall.

Bateman, T. S. & Crant, J. M. 1993, "The proactive component of organizational behavior: A measure and correlates," *Journal of Organizational Behavior,* vol. 14, no. 2, pp. 103–118.

Beehr, T. A., Jex, S. M., Stacy, B. A. & Murray, M. A. 2000, "Work stressors and co–worker support as predictors of individual strain and job performance," *Journal of Organizational Behavior,* vol. 21, pp. 392–403.

Buttner, E. H. 1992, "Entrepreneurial stress: Is it hazardous to your health?," *Journal of Managerial Issues*, vol. 4, no. 2, pp. 223–240.

Caruna, A. Morris, M. H. & Vella, A. J. 1998, "The effect of centralization and formalization on entrepreneurship in export firms," *Journal of Small Business Management*, January, pp. 16–29.

Certo, S. T., Moss, T. W. & Short, J. C. 2009, "Entrepreneurial orientation: An applied perspective," *Business Horizons,* vol. 52, no. 4, pp. 319–324.

Chang. H. J. & Lin, S. J. 2011, "Entrepreneurial intensity in catering industry: A case study on Wang Group in Taiwan," *Business and Management Review,* vol. 1, no. 9, pp. 1–12.

Chauhan, A. P. 2014, "Organizational role stress," *International Journal of Advanced Research in Management* and Social Science, vol. 3, no. 2, pp. 154–171.

Clarke, L. 1994, "The essence of change," London: Prentice Hall International.

Cornwall, J. R. & Perlman, B. 1990, "*Organizational entrepreneurship,"* Homewood, IL: Boston–Irvin.

Covin, J. G. & Lumpkin, G. T. 2011, "Entrepreneurial orientation theory and research: Reflections on a needed construct," *Entrepreneurship Theory and Practice,* vol. 35, no. 5, pp. 855–872.

Covin, J. G. & Miles, M. P. 1999, "Corporate entrepreneurship and the pursuit of competitive advantage," *Entrepreneurship Theory and Practice*, vol. 23, no. 3, pp. 47–63.

Covin, J. G. & Slevin, D. P. 1989, "Strategic management of small firms in hostile and benign environment," *Strategic Management Journal,* vol. 10, no. 1, pp. 75–87.

Covin, J. G. & Slevin, D. P. 1990, "New venture strategic posture, structure and performance: An industry life cycle analysis," *Journal of Business Venturing,* vol. 5, pp. 123 – 135.

Covin, J. G. & Slevin, D. P. 1991, "A conceptual model of entrepreneurship as firm behavior," *Entrepreneurship Theory and Practice,* vol. 16, no. 1, pp. 7–24.

Covin, J. G., Green, K. & Slevin, D. P. 2006, "Strategic process effects on the entrepreneurial orientation – sales growth rate relationship," *Entrepreneurship Theory and Practice,* vol. 30, no. 1, pp. 57–81.

Damanpour, F. 1991, "Organizational innovation: A meta–analysis of effects of determinants and moderators," *The Academy of Management Journal*, vol. 34, no. 3, pp. 555–590.

Deepti P., Shilpa, J. & Kavita, C. 2015, "Entrepreneurial intensity in relation to presence of entrepreneurship development cell: A study of institutes offering professional courses in national capital region Delhi, India," *The International Journal of Management Education*, vol. 13, no. 1, pp. 95-105.

Demirci, A. 2013, "Cross–cultural differences in entrepreneurial tendencies: An exploratory view in Turkey and Canada". *International Journal of Entrepreneurship,* vol. 17, pp. 21–40.

Dess, G. G. & Lumpkin, G. T. 2005, "The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship," *Academy of Management Executive,* vol. 19, no. 1, pp. 147–156.

Drucker, P. 1985, "The discipline of the innovator," *Harvard Business Review,* vol. 63, no. 3, pp. 67–72.

Eatough, E. M., Chang, C. H., Miloslavic, S. A. & Johnson, R. E. 2011, "Relationships of role stressors with organizational citizenship behaviour: A meta–analysis," *Journal of Applied Psychology,* vol. 96, pp. 620–621.

Eisinga, R., te Grotenhuis, M. & Pelzer, B. 2013, "The reliability of a two–item scale: Pearson, Cronbach, or Spearman–Brown?," *International Journal of Public Health,* vol. 58, pp. 637–642.

Erasmus P. & R. Scheepers, 2008, "The relationship between entrepreneurial intensity and shareholder value creation," *Managing Global Transitions,* vol. 6, no. 3, pp. 229–56.

Fogarty, T. J. 1996, "An examination of job tension and coping in the relationship between stressors and outcomes in public accounting," *Journal of Managerial Issues,* vol. 8, no. 3, pp. 269–285.

Hamel, G. 2007, "*The future of management,"* Boston, MA: Harvard Business School Press.

Harris, J. A, Saltstone, R. & Fraboni, M. 1999, "An evaluation of the job stress questionnaire with a sample of entrepreneurs," *Journal of Business and Psychology,* vol. 13, no. 3, pp. 447–455.

Hayton, J. C. 2005, "Promoting corporate entrepreneurship through human resource management practices: A review of empirical research," *Human Resources Management Review*, vol. 15, no. 1, pp: 21–41.

Hindle, K. & Cutting, N. 2002, "Can applied entrepreneurship education enhance job satisfaction and financial performance? An empirical investigation in the Australian pharmacy profession," *Journal of Small Business Management*, vol. 40, no. 2, pp. 162–167.

Hisrich, D. R. & Peters, P. M. 2002, "*Entrepreneurship,"* London, UK: McGraw–Hill Irwin.

Hornsby, J. S., Naffziger, D. W., Kuratko, D. F. & Montagno, R. V. 1990, "Developing an intrapreneurial assessment instrument for an effective corporate entrepreneurial environment," *Strategic Management Journal,* vol. 11, pp. 49–58.

Hornsby, J. S., Naffziger, D. W., Kuratko, D. F. & Montagno, R. V. 1993, "An interactive model of the corporate entrepreneurship process," *Entrepreneurship Theory and Practice,* vol. 17, no. 2, pp. 29–37.

Jimmieson, N. L., Terry, D. J. & Callan, V. J. 2004, "A longitudinal study of employee adaptation to organizational change: the role change related information and change–related self–efficacy," *Journal of Occupational Health Psychology,* vol. 9, no. 1, pp. 11–27.

Kaplanoglu, E. 2014, "The basic causes and potential consequences of occupational stress: A study of certifıed public accountants in Manisa Province," *Journal of Accounting and Finance,* October, pp. 131–150.

Keh, H. T., Foo, M. D. & Lim, B. C. 2002, "Opportunity evaluation under risky conditions: The cognitive processes of entrepreneurs," *Entrepreneurship Theory and Practice,* vol. 27, no. 2, pp. 125–148.

Kemery, E. R., Bedeian, A. G., Mossholder, K. W. & Touliatos, J. 1985, "Outcomes of role stress: a multi–sample constructive replication," *Academy of Management Journal,* vol. 28, no. 2, pp. 363–375.

Ketchen, D. J., Jr., Ireland, R. D. & Snow, C. C. 2007, "Strategic entrepreneurship, collaborative innovation, and wealth creation," *Strategic Entrepreneurship Journal,* vol. 1, no. 3–4, pp. 371–385.

Khan, A. M. & Manopichetwattana, V. 1989, "Models for innovative and non–innovative small firms," *Journal of Business Venturing,* vol. 4, no. 3, pp. 187–196.

Knight, G. 1997, "Cross–cultural reliability and validity of a scale to measure firm entrepreneurial orientation," *Journal of Business Venturing,* vol. 12, no. 3, pp. 213–225.

Koçel, T. 2005, "*Business management,"* 10th Edition, Istanbul, Turkey: Arıkan Basım Yayım Dağıtım Ltd. Şti.

Kraus, S. 2013, "The role of entrepreneurial orientation in service firms: empirical evidence from Austria," *The Service Industries Journal,* vol. 33, no. 5, pp. 427–444.

Kuo, S. Y. 2015, "Occupational stress, job satisfaction, and affective commitment to policing among Taiwanese police officers," *Police Quarterly,* vol. 18, no. 1, pp. 27–54, DOI: 10.1177/1098611114559039

Kuratko, D. F., Hornsby, J. S. & Goldsby, M. G. 2007, "The relationship of stakeholder salience, organizational posture, and entrepreneurial intensity to corporate entrepreneurship," *Journal of Leadership and Organizational Studies,* vol. 13, no. 4, pp. 56–72.

Kuratko, D. F., Morris, M. H. & Covin, J. G. 2011, "*Corporate innovation and entrepreneurship,"* 3rd Edition, Canada: Cengage Learning.

Lee, C., Lee, K. & Pennings, J. M. 2001, "Internal capabilities, external networks, and performance: A study of technology–based ventures," *Strategic Management Journal,* vol. 22, no. 6–7, pp. 615–640.

Luecke, R. 2003, "*Managing creativity and innovation,"* Boston, MA: Harvard Business Essentials.

Lumpkin, G. T. & Dess, G. G. 1996, "Clarifying the entrepreneurial orientation construct and linking it to performance," *Academy of Management Executive,* vol. 21, no. 3, pp. 135–172.

Lumpkin, G. T. & Dess, G. G. 2001, "Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle," *Journal of Business Venturing,* vol. 16, no. 5, pp. 429–451.

Markman, G. D. & Baron, R. A. 2003, "Person–entrepreneurship fit: Why some people are more successful as entrepreneurs than others," *Human Resource Management Review*, vol. 13, no. 2, pp. 281–301.

Miller, D. 1987, "Strategy making and structure: Analysis and implication for performance," *Academy of Management Journal*, vol. 30, no. 1, pp. 7–32.

Miller, D. & Friesen, P. 1978, "Archetypes of strategy formulation," *Management Science*, vol. 24, pp. 921–933.

Monsen, E. & Boss, R. W. 2009, "The impact of strategic entrepreneurship inside the organization: Examining job stress and employee retention," *Entrepreneurship Theory and Practice,* vol. 33, no. 1, pp. 71–104.

Morris, M. H. 1998, "*Entrepreneurship intensity: Sustainable advantages for individuals, organizations and societies*," London: Quorum Books.

Morris, M. H., & Kuratko, D. F. 2002, "*Corporate entrepreneurship: Entrepreneurial development within organizations,"* London: Thompson South Western.

Morris, M. H. & Sexton, D. L. 1996, "The concept of entrepreneurial intensity: Implications for company performance," *Journal of Business Research,* vol. 36, no. 1, pp. 5–13.

Morris, M. H., Kuratko, D. F. & Covin, J. G. 2010, "*Corporate entrepreneurship and innovation,"* Mason: Thompson/South–Western Publishing.

Mueller, S. & Thomas, A. 2001, "Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness," *Journal of Business Venturing,* vol. 16, no. 1**,** pp. 51–75.

Neely, A. & Hii, J. 1998, "*Innovation and business performance: A literature review,"* Cambridge, MA: The Judge Institute of Management Studies.

O'Driscoll, M. P. & Beehr, T. A. 1994, "Supervisor behaviors, role stressors and uncertainty as predictors of personal outcomes for subordinates," *Journal of Organizational Behavior,* vol. 15, pp. 143–154.

Organ, D. W. & Greene, C. N. 1981, "The effects of formalization on professional involvement: A compensatory process approach," *Administrative Science Quarterly,* vol. 26, no. 2, pp. 237–252.

Pearce, J. A., II, Kramer, T. R. & Robbins, D. K. 1997, "Effects of managers' entrepreneurial behaviour on subordinates," *Journal of Business Venturing*, vol. 12, no. 2, pp. 147–160.

Rafferty, A. E. & Griffin, M. A. 2006, "Perceptions of organizational change: A stress and coping perspective," *Journal of Applied Psychology*, vol. 91, no. 5, pp. 1154–1162.

Rausch A., Wiklund, J., Lumpkin, G. T. & Frese, M. 2009, "Entrepreneurial orientation and business performance: An assessment of past research and suggestions for future," *Entrepreneurship Theory and Practice,* vol. 33, no. 3, pp. 761–787.

Rizzo, J. R., House, R. J. & Lirtzman, S. I. 1970, "Role conflict and ambiguity in complex organizations," *Administrative Science Quarterly,* vol. 15, no. 2, pp. 150–163.

Rocha, H. 2004, "Entrepreneurship and development: The role of clusters," *Small Business Economics,* vol. 23, no. 5, pp. 363-400.

Rutherford, M. W. & Holt, D. T. 2007, "Corporate entrepreneurship: An empirical look at the innovativeness dimension and its antecedents," *Journal of Organizational Change Management*, vol. 20, no. 3, pp. 429–446.

Rutherford, M. W., Holt, D. T. & Clohessy, G. R. 2007, "Corporate entrepreneurship: An empirical look at individual characteristics, context, and process," *Journal of Leadership and Organizational Studies,* vol. 13, no. 4, pp. 40–54.

Sathe, V. 1989, "Fostering entrepreneurship in a large diversified firm," *Organizational Dynamics,* vol. 18, no. 1, pp. 20–32.

Savery, L. K. & Luks, J. A. 2000, "Long hours at work: Are they dangerous and do people consent to them?," *Leadership and Organizational Development Journal,* vol. 21, no. 6, pp. 307–310.

Scheepers, M. J., Hough, J. & Bloom, J. Z. 2008, "Nurturing the corporate entrepreneurship capability," *South African Business Review,* vol. 12, no. 3, pp. 50–75.

Schindehutte, M. & Morris, M. H. 2001, "Understanding strategic adaptation in small firms," *International Journal of Entrepreneurial Behaviour and Research*, vol. 7, no. 3, pp. 84–107.

Schindehutte, M., Morris, M. H. & Allen, J. 2006, "Beyond achievement: Entrepreneurship as extreme experience," S*mall Business Economics,* vol. 27, no. 4, pp. 49–68.

Schumpeter, J. A. 1934, "*The theory of economic development,"* Boston, MA: Harvard University Press.

Slater, S. F. & Narver, J. C. 1995, "Market orientation and the learning organization," *Journal of Marketing*, vol. 59, July, pp. 63–74.

Stevenson, H. H. & Gumpert, D. E. 1985, "The heart of entrepreneurship," *Harvard Business Review,* March–April, pp. 85–94.

Stoedeur, S., D'hoore, W. & Vandenberghe, C. 2001, "Leadership, organizational stress, and emotional exhaustion among hospital nursing staff," *Journal of Advanced Nursing,* vol. 35, pp. 534–535.

Teoh, H. Y. & Foo, S. L. 1997, "Moderating effects of tolerance for ambiguity and risk taking propensity on the role conflict–perceived performance relationship: Evidence from Singaporean entrepreneurs," *Journal of Business Venturing,* vol. 12, pp. 67–81.

Upson, J. W., Ketchen, D. J. & Ireland, R. D. 2007, "Managing employee stress: a key to the effectiveness of strategic supply chain management," *Organizational Dynamics,* vol. 36, pp. 78–92.

Urban, B. & Sefalafala, M. R. 2015, "The influence of entrepreneurial intensity and capabilities on internationalisation and firm performance," *South African Journal of Economic and Management Sciences,* vol. 18, no. 2, pp. 260–276.

Venkatraman, N. 1989a, "The concept of fit in strategy research: Toward verbal and statistical correspondence," *The Academy of Management Review*, vol. 14, no. 3, pp. 423–444.

Venkatraman, N. 1989b, "Strategic orientation of business enterprises: The construct, dimensionality, and measurement," *Management Science*, vol. 35, no. 8, pp. 942–962.

Vozikis, G. S., Bruton, G. D., Prasad, D. & Merikas, A. A. 1999, "Linking corporate entrepreneurship to financial theory through additional value creation," *Entrepreneurship Theory and Practice,* vol. 24, no. 2, pp. 33–43.

Wennekers, S. & Thurik, R. 1999, "Linking entrepreneurship to economic growth," *Small Business Economics,* vol. 13, no. 1, pp. 27-55.

Wiklund, J. & Shepherd, D. 2005, "Entrepreneurial orientation and small business performance: A configurational approach," *Journal of Business Venturing,* vol. 20, no. 1, pp. 71–91.

Yongkang, Z., Weixi, Z, Yalin, H., Yipeng, X. & Liu, T. 2014, "The relationship among role conflict, role ambiguity, role overload and job stress of Chinese middle–level cadres," *Chinese Studies,* vol. 3, no. 1, pp. 8–11.

Zahra, S. A. 1991, "Predictors and financial outcomes *of* corporate *entrepreneurship:* An exploratory study," *Journal of Business Venturing,* vol. 6, no. 4, pp. 259–285.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

THE DYNAMICS OF EXCHANGE RATE PASS-THROUGH TO DOMESTIC PRICES IN TURKEY

DOI: 10.17261/Pressacademia.2016116552

Huseyin Karamelikli[1], Suna Korkmaz[2]

[1] Karabuk University. huseyinkaramelikli@karabuk.edu.tr

[2] Bandirma Onyedi Eylul University. skorkmaz@balikesir.edu.tr

ABSTRACT

In an environment where countries have trade relations with each other, prices of domestic goods should vary due to trade. Developing countries in particular import raw materials and semi-manufactured goods from other countries in order to carry out the production process. Final goods are imported for household consumption as well. Exchange rate changes naturally affect domestic prices as well. The effect of exchange rate pass-through on inflation for Turkey was investigated with the NARDL method using the data between January 2003 and November 2015. According to the results of the analysis, an increase in the exchange rate increases the consumer price index. While a decrease in the exchange rate does not have the same reaction, any decrease in the exchange rate would cause prices to increase in the short-run. In addition, domestic product has an asymmetrical and negative relationship with price index in short and long-term according to our analysis. We found that in the short-run both the exchange rate and domestic product are asymmetrically related with the price index where only domestic product asymmetrically affects the consumer price index.

Keywords: Exchange rate pass-through, NARDL, domestic prices.

JEL Classification : C51, D51, E31, E50

1. INTRODUCTION

The central bank of each country sets certain goals according to country's economic conditions. Monetary policy tools are used in order to achieve these goals. The main goal of the Central Bank of the Republic of Turkey (CBRT) is price stability. In 2002, the inflation targeting was implicitly implemented in Turkey for the first time. Floating exchange rate practice was passed in 2001 when CBRT obtained its independence. The inflation targeting was introduced explicitly in 2006. Inflation is one of the most important macro-economic problems. The functioning order of the economy is disrupted in economies where inflation is present. Inflation disturbs income distribution, leads to reduced savings, negatively affects industrial investments and reduces export rates. Hence, inflation is one of the undesired phenomena in any economy.

One of the greatest difficulties in inflation targeting is effects of import prices and exchange rate shocks on domestic prices. In most developing countries such as Turkey, exchange rates serve as an anchor in terms of pricing. Therefore, when there is an increase in exchange rate, a rise in prices is expected as well. Production is usually dependent on imports in developing countries. In Turkey, imported products seem to constitute the majority especially in the industrial sector. Raw materials and intermediate goods are imported in particular. Imported goods affect domestic prices in two ways. One of them is the exchange rate and the other is import prices. In terms of import, the competition between countries and the structure of internationally traded goods are determining factors. Companies adjust prices of their products depending on the size of the shock from the exchange rate. It is important for an accurate reading of economy to distinguish whether the rise in the price of a domestic product is related to country's currency losing value against U.S. Dollar or a rise in the import price of the product.

Both internal and external variables could affect the consumer price index. Alongside world markets, domestic production, especially in the case of non-tradable goods, can affect local prices. Therefore in the present study, we examined the industrial production index as a proxy of national production in order to reveal how a rise in the domestic product influences consumer prices. The consumer price index variable was used in order to evaluate the reflection of exchange rate pass-through on domestic prices. The period from 2003, after Turkey implicitly adopted inflation targeting, to the present day was examined in the analysis.

In this study literature will be reviewed as the first step. In the second part, the model will be explained. In this part alongside the long-run model, the NARDL model and its determinants will be described. Empirical results will be presented in the third section. Finally, the forth section contains a summary and the results of this study.

2. LITERATURE REVIEW

Hooper and Mann (1989) and Wang and Wu (1996) exchange rate pass-through can be broadly defined as the extent to which a change in the nominal exchange rate induces a change in the import price. Yang (1997) paper studies exchange rate pass-through in U.S. manufacturing industries and its cross-sectional variation. His result shows a negative relationship between import share and exchange rate pass-through. Choudhri and Hakura (2006) have made estimates for 71 countries, covering the period 1979-2000. They exhibit strong evidence of a positive and significant association between the pass-through and the average inflation rate across countries. Mwase (2006) use VAR models and a data set covering the period 1990–2005. He fined that the exchange rate pass-through to inflation declined in the late 1990s. Junior (2007) results show that the response of producer prices inflation to exchange rate changes is higher than that of consumer prices inflation. Devereux and Yetman (2010) paper argues that sticky prices represent a key determinant of exchange rate pass-through. Their model implies that exchange rate pass-through is increasing in average inflation, but at a declining rate. Frimpong and Adam (2010) use VAR model and a data set covering the period 1990M01–2009M02 in Ghana. They find that the exchange rate pass-through to inflation is 'incomplete' and decreasing. Prasertnukul et al. (2010) study examines how the adoption of inflation-targeting influenced exchange rate pass-through and volatility in four Asian countries over the sample period of 1990:01 to 2007:06. They results indicate that inflation targeting caused a decline in exchange rate volatility in all four countries. Kataranova (2010) found pass-through effect has a pronounced asymmetrical character, consumer prices are more respond to the depreciation of the domestic currency, rather than to its appreciation. Beirne and Bijsterbosch (2011) using a five-variate cointegrated VAR for each country, they show that ERPT to consumer prices averages about 0.6 using the cointegrated VAR and 0.5 using the impulse responses. Shintani et al. (2013) use smooth transition autoregressive (STAR) models. Their estimation result suggests that declines in the exchange rate pass-through during the 1980s and 1990s are associated with lowered inflation. Saha and Zhang (2013) have used the VAR model over the period 1990–2011. Their impulse responses tests indicate that exchange rates have less effect in the rising domestic prices in China and India. Peón and Brindis (2014) use Structural Vector Autorregression with exogenous variables (recursive SVAR-X) model. Their results show that the exchange rate pass-through to consumer prices is quite small and fast. Mohammed et al. (2015) investigated the effect of exchange rate pass-through on producer and consumer price index for Algerian economy by examining the period between 2002 and 2011. The empirical findings show that the consumer price increases in response to an appreciate foreign exchange rates but the exchange rate pass-through involves a negligible reaction on producer price index. Cheikh and Louhichi (2016) have used the panel data over the 1992-2012. They point out a strong regime-dependence of pass-through to inflation environment, that is, the class of countries with higher inflation rates experiences the higher degree of exchange rate pass-through.

3. METHODOLOGY

Campa and Goldberg (2005), Berman et al. (2012), Gopinath and Rigobon (2008) and Goldberg and Knetter (1996) theoretical frameworks and following Çiçek and Boz (2013) our long-run model formulated as follow:

$$CPI_t = \alpha_0 + \alpha_1 ER_t + \alpha_2 IND_t + \epsilon_t \quad (1)$$

Where CPI is consumer price index, ER is the US Dollar to Turkish Lira exchange rate and IND represents industrial production index that is used as a proxy of domestic production. The error correction model (ECM) can display a return to long-run equilibrium in the short-run after any diversion from it. The ordinary ECM model can be written as follows:

$$\Delta CPI_t = \beta_0 + \sum_{j=1}^{p} \beta_{1j} \Delta CPI_{t-j} + \sum_{j=0}^{q} \beta_{2j} \Delta ER_{t-j} + \sum_{j=0}^{m} \beta_{3j} \Delta IND_{t-j} + \gamma_1 DUMMY_t + \theta \epsilon_{t-1} + e_t \quad (2)$$

Where Δ represents the first differences of the variables in model. Here e represents error term in ECM while ε shows the error-correction term which forms with the OLS residuals series from the long-run cointegrating regression in Equation (1). In regards to the financial crises that occurred in 2008, we added a dummy variable which reflects that months special situation. With the combination of both (1) and (2) numbered equations the following equation would be created:

$$\Delta CPI_t = \psi + \eta_0 CPI_{t-1} + \eta_1 ER_{t-1} + \eta_2 IND_{t-1} + \sum_{j=1}^{p} \beta_{1j} \Delta \mathrm{CPI}_{t-j} + \sum_{j=0}^{q} \beta_{2j} \Delta ER_{t-j} + \sum_{j=0}^{m} \beta_{3j} \Delta IND_{t-j} + \gamma_1 DUMMY_t + e_t \quad (3)$$

With manipulation in error correction model some model parameters has been changed as $\psi = \beta_0 - \theta\alpha_0$,$\eta_0 = \theta$,$\eta_1 = -\theta\alpha_1$ and $\eta_2 = -\theta\alpha_2$. On the other hand η_0 ,$-\frac{\eta_1}{\theta}$,$-\frac{\eta_2}{\theta}$ are the long run coefficients of CPI, ER and IND variables, while β_1, β_2 and β_3 are the short run coefficients of the variables.

The approach that was developed by Schorderet (2002, 2003) and Shin et al. (2014) is used in this study to determine the asymmetric pass-through of the exchange rate and the domestic product on the consumer price index. This approach requires that the exchange rate variable be decomposed to positive and negative shocks. Then $ER^+$and ER^- are the partial sums of positive and negative changes in the ER variable. AlsoIND^+ and IND^- are positive and negative components of the IND variable.

$$ER_t^+ = \sum_{i=1}^{t} \Delta ER_i^+ = \sum_{i=1}^{t} max(\Delta ER_i, 0) \ ; \ ER_t^- = \sum_{i=1}^{t} \Delta ER_i^- = \sum_{i=1}^{t} min(\Delta ER_i, 0) \quad (4)$$

$$IND_t^+ = \sum_{i=1}^{t} \Delta IND_i^+ = \sum_{i=1}^{t} max(\Delta IND_i, 0) \ ; \ IND_t^- = \sum_{i=1}^{t} \Delta IND_i^- = \sum_{i=1}^{t} min(\Delta IND_i, 0) \quad (5)$$

We use the NARDL (nonlinear autoregressive distributed lag) approach to estimate the asymmetric effect of both the exchange rate and the domestic product on the consumer price index. The NARDL estimation method is derived from the Pesaran et al. (2001) paper by Shin et al. (2014). The nonlinear autoregressive distributed lag model combines the nonlinear the long run relationship with the nonlinear error correction by using the partial sum decompositions. Therefore Equation (1) can be rewritten as follows by considering Equation (4) and (5):

$$CPI_t = \alpha_0 + \alpha_1^+ ER_t^+ + \alpha_1^- ER_t^- + \alpha_2^+ IND_t^+ + \alpha_2^- IND_t^- + \epsilon_t \quad (6)$$

Also by inserting the equation (6) into the equation (2) and taking into account of asymmetry in the short-run that could be rewritten as follow:

$$\Delta CPI_t = \psi + \eta_0 CPI_{t-1} + \eta_1^+ ER_{t-1}^+ + \eta_1^- ER_{t-1}^- + \eta_2^+ IND_{t-1}^+ + \eta_2^- IND_{t-1}^- + \sum_{j=1}^{p} \beta_{1j} \Delta CPI_{t-j} + \sum_{j=0}^{q} \left(\beta_{2j}^- \Delta ER_{t-i}^- + \beta_{2j}^+ \Delta ER_{t-i}^+\right) + \sum_{j=0}^{m} \left(\beta_{3j}^- \Delta IND_{t-i}^- + \beta_{3j}^+ \Delta IND_{t-i}^+\right) + \gamma_1 DUMMY_t + e_t \quad (7)$$

The parameters of this equation obtained as follow:

$\psi = \beta_0 - \theta\alpha_0$,$\eta_0 = \theta$,$\eta_1^+ = -\theta\alpha_1^+$,$\eta_1^- = -\theta\alpha_1^-$,$\eta_2^+ = -\theta\alpha_2^+$,$\eta_2^- = -\theta\alpha_2^-$

The long-run coefficients of nonlinear model are η_0 , $-\frac{\eta_1^+}{\theta}$, $-\frac{\eta_1^-}{\theta}$, $-\frac{\eta_2^+}{\theta}$ and $\frac{\eta_2^-}{\theta}$ which belongs to CPI, ER^+, ER^-, IND^+ and IND^- respectively.

Following Shin et al. (2014) equation (7) could be divided into long asymmetry and short run symmetry or long-run symmetry and short-run asymmetry.

Similar to the ordinary ARDL model, the long-run cointegration can be determined by t-statistics offered by Banerjee et al. (1998) and Pesaran et al. (2001) suggested F-statistics. Similar to the linear ARDL method, Shin et al. (2014) proposed the bond test to determine the long-run asymmetric cointegration. The bounds test is used to jointly test all lagged level regressors and null hypothesis is defined as $H_0: \eta_0 = \eta_1 = \eta_2 = 0$ against alternative hypothesis$H_1: \eta_0 \neq 0$or $\eta_1 \neq 0$or $\eta_2 \neq 0$. When long-run asymmetry is existed in model the null hypothesis should be changed as $H_0: \eta_0 = \eta^+{}_1 = \eta^-{}_1 = \eta^+{}_2 = \eta^-{}_2 = 0$. For checking long-run cointegration, calculated Wald F value would compare with Pesaran et al. (2001) tabulated F values. In addition to long-run cointegration, asymmetry in long-run should be checked by null hypothesis of $H_0: \alpha^+{}_1 = \alpha^-{}_1$and $H_0: \alpha^+{}_2 = \alpha^-{}_2$. In the case of short-run asymmetry, it should be tested by $H_0: \sum_{i=0}^{q} \beta_{2i}^+ = \sum_{i=0}^{q} \beta_{2i}^-$and $H_0: \sum_{i=0}^{q} \beta_{3i}^+ = \sum_{i=0}^{q} \beta_{3i}^-$. In both cases with rejection of a null hypothesis, asymmetric effects statistically should be accepted. Therefore the asymmetric model could be accepted only when a null hypothesis is rejected. By rejecting a null hypothesis of symmetry, asymmetric dynamic multiplier of change of ER^+, ER^-, IND^+ and IND^- could be found respectively. The cumulative dynamic multiplier effects of ER^+, ER^-, IND^+ and IND^- on CPI can be evaluated respectively as follows:

$$m_h^+ = \sum_{i=0}^{h} \frac{\partial CPI_{t+i}}{\partial ER_t^+} \; ; \; m_h^- = \sum_{i=0}^{h} \frac{\partial CPI_{t+i}}{\partial ER_t^-} \tag{8}$$

$$z_h^+ = \sum_{i=0}^{h} \frac{\partial CPI_{t+i}}{\partial IND_t^+} \; ; \; z_h^- = \sum_{i=0}^{h} \frac{\partial CPI_{t+i}}{\partial IND_t^-} \tag{9}$$

Note that $lim_{h\to\infty} m_h^+ = \alpha_1^+$, $lim_{h\to\infty} m_h^- = \alpha_1^-$, $lim_{h\to\infty} z_h^+ = \alpha_2^+$and $lim_{h\to\infty} z_h^- = \alpha_2^-$are valid where α_1^+, α_1^-, $\alpha_2^+$and $\alpha_2^-$are the asymmetric long-run coefficients. The dynamic multipliers could capture the positive and negative shocks of real exchange rate and domestic product on the consumer price index from an initial equilibrium to the new equilibrium (Shin et al., 2014).

4. FINDINGS AND DISCUSSIONS

In this study Turkey's exchange rate pass-through the consumer price index is analyzed. For this purpose we obtained monthly data from January 2003 to November 2015. All data was retrieved from the IMF data service. In this study the industrial production index is used as a proxy of real domestic product. US Dollar equivalence in Turkish Lira is used as exchange rate data as well. All variables were checked for their unit root problem. According to Phillips and Perron (1988) criterion, we found that all of the variables in our model were integrated of the order one.

The full symmetric model (Equation no 7) was estimated by the ordinary least square method with a maximum of 12 lags. Using Akaike Info Criterion (AIC) for selecting the best lag length from 2028 an estimated model led us to choose ARDL (1,3,9). Normality, autocorrelation and heteroscedasticity of the final model made us to be statistically confident that our results are valid. The last step on our estimation is the testing of symmetry for ER and IND variables both in the short-run and the long-run. Symmetry Wald test results are shown in table (1).

Table 1: Short-run and Long-run Symmetry Tests.

Variable	Short-run		Long-run	
	Model I	Model II	Model I	Model II
ER	9.625523*	12.81702*	3.251705**	-
IND	30.90313*	30.37890*	69.17850*	760.0659*

Note. * and ** denote significance at 1% and 10% level, respectively

The Model I in the Table 1 represents Equation (7) in which all independent variables except the dummy have an asymmetric character. By concentrating on the results of symmetric test on the mentioned variables we can conclude that all hypotheses of symmetry in the short-run were rejected whereas the symmetry hypothesis for ER in the long-run was accepted. Therefore, we cannot treat that variable as asymmetric in the long-run. The model should be rewritten to cover this case and Equation (10) will take the alternative.

$$\Delta CPI_t = \psi + \eta_0 CPI_{t-1} + \eta_1 ER_{t-1} + \eta_2^+ IND_{t-1}^+ + \eta_2^- IND_{t-1}^- + \sum_{j=1}^{p} \beta_{1j} \Delta CPI_{t-j}$$
$$+ \sum_{j=0}^{q} \left(\beta_{2j}^- \Delta ER_{t-i}^- + \beta_{2j}^+ \Delta ER_{t-i}^+\right) + \sum_{j=0}^{m} \left(\beta_{3j}^- \Delta IND_{t-i}^- + \beta_{3j}^+ \Delta IND_{t-i}^+\right) + \gamma_1 DUMMY_t + e_t \quad (10)$$

Reestimating of the Model II (Eq 10) with maximum 12 lags surprisingly same lag orders as first model. The results of estimation for both first and second model are in the Table 2.

Table 2: Short-run and Long-run Assymetric Models Estimations

Variable	Model I	Model II
CPI(-1)	-0.284043*	-0.270706*
ER_N(-1)	1.525052**	-
ER_P(-1)	3.528788*	-
ER	-	1.960469*
IND_N(-1)	-0.157090*	-0.181448*
IND_P(-1)	-0.064524**	-0.075285*
D(CPI(-1))	0.185682**	0.185671**
D(ER_N)	1.961235	1.398601
D(ER_P)	6.821931*	6.167625*
D(ER_N(-1))	-1.345757	-2.229815
D(ER_P(-1))	1.215120	2.151038
D(ER_N(-2))	-7.619415**	-7.965968*
D(ER_P(-2))	1.148737	1.649842
D(ER_N(-3))	-6.687265**	-7.075626**
D(ER_P(-3))	4.025666***	4.653639**
D(IND_N)	-0.031493	-0.037155
D(IND_P)	-0.045332***	-0.044147***
D(IND_N(-1))	0.131332*	0.150175*
D(IND_P(-1))	-0.016412	-0.007648
D(IND_N(-2))	0.094934*	0.110177*
D(IND_P(-2))	-0.012099	-0.002559
D(IND_N(-3))	0.104834*	0.120001*
D(IND_P(-3))	-0.071769**	-0.061215**

D(IND_N(-4))	0.063236**	0.077304*
D(IND_P(-4))	0.042457	0.055836***
D(IND_N(-5))	0.076847*	0.088333*
D(IND_P(-5))	0.053080***	0.064121**
D(IND_N(-6))	0.188329*	0.198895*
D(IND_P(-6))	0.038693	0.046963
D(IND_N(-7))	0.154635*	0.160701*
D(IND_P(-7))	0.122077*	0.129851*
D(IND_N(-8))	0.142780*	0.145138*
D(IND_P(-8))	-0.035823	-0.028776
D(IND_N(-9))	0.070252**	0.068173**
D(IND_P(-9))	-0.082423*	-0.075266*
C	28.79100*	24.07646*
DUMMY	-1.560251*	-1.186554*
Heteroskedasticity F	1.003745	0.959103
Jarque-Bera	5.891053***	2.563189
Bound F	11.36004	12.14496
R2	0.694156	0.685151
F-statistic	7.003454*	6.976399*

Note. *, ** and *** denote significance at 1%, 5% and 10% level, respectively

Testing for Normality, Heteroscedasticity, autocorrelation and CUSUM stability test for the second model shows that there is not any statistical problem in our estimation. Looking for long-run coefficients of the exchange rate and domestic production reveals that both positive and negative components of domestic production have a negative effect on the consumer price index. Therefore any increase in domestic production will cause a significant decrease in the price index where a decrease in domestic production will push the price index to be increased as well. Our estimation displays that in the long-run effects of increase and decrease in domestic production are not same. Also we found that the exchange rate effects are symmetric and negatively related to price index in the long-run.

Figure 1: Short-run Dynamics of Exchange Rate

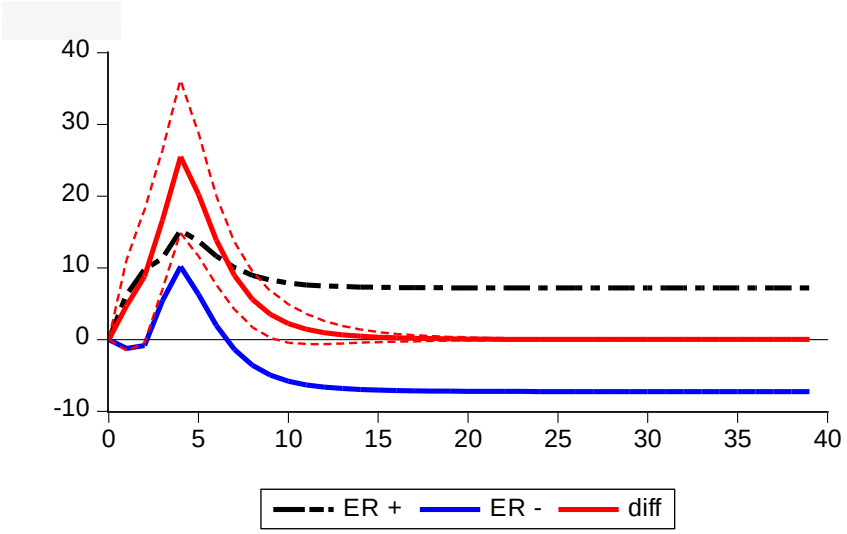


Figure 2: Short-run Dynamics of Domestic Product

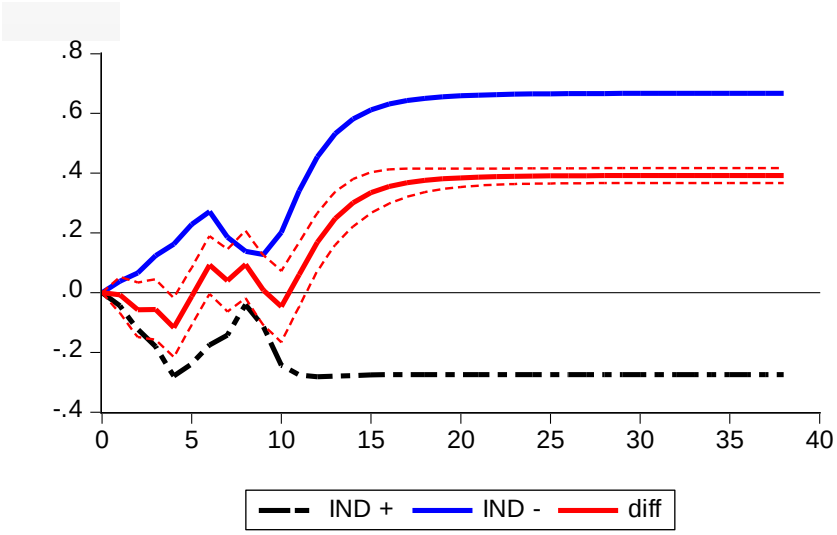


Figure (1) displays the short-run dynamics of the exchange rate. Any increase on the exchange rate has a positive effect on consumer prices because firms could adjust their prices due to increases of imported goods in domestic prices, whereas a decreasing in the exchange rate could have the inverse effect. In the short-run prices would be increased despite the decreasing of exchange rates. In the case of oligopoly, firms are able to adjust their prices due to market conditions. Therefore, an increase in the exchange rate should be reflected in commodity prices. This situation puts inflationary pressure on the market and which will reach its maximum level in four months. After that point the decrease of demand due to the increasing price of goods would cause a diminishing of the prices that jumped so high since the fifth month. Any decreasing in the exchange rate has a totally different effect. Because of price rigidity, sellers of imported goods would not reduce their prices immediately, while exporters would be faced with sudden loss because of the absence of price changing power in global markets. Then, in order to provide compensation for loses in the global market exporter firms may

prefer local markets with high profit margins in the short-run. Therefore, despite a decrease in the exchange rate, the consumer price index would be increased in the short-run. Along with the case of the increase in the exchange rate, in the case of decreasing of exchange rate the five month mark is the starting point of long-run adjustment.

Figure 2 displays the effects of increases and decreases in the domestic production in the short-run. We can see that the long-run positive effect of decreasing is greater than the negative effects of increasing in domestic production. We can conclude that devastative effect of decrease in national product in long-run is very higher than an amendatory when increasing in national product occurred. It can be summarized that negative shocks have more pressure on general prices in comparison to positive shocks in long-run. Therefore any decrease in production would cause structural disruptive effect on economic system especially on inflationary expectations.

5. CONCLUSION

It was analyzed with the NARDL method whether exchange rate pass-through had any effect on consumer price index. The period from January 2003 to November 2015 was examined. It was found that an increase in the exchange rate increased the consumer price index. Because price increases in imported goods are reflected by companies in prices of their own products, which inducing the rise in inflation. In addition, it was found that exchange rate influences had a symmetrical and positive relationship with price index in long-term. We can see that long-run positive effect of decreasing is greater than negative effects of increasing in domestic production. The finding that exchange rate would affect consumer price at positive direction is consistent with findings of Choudhri and Hakura (2006), Devereux and Yetman (2010), Shintani et al. (2013), Mohammed et al. (2015), Cheikh and Louhichi (2016) in the literature. However, it conflicts with findings of Mwase (2006), Frimpong and Adam (2010), Saha and Zhang (2013), Peón and Brindis (2014).

Exchange rate pass-through is of great importance for countries implementing inflation targeting. Exchange rate pass-through seems to be low in countries practicing floating exchange rate policy. However, the completion of pass-through takes time in cases where exchange rate shocks have a certain direction and are continuous. Intractable exchange rate shocks have greater influence on inflation. Especially in developing countries, increases in exchange rates are reflected positively on domestic prices. The increase in the exchange rate affects the industrial sector as well. Because raw materials and semi-manufactured goods of finished products manufactured by the industrial sector in Turkey are imported from overseas, an increase in the exchange rate increases prices of imported products as well, thus a change in domestic production index occurs. Then, one of the possible measures to reduce the effect of exchange rate pass-through is to produce goods with higher added-value. Another factor that will reduce exchange rate pass-through is the monetary policy adopted by the Central Bank. The capital will flow to developing countries for short-term due to difference in interest rates between developed countries and developing countries. As a result, the domestic currency will gain value. This will lead to deterioration in the trade balance. For this reason, the CBRT utilizes monetary policy tools such as interest rate corridor and reserve option mechanism in order to reduce the pressure on Turkish Lira created by rapid capital flows.

In this study we found that the short-run asymmetric relation is prevailing for both the exchange rate and domestic product, while only domestic product has long-run asymmetric relation with the consumer price index. Also, we found that in the short-run both the increase and decrease in the exchange rate would affect consumer prices in a positive direction. However, in the long-run each of the positive or negative decompositions of the exchange rate would affect price in similar directions. Therefore, monetary policy makers of Turkey have to be vigilant about volatilities in the exchange rate. The most important finding of this study is about the strong effect of negative changes in domestic product on local prices. This means that any negative shocks in the domestic product would be interpreted as future economic crises and put heavy pressure on prices. Therefore economic authorities have to concentrate on real sector production and keep it on a rapidly increasing path of production.

REFERENCES

Banerjee, A., Dolado, J., & Mestre, R. (1998). Error-correction Mechanism Tests for Cointegration in a Single-equation Framework. *Journal of Time Series Analysis*, 19 (3), 267–283. http://doi.org/10.1111/1467-9892.00091.

Beirne, J. and Bijsterbosch, M. (2011), "Exchange Rate Pass-through in Central and Eastern European EU Member States", *Journal of Policy Modeling*, 33 (2), 241-254.

Berman, N., Martin, P., & Mayer, T. (2012). How do Different Exporters React to Exchange Rate Changes? *The Quarterly Journal of Economics*, 127 (1), 437–492. http://doi.org/10.1093/qje/qjr057.

Campa, J. M., & Goldberg, L. S. (2005). Exchange Rate Pass-Through into Import Prices. *Review of Economics and Statistics*, 87 (4), 679–690. http://doi.org/10.1162/003465305775098189.

Cheikh, N. B. and Louhichi, W., (2016), "Revisiting the Role of Inflation Environment in Exchange Rate Pass-through: A Panel Threshold Approach", *Economic Modelling*, 52, 233-238.

Choudhri, E. U. and Hakura, D. S., (2006), "Exchange Rate Pass-through to Domestic Prices: Does the Inflationary Environment Matter?", Journal of International Money and Finance, 25 (4), 614-639.

Çiçek, S., & Boz, Ç. (2013). A New Test of Exchange Rate Pass-through in a Small Open Economy: Evidence from Asymmetric ARDL Bounds Approach. *İktisat İşletme ve Finans*, 28 (333), 43–64. http://doi.org/10.3848/iif.2013.333.3840.

Devereux, M. B. and Yetman, J. (2010), "Price Adjustment and Exchange Rate Pass-Through", *Journal of International Money and Finance*, 29 (1), 181-200.

Frimpong, S. and Adam, A. M., (2010), "Exchange Rate Pass-Through in Ghana", *International Business Research*, 3 (2), 186-192.

Goldberg, P., & Knetter, M. (1996). Goods Prices and Exchange Rates: What Have We Learned? (NBER Working Paper No. 5862). Cambridge, MA. Retrieved from http://www.nber.org/papers/w5862.pdf.

Gopinath, G., & Rigobon, R. (2008). Sticky Borders. *Quarterly Journal of Economics*, 123 (2), 531–575. http://doi.org/10.1162/qjec.2008.123.2.531.

Hooper, P. and Mann, C. L. (1989), "Exchange Rate Pass-through in the 1980s: The Case of U.S. Imports of Manufactures", *Brookings Papers on Economic Activity,* No. 1, 297-337.

Junior, R.P.N. (2007)," Inflation Targeting and Exchange Rate Pass-Through", *Econ. Aplic*, 11 (2), 189-208.

Kataranova, M. (2010), "The Relationship Between the Exchange Rate and Inflation in Russia", *Problems of Economic Transition*, 53 (3), 45-68.

Mohammed, K. S., Bendob, A., Djediden, L.and Mebsout, H., (2015), "Exchange Rate Pass - Through in Algeria", *Mediterranean Journal of Social Sciences*, 6 (2), 195-201.

Mwase, N. (2006), "Empirical Investigation of the Exchange Rate Pass-Through to Inflation in Tanzania", IMF Working Paper, WP/06/150.

Peón, S.B.G. and Brindis, M.A.R., (2014), "Analyzing the Exchange Rate Pass-through in Mexico: Evidence Post Inflation Targeting Implementation", *Ensayos sobre Política Económica*, 32 (74), 18-35.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16 (3), 289–326. http://doi.org/10.1002/jae.616.

Phillips, P. C. B., & Perron, P. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika*, 75 (2), 335–346. http://doi.org/10.1093/biomet/75.2.335.

Prasertnukul, W., Kim, D. And Kakinaka, M. (2010), "Exchange Rates, Price Levels, and Inflation Targeting: Evidence from Asian Countries", *Japan and World Economy*, 22 (3), 173-182.

Saha, S. and Zhang, Z. (2013), "Do Exchange Rates Affect Consumer Prices? A Comparative Analysis for Australia, China and India", *Mathematics and Computers in Simulation*, 93, 128-138.

Schorderet, Y. (2002). *A Nonlinear Generalization of Cointegration: A Note on Hidden Cointegration* (No. 2002.03). Genève. Retrieved from http://www.unige.ch/ses/metri/

Schorderet, Y. (2003). *Asymmetric Cointegration* (No. 2003.01). Cahiers du département d'économétrie, Faculté des sciences économiques et sociales, Université de Genève.

Shin, Y., Yu, B., & Greenwood-nimmo, M. (2014). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework. In R. C. Sickles & W. C. Horrace (Eds.), *Festschrift in Honor of Peter Schmidt Econometric Methods and Applications* (pp. 281–314). http://doi.org/10.1007/978-1-4899-8008-3.

Shintani, M., Terada-Hagiwara, A. and Yabu, T. (2013), "Exchange Rate Pass-through and Inflation: A Nonlinear Time Series Analysis", *Journal of International Money and Finance*, 32 , 512-527.

Wang, K-L and Wu, C-S., (1996), "Exchange Rate Pass-through and Industry Characteristics: The Case of Taiwan's Exports of Midstream Petrochemical Products", *NBER Working Paper*, No. 5749, 1-28.

Yang, J. (1997), "Exchange Rate Pass-Through in U.S. Manufacturing Industries", *The Review of Economics and Statistics*, 79 (1), 95-104.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

THE RELATIONSHIP BETWEEN INCOME INEQUALITY AND TERTIARY ATTAINMENT FOR DEVELOPING COUNTRIES: IS IT A U-SHAPED RELATIONSHIP?

DOI: 10.17261/Pressacademia.2016116553

Ozlem Yorulmaz

Istanbul University. yorulmaz@istanbul.edu.tr

ABSTRACT

This study explores the effects of tertiary attainment and per capita income on income inequality for 30 developing countries over the period 1990-2008 by three different estimation approaches namely classical estimation of a fixed effects panel data model, quantile panel type regression, and robust panel type regression models. The findings reveal that there is no evidence of the Kuznets hypothesis of inverted U curve dependence of income inequality on income. However, the results of robust panel type regression and quantile regression for the 20th percentile indicate this relationship as U-shaped. According to robust panel type regression, the effect of tertiary attainment on income inequality is significant and U-shaped, as well.

Keywords : Income inequality, Kuznets inverted U hypothesis, Quantile regression, Robust regression, tertiary education.

JEL Classification : C14, C23, I32

1. INTRODUCTION

As the gap between the rich and poor continues to widen steadily in line with economic development, income inequality has been a prevalent concern for both advanced and developing countries since it brings about undesirable outcomes in economic, social and political areas such as poor public health, high crime ratios, political instability, lower average education levels. “High and sustained levels of inequality, especially inequality of opportunity can entail large social costs. Entrenched inequality of outcomes can significantly undermine individuals’ educational and occupational choices” (Dabla-Norris et al.,2015). The increase in income inequality among families and neighbourhoods has implications for the average years of schooling particularly for lower income families (Campbell et al., 2005).

Additional to an outcome role of education as mentioned above, educational attainment has been considered as one of the most crucial determiner of income inequality (De Gregorio and Wha-Lee, 2002). Education brings about such an expectancy of people better off as making contribution to their work and daily life; better jobs, better social status, easy access to information, easily overcoming with environmental and technological changes. According to Knigth and Sabot (1983), the impacts of education can be explained under two main topics namely, “composition effect” and “compression effect”. The composition effect states that the increase in the proportion of educated labour initially increases the income inequality; this approach is similar to the process of Kuznets Hypothesis. Kuznets (1955) explained that as countries developed, income inequality initially rose, subsequently peaked, and then declined during the later phases of economic development by using both time series and cross-sectional data. Over the course of time, this hypothesis has been referred to as the ‘inverted-U hypothesis’. From the educational perspective the emphasis of Kuznets’ approach can be interpreted as following: In the lowest income groups, mostly people have very low level of education and their income is more equally distributed. As the level of education improves in line with the economic development, income increases and urbanization rises, and the distribution of income becomes more unequal before reaching the peak. As the average level of education attains to higher levels in a society and economy becomes

further matures, income distribution attains more equal level. With respect to "compression effect", it leads to decreasing effect of education on income inequality. This process arises from the competition in the labour market.

This paper explores the effect of tertiary attainment on income inequality for developing countries between the period of 1990-2008 by three different estimation approaches namely classical estimation of a fixed effects panel data model, quantile panel type regression, and robust panel type regression models. Our dataset reflects economic, social, political and demographic diversities of countries. It is likely to encounter some countries which are away from the remaining in the dataset. To the best of our knowledge the diagnosis of outlying observations in panel data has not been studied yet. Statistical analysis and interpretations based on a dataset including outlying observations or not may differ significantly. To cope with this shortcoming robust statistics are preferred in the literature. Unlike the classical estimation of the panel data model, quantile regression reflects differences in the response of the dependent variable to changes in the regressors at various points along the conditional distribution of the dependent variable (McGregor et al. 2015), and robust regression provides a resistant estimated coefficient vector against outlying observations both on the dependent and independent variables. By employing different perspectives on the estimation of our model, we provide estimates that are not sensitive to outliers, take into consideration different percentiles of income inequality, and hence obtain a complete view of the effects of income and education on income inequality.

This study makes several contributions to the existing literature. To the best of our knowledge, this is the first paper that considers both quantile regression and robust regression approaches for the investigation of the relationship between income inequality and tertiary attainment. While examining the stationarity of variables, we take into consideration the possibility of the dependency of panels and small time dimension problem cases, and therefore employed panel bootstrap block unit root tests.

The paper is organised into five sections. Section 2 reviews the relevant literature for the effect of education on income. The methodology is explained in Section 3. Section 4 present data and the empirical results and, finally, Section 5 concludes.

2. LITERATURE REVIEW

Our investigation is based on the process postulated by Kuznets which is mentioned in the study of Knight and Sabot (1983). The validity of Kuznets hypothesis has been widely studied in the literature however, the relationship between income per capita and income inequality remains unclear due to the different datasets, different estimation techniques. In the study of Bulir and Gulde (1995), it was found that the inverted-U hypothesis accounts for only a limited part of the inter-country variation of the income distribution. Dimelis and Livada (1999), reported that economic growth has a reducing effect on income inequality in the US and UK, but has an increasing effect on inequality in Greece. In the studies of Ravallion and Chen (1997), Easterly (1999), and Dollar and Kraay (2002), a significant relationship between economic growth and high levels of income inequality were not found. Gallup (2012) included a large number of countries in his study and obtained that there is no evidence of inverted-U hypothesis; however, inequality declines in low-income countries, whereas it increases in high-income countries, and a U-shaped pattern shows up in a non-parametric trend.

Education is an essential opportunity for low income class to improve their skills and it is frequently addressed in the studies of economic development as a factor that reduces urban inequality and increases economic growth. However recent studies reveal that the relationship between income inequality and educational attainment are controversial. The study of Knight and Sabot (1983) as mentioned in the previous section, explains that the link between "compression" and "composition" effects determines the income inequality. Barro (2000) examined the relation between income inequality and educational attainment; it was concluded that there is a positive relationship between income inequality and higher education attainment, whereas there is a negative relationship for primary education attainment. In the study of Checchi (2001), U shaped relationship between educational attainment and income inequality was found. Degregoria and Wha Lee (2002) investigated the mentioned relationship over a broad range of countries by Seemingly Unrelated Regressions (SUR) model and obtained a negative relationship between income inequality and median

educational attainment. They emphasised that higher education attainment plays a significant role in making income distribution more equal. Carnoy, Loyalka and Androuschak (2014), examined the relationship between higher education expansion and income inequality using a standard human capital model for BRIC countries. Their study obtained that higher education expansion contributes to greater income inequality in China, as to other BRIC countries the effect of higher education as negligible. According to Schultz (1963), increase of educational attainment effects both lower and higher incoming groups, as higher incoming group will earn less due to the competition and the lowest incoming group will have more income. The findings of Abdullah et al, (2011) are in line with Schultz (1963), they employed a Meta regression analysis including 64 empirical studies and obtained that education have reducing effect on rich and increasing effect on the poor thus the gap between lower and higher incoming groups becomes narrower.

Checchi and Van de Verfhorst (2014) emphasized that the educational reforms have an effect on the distribution of the quality and quantity of education. Moreover, educational policies have an impact on the income distribution.

The relationship between income inequality and education has been dealt recently by the studies of Kraugman (2015)[1]. He emphasized that education is not a cure for income inequality since increasing education is not able to bring down wages of the top and the improved conditions of low and middle income will not change the existence of the very wealthiest. The study of Herishbein, Kearney and Summers (2015) is in line with the approach of Krugman (2015). They asserted that increasing educational attainment does not significantly change overall income inequality since a large share of income inequality is at the top of the income distribution and college shares will not shrink those differences. However, it is also mentioned in their study that increasing educational attainment reduce inequality in the bottom half of the income distribution, by pulling up the income of those near the 25th percentile.

3. METHODOLOGY

The affective components of tertiary attainment as the government policies, rates of public subsidies for lower incoming students, tuition fees for universities or institutes show difference across countries. Some of these differences may cause outlying observations. Considering the different patterns in the set of developing countries, panel regression and robust regression approaches were employed in our empirical models in addition to classical estimation of the fixed effects panel data model. The quantile regression method was developed by Koenker and Bassett (1978); it allows for the effects of the independent variable to vary over the quantiles.

Different from the ordinary least squares, quantile regression is based on the conditional quantile functions of the dependent variable where each function presents the behaviour of a specific point on the conditional distribution. Furthermore, the quantile regression approach is resistant to outlying observations in the y direction (Verardi and Croux, 2009; McGregor et al., 2015) and convenient in the case of asymmetric or fat-tailed conditional distributions. Koenker (2004) adapted the quantile regression approach for the estimation of fixed effects panel data.

A conditional quantile model can be modelled as follows:

$$Q_\tau(y_i|x_i) = \alpha(\tau) + x_i\beta(\tau) \qquad j = 1,...,m_i, \qquad i = 1,...,n \tag{1}$$

where τ ($\tau \in [0,1]$) corresponds to quantiles, α_i is a vector of unobserved fixed effects, *i* is the index for countries, *j* is the number of observations per country m_j, *x* is the matrix of explanatory variables, and *y* is the dependent variable. Koenker (2004) proposed to obtain parameter estimates by solving the following objective function:

[1] Nobel laureate economist

$$\min_{(\alpha,\beta)} \sum_{k=1}^{q}\sum_{j=1}^{n}\sum_{i=1}^{m_i} \omega_k \rho_{\tau k}(y_{ij} - \alpha_i - x_{ij}^T \beta(\tau_k)) + \lambda \sum_{i=1}^{n} |\alpha_i| \quad (2)$$

where q is the index for quantiles, ω_k is a weight function, and $\rho_{\tau k}$ corresponds to the quantile loss function. ($\rho_{\tau k}(u) = u(\tau_k - I(u \le 0))$) and the last part of the expression is called the penalty term. λ is a tuning parameter that defines the magnitude of the penalty term and serves to reduce the additional variability based on the estimation of the individual fixed effects (Koenker, 2004; Lamarche, 2010). The penalty term provides a solution for the computational problem of estimating a large number of parameters. According to the definition of Lamarche (2011), it is possible to view λ as controlling the vertical distance between the empirical conditional density function of the ith country and the one of the pooled sample.

The relationship of tertiary attainment across the conditional income inequality distribution was denoted considering the 10th, 20th, 50th, 70th, and 90th percentiles in this study. Estimations of the standard errors are obtained by the bootstrap procedure (Bose and Chartterjee, 2003).[2]

The robust regression approach is the other estimation technique we included in the study. Quantile regression is not resistant against outliers in the space of explanatory variables; as mentioned previously, it is resistant only against outlying observations in the y dimension. Bramati and Croux (2007) proposed two robust approaches to fixed effects panel data models, namely within-groups generalised M estimator and within-groups MS estimator, which are resistant against outliers in the y-direction and against bad leverage points (outlying observations in the x-direction and can tilt the regression line). Both approaches are based on two main steps, namely *centering series with respect to median* and *adapting a robust estimator to standard within-groups estimator process*. Verardi and Wagner (2012) studied the aforementioned robust approaches and proposed an S estimator through the estimation process.

We consider the fixed effects linear panel data model

$$y_{it} = \alpha_i + x_{it}^t \beta + \varepsilon_{it} \quad (3)$$

where subscript *i* denotes the cross-section dimension and *t* denotes time series dimension. Y_{it} indicates dependent variables, x_{it} is the Kx1 column vector of explanatory variables β is the Kx1 column vector of regression parameters, and α_i values are the time-invariant fixed effects.

The steps of the method that Verardi and Wagner (2012) proposed can be summarised as follows:

-Centre all variables by removing the median:

$$\tilde{y}_{it} = y_{it} - med_i y_{it}$$
$$\tilde{x}_{it}^{(j)} = x_{it}^{(j)} - med_i x_{it}^{(j)}$$

We run an S estimator of the centred dependent variable, $\tilde{y}_{it}$, on the centred explanatory ones, $\tilde{x}_{it}^{(j)}$, and obtain the estimated parameters

$\tilde{\beta} = \arg\min_{\beta} \sigma(r_1(\beta),...r_{NT}(\beta))$ where r are the estimated residuals and σ is an M estimator of scale.

-Using the residuals from the previous step, an identification of outliers is performed (standardised residuals larger than 1.96).

-Observations are weighed and standard fixed effects estimator is estimated.[3]

[2] rqpd package in R written by Roger Koenker and Stefan Holst Bache was used.
[3] Stata codes of the robust estimator was provided by Vincenzo Verardi

4. DATA, DESCRIPTIVE STATISTICS, AND FINDINGS

In this study, income inequality was evaluated by Theil indices that are estimated by the University of Texas Inequality Project (UTIP-UNIDO). The Theil index is based on the following calculation:

$$T = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\mu}\ln\left(\frac{y_i}{\mu}\right) \tag{4}$$

where *i* corresponds to index group, y_i refers to average wage in each index group, and μ is the average wage of the entire population; in the case of perfect equality, it equals 0.

Before evaluating the effect of tertiary attainment on income inequality, we investigated the existence of Kuznets' inverted U pattern on our dataset. The following empirical equations were modelled in this study:

$$LTheil_{it} = \beta_0 + \beta_1 LGDP_{it} + \beta_2 LGDP_{it}^2 + u_i + e_{it} \tag{5}$$

$$LTheil_{it} = \beta_0 + \beta_1 LEduc_{it} + \beta_2 LEduc_{it}^2 + u_i + e_{it} \tag{6}$$

where the subscripts *i* and *t* indicate countries and years, respectively. Dependent variables refer to the logarithm of Theil indices (LTheil), u_i is the country-specific fixed effects, and e_{it} is the traditional error term. Explanatory variables in models were arranged as follows: GDP per capita constant prices based on purchasing power parity (LGDP), tertiary attainment as a percentage of the total population[4] (LEduc). Explanatory variables described above are in logarithm form. The data consist of 30 developing countries[5] between the years of 1990 to 2008, and the World Bank Database (World Bank Development Indicators-WDI) is the main source in this study. Both empirical models were considered with three different estimation approaches of panel data models, namely classical estimation, quantile regression, and robust estimation.

Prior to the estimation of empirical models, the stationarity of variables was investigated to avoid spurious findings. Jacobsen and Giles (2006) pointed out that most of the studies that investigate the inverted-U pattern (particularly environmental Kuznets curves) do not pay attention to the importance of non-stationary data. Wagner (2008) emphasised the previously-ignored nonstationary investigation in addition to several disregarded issues through the econometric approaches of testing the existence of the environmental Kuznets curve in the literature. The disregarded points can be summarised as:

-not investigating stationarity of nonlinear transformations of variables

-relying upon the cross-sectional independence assumption and using first-generation unit root tests. He pointed out that the assumption of the independence of panels is implausible and that first-generation methods perform poorly for small samples. Therefore, he implemented a second-generation unit root test through bootstrap approaches for a small sample size in his study.

Following the study of Wagner (2006), panel unit tests based on bootstrap methods, namely Robust Block Bootstrap (RBB) and Modified Wild Bootstrap (MWB) were choosen here alongside Im-Peseran-Shin (IPS), Fisher-ADF, and Fisher-PP tests to investigate the stationarity of variables. IPS, Fisher-ADF, and Fisher-PP tests are named as first-generation tests that assume the independence of panels, whereas the other two tests consider the dependency of cross-sectional panels. The RBB test was developed by Palm, Smeekes, and Urbain (2011), and their approach is an extension to the panels of the unit root test of Paparoditis and Politis (2003). Smeekes and Urbain (2014) proposed the MWB test that takes dependence within and different elements of the time series into account.

Considering three variables, GDP per capita, tertiary attainment and Theil index, some descriptive statistics are presented in Appendix 1. Some countries seem different from the overall, for instance Oman is the most striking one with the highest GDP per capita and the lowest proportion of tertiary attainment rate. Russia,

[4] Lagged by 5 years

[5] Due to unavailability of the Theil indices and ratios of tertiary attainment for some countries, our analysis does not include all developing countries.

Romania, Poland and Ukraine seem to have similar pattern, however different from the remaining, they have very high tertiary attainment ratios and low Theil indices.

Table 1 reveals the results of the unit root tests. The null hypothesis is that each panel contains a unit root. As can be seen from Table 1, considering the findings of the five unit root tests, all variables are I(1) except LTheil. Since LTheil is I(0), we do not investigate the existence of cointegration in the empirical models. Our analysis goes on to evaluate the empirical models considering stationary series.

Investigation of the inverted-U pattern was done with the first empirical model (eq.5) and the results are exhibited in Table 2. Table 2 reports panel regression results by using classical estimation of fixed effects[6] (column 1), quantile regression (columns 2-5), and robust regression (column 6). The results based on the quantile regression for 20th percentile and robust regression confirm U-shaped relationship.

Table 3 exhibits the findings of the second empirical model (Eq. 6). Considering the results of classical estimation of fixed effects and quantile regression, tertiary attainment has no impact on income inequality for developing countries. However, robust regression obtained significant effect of tertiary attainment on income inequality, the relationship between tertiary attainment and income inequality is U-shaped. Although the results of quantile regression are not statistically significant, the pattern between income inequality and tertiary attainment is striking. For the lower and middle percentiles it is inverted-U shape whereas it is U shaped for the higher percentiles.

Overall, the findings indicate that there is no evidence of Kuznets' inverted-U curve type relationship between GDP per capita and income inequality for the studied developing countries. However, results of robust regression and quantile regression for the 20th percentile indicate that the aforementioned relationship between GDP per capita and income inequality is U-shaped. As mentioned in Section 2, recent studies reveal that the relationship between income inequality and income remains controversial. According to Oyvat (2010), social structures of developing countries might show a negative or slightly positive shape for the first phase. Gallup (2012) emphasised the existing relationship between income and income inequality as being U-shaped. These results are compatible with our findings. With respect to tertiary attainment, only findings of robust regression confirm that education and education square are significant; the relationship is a U-shaped. This result is in line with the study of Checci (2001) that obtained the pattern of relationship between income inequality and average years of schooling as U-shaped.

[6] A Hausman test was performed to determine whether a random or fixed effect is more appropriate, and it was indicated that the fixed effect (FE) model is preferable. Additionally, the appropriateness of FE model against pooled OLS was investigated by an F test for each empirical model, and it is inferred to use the FE model.

Table 1: Unit Root Tests

		IPS	Fisher-ADF	Fisher-PP	RRB	MWB
LGDP	i.e.	1	1	1	0.92	0.8
	i.e. and l.t.	0.08***	0.6	0.09***	0.77	0.76
$LGDP^2$	i.e.	1	1	1	1	1
	i.e. and l.t.	0.26	0.1	0.08	0.69	0.77
D(LGDP)	i.e.	0*	0*	0*	0*	0.02**
	i.e. and l.t.	0*	0*	0*	0.001*	0.004*
D($LGDP^2$)	i.e.	0*	0*	0*	0*	0*
	i.e. and l.t.	0*	0	0*	0*	0.001*
LEDUC	i.e.	1	1	0.99	0.58	0.78
	i.e. and l.t.	0.88	0.32	0.59	0.26	0.69
$LEDUC^2$	i.e.	1	0.54	1	0.71	0.88
	i.e. and l.t.	0.98	1	0.55	0.12	0.56
D(LEDUC)	i.e.	0*	0*	0*	0*	0.04**
	i.e. and l.t.	0*	0 *	0*	0.004**	0.09***
D($LEDUC^2$)	i.e.	0*	0*	0*	0*	0.004*
	i.e. and l.t.	0*	0*	0*	0.002*	0.004*
LTHEIL	i.e.	0 *	0*	0*		0.04**
	i.e. and l.t.	0.*	0.0012*	0 *		0.005*

All values correspond to p values. P values are based on the intercept (i.e.) and trend included models(l.t.). *, **,*** refer stationary variables significance at 1, 5 and 10% levels, respectively. D(.) refers first differences and the blank cell indicates "no result" due to missing observations.

Table 2: Parameter Estimates of First Empirical Model

	FE-Classic	10th	20th	50th	70th	90th	Robust
DLGDP	-11.204 (7.213)+	-13.937 (11.265)	-15.908*** (9.17)	-6.859 (6.413)	-5.593 (5.374)	-5.194 (10.908)	-18.641* (7.187)
DLGDP2	.821*** (.4533)+	1.296 (0.738)	1.117*** (0.612)	0.455 (0.40)	0.433 (0.349)	0.412 (0.646)	1.102* (0.445)
Constant	-3.061* (.001)	-3.355* (0.118)	-3.09* (0.04)	-2.857* (0.028)	-2.691* (0.033)	-2.467* (0.051)	

(.) Parenthesis indicate the standard errors . '+' refers robust standard errors.
*,**,*** represent significance at 1, 5 and 10 % levels, respectively.

Table 3: Parameter Estimates of Second Empirical Model

	FE-Classic	10th	20th	50th	70th	90th	Robust
DLEDUC	.1572 (.124)+	0.452 (0.454)	0.268 (0.254)	0.025 (0.204)	-0.024 (0.362)	-0.049 (0.961)	-4.883** (1.958)
DLEDUC2	-.0125 (0.046)+	-0.05 (0.138)	-0.02 (0.05)	0.016 (0.041)	0.0514 (0.061)	0.0262 (0.163)	.654** (0.291)
Constant	-3.152* (0.006)	-3.484* (0.115)	-3.136* (0.06)	-2.888* (0.03)	-2.706* (0.035)	-2.529* (0.051)	

(.) Parenthesis indicate the standard errors . '+' refers robust standard errors.
*,**,*** represent significance at 1, 5 and 10 % levels, respectively.

5. CONCLUSION

This paper investigates the effect of tertiary attainment on income inequality for 30 developing countries from 1990 to 2008 by employing three different empirical models. Since the sample reflects the economic, financial, political and demographic diversities of countries, we considered panel quantile regression and panel robust regression approaches in addition to the classical estimation of fixed effects panel data model to refrain the potential effects of outlying observations.

We began our analysis to explore the existence of Kuznets' inverted-U and afterwards evaluated the effect of tertiary attainment on income inequality. Both subjects have been widely discussed in the literature however the empirical findings are not consistent due to different estimation techniques, inclusion of nonstationary regressors, and selection of different country groups and variables. Taking into account the small time dimension of the data and the possible dependency of panels, stationarity of variables were tested with bootstrap-based panel unit roots, namely MWB and RBB, alongside first-generation unit root tests.

Our findings confirm that there is no evidence of Kuznets' inverted U-shaped relationship between income and income inequality for developing countries. However, the quantile regression for the 20th percentile and robust regression approach conclude a U-shaped relationship between income and income inequality, and this finding is consistent with the study of Gallup (2012). The examination of the effect of tertiary attainment is based on the process postulated by Kuznets which is mentioned in the study of Knight and Sabot (1983). However, the result of robust regression is contrary to Knight and Sabot (1983), it is obtained that the relationship between tertiary education and income inequality is as U-shaped. This finding is in line with the study of Checci (2001).

REFERENCES

Barro, R. J. 2000, "Inequality and Growth in a Panel of Countries", Journal of Economic Growth, 5(1), pp. 5-32.

Bose, A., &Chatterjee, S. 2003, "Generalized bootstrap for estimators of minimizers of convex functions",J. Stat. Planning and Inf., 117, pp. 225-239.

Bramati, M.C., & Croux, C. 2007, "Robust Estimators for the Fixed Effects Panel Data Model", Econometrics Journal, 10(3), pp. 521-540

Bulir, A., & Gulde, A.M. 1995, "Inflation and income distribution: Further evidence on empirical links", IMF Working Paper 95/86. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=883233. Accessed 10 July 2015.

Campbell, M.,Haveman, R., Sandefur, & G.-Wolfe, B. 2005, "Economic inequality and educational attainment across ageneration". http://www.irp.wisc.edu/publications/focus/pdfs/foc233b.pdf. Accessed 10 July 2015.

Carnoy, M., Loyalka, P., Androuschak, G., & Froumin, I. 2014, "The Concept of Public Goods, the State, and Higher Education Finance: A View from the BRICS", Higher Education, 68(3), pp. 1-20.

Checci,D. 2001, "Education, inequality and income inequality. LSE Research paper", http://eprints.lse.ac.uk/6566/. Accessed 15 May 2015.

Checchi, D., &Van De Werfhorst, H. 2014, "Educational Policies and Income Inequality", IZA Discussion Paper DP No.8222. http://ftp.iza.org/dp8222.pdf. Accessed 17 May 2015.

Dabla-Norris, E.,Kochhar, K., Suphaphiphat, N., Ricka, & Tsounta, E. 2015, "Causes and consequences of income inequality: A global perspective", IMF staff discussion note. https://www.imf.org/external/pubs/ft/sdn/2015/sdn1513.pdf. Accessed 3 July 2015.

De Gregorio, J., & Lee. J.W. 2002, "Education and Income Inequality: New Evidence from Cross-Country Data", Review of Income and Wealth, 48(3), pp. 395-416.

Dimelis, S., & Livada, A. 1999, "Inequality and Business Cycles in the US and European Countries", International Advances in Economic Research, 5(3), pp.321-338.

Dollar, D., & Kraay, A. 2002, "Growth is Good for the Poor", Journal of Economic Growth, 7(3), pp. 195-225.

Easterly, W. 1999, "Life during Growth: International Evidence on Quality of Life and per capita Income", Journal of Economic Growth 4, pp. 239-276.

Gallup, J.L. 2012, "Is there a Kuznets curve?", Working paper. https://www.pdx.edu/econ/sites/www.pdx.edu.econ/files/kuznets_complete.pdf. Accessed 10 May 2015.

Hershbein, B., Kearney, M., & Summers, H. 2015, "Increasing education: What it will and will not do for earnings and earnings inequality", http://www.brookings.edu/blogs/up-front/posts/2015/03/31-what-increasing-education-will-and-wont-do-for-earnings-inequality-hershbein-kearney-summers. Accessed 20 October 2015.

Jacobsen, P. E., & Giles, D. E. A. 2006, "Income Distribution in the United States: Kuznets' Inverted U-Hypothesis and Data Non-Stationarity", The Journal of International Trade and Economic Development, 7, pp. 405-423

Knight, J., & Sabot, R. 1983, "Educational expansion and the Kuznets effect", The American Economic Review, 73(5), pp. 1132-36.

Koenker, R., & Bassett, S. 1978, "Regression Quantiles", Econometrica, 46, pp. 33-50.

Koenker, R. 2004, "Quantile Regression for Longitudinal Data", Journal of Multivariate Analysis, 91 (1), pp.74–89.

Kraugman, P. 2015, "Knowledge Isn't Power", http://www.nytimes.com/2015/02/23/opinion/paul-krugman-knowledge-isnt-power.html?_r=0. Accessed 15 October 2015.

Kuznets, S. 1955, "Economic Growth and Income Inequality", American Economic Review, 45(1), pp. 1-28.

Lamarche, C. 2010, "Robust penalized quantile regression estimation for panel data", Journal of Econometrics 157(2), pp. 396-408.

McGregor, N., Isaksson, A., & Kaulich, F. 2015, "Importing, exporting and the productivity of services firms in Sub Saharan Africa". The journal of International Trade & Economic Development, 24, pp. 499-522.

Palm, F.C., Smeekes, S., & Urbain, J.P. 2011, "Cross-sectional dependence robust block bootstrap panel unit root tests", Journal of Econometrics, 163(1), pp. 85-104.

Paparoditis, E., & Politis, D.N. 2003, "Residual-based block bootstrap for unit root testing". Econometrica, 71, pp. 813–856

Ravallion, M., & Chen, S. 1997, "What can new survey data tell us about recent changes in distribution and poverty?", World Bank Economic Review, 11(2), pp. 357-382.

Schultz, T. W. 1963, The Economic Value of Education. New York: Columbia University Press.

Smeekes, S., & Urbain, J.P. 2014, "On the Applicability of the Sieve Bootstrap in Time Series Panels", Oxford Bulletin of Economics and Statistics, 76(1), pp. 139-151.

Oyvat, C. 2010, "How Urbanization Affects the Inequality in Developing Countries: A Critique of Kuznets Curve", University of Massachusetts New School University Economics Graduate Student Workshop 23-24 October, 2010.http://scholar.google.com/citations?view_op=view_citation&hl=en&user=ku4HdIwAAAAJ&citation_for_view=ku4HdIwAAAAJ:u-x6o8ySG0sC. Accessed 15 April 2015.

University of Texas, Inequality Project, http://utip.gov.utexas.edu/data.html, Accessed 15 Nov 2015.

Verardi, V., & Wagner, J. 2012, "Productivity Premia for German Manufacturing Firms Exporting to the Euro-Area and Beyond: First Evidence from Robust Fixed Effects Estimations", The World Economy, Wiley Blackwell, 35(6), pp. 694-712.

Verardi, V., & Croux, C. 2009, "Robust Regression in Stata", Stata Journal, 9 (3), pp. 439–453.

Wagner, M. 2008, "The carbon Kuznets curve: A cloudy Picture emitted by bad econometrics?", Resource and Energy Economics, 30(3), pp. 388-408.

World Bank: World Development Indicators. http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=World-Development-Indicators (2015). Accessed 15 Nov 2015.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

THE EFFECTS OF COGNITION AND AFFECT BASED TRUST ON ORGANIZATION IDENTIFICATION

DOI: 10.17261/Pressacademia.2016116554

Hasim Cuce[1], Ozge Tayfur Ekmekci[2], Semra Guney[3]

[1]Turkish Armed Forces. hasimmm293@hotmail.com

[2]Hacettepe University. otayfur@hacettepe.edu.tr

[3]Hacettepe University. semguney@yahoo.com

ABSTRACT

This study aims to investigate the effects of cognition and affect-based trust on organizational identification and test whether the predictive power of these two trust dimensions differs for male and female employees. Data were collected from 161 white-collar employees of a Turkish public organization. The results of path analysis did not support the hypotheses indicating that affect and cognition-based trust positively predicted organizational identification. However, the effects of affect and cognition-based trust on identification were found to be significant after controlling the effects of demographic variables and social desirability. In multi-group path analysis, the differential effect of gender was not found to be significant. That is, the effects of affect and cognition-based trust on identification were not stronger for women and men employees respectively. Despite the insignificant effects of trust dimensions, this study demonstrated the importance of overall supervisory trust on the development of identification. In line with Social Exchange Theory, employees tend to reciprocate their supervisors' trustworthiness by being identified with their organization. Alternatively, employees may feel identification because existence of trustworthy supervisors within the organization could help them to portray good image to both themselves and other people.

Key words: Supervisory-trust, cognition-based trust, affect-based trust, identification, gender.

JEL Classification: M10, M12, M54

1. INTRODUCTION

Lifelong employment becomes an exception and employee loyalty substantially diminishes in today's business world. Mergers, takeovers and restructurings turn out to be part of business life and redefine the employee and organization relations. As the threats to employee loyalty increases, retaining talented employees and eliciting their identification with the organization has gained importance for the effectiveness of organizations and for the well-being of their members. Identification, which reflects "employees' perception of oneness with or belongingness to the organization" (Ashforth & Mael, 1989, p.21) may increase employees' performance, decrease their desire for leaving the organization and make them more committed to their job and organization (Kreiner & Ashforth, 2004). Anticipating these positive consequences, many researchers directed their attention to find the correlates and antecedents of organizational identification. Regarded as the basis of any quality relationships, trust seems to be one of most prominent antecedents of identification.

Besides enhancing relationships and identification, today's complex and ambiguous business environment calls for more collaboration and coordination between supervisors and employees. Effective execution of the tasks and gaining competitive advantage largely depend on interpersonal trust established between supervisors and employees. Supervisory trust, which is related to employees' *willingness to rely on their supervisor(s) and*

expectations of regular, honest, and cooperative behavior from them" (Doney, Cannon & Mullen, 1998; Fukuyama, 1995) results in number of positive work outcomes such as enhanced team (Dirks, 2000) and organizational performance (Davis, Schoorman, Mayer, & Tan, 2000), reduced turnover intention (Mulki, Jaramillo & Locander, 2006) and organizational citizenship behaviors (McAllister, 1995).

Despite the extensive and well-developed literature on organizational identification and supervisory trust, relatively few studies (e.g., DeConnick, 2011) addressed the relationship between these constructs. This study aims to investigate seemingly under-explored relationship by examining the effects of affect and cognition-based trust on identification. The study distinguishes itself from many studies: a) by testing the effects of both affect and cognition-based trust on identification rather than testing the effect of supervisory trust in general, b) by testing the relationship between supervisory trust and organizational identification separately for female and male employees to understand whether gender influences that relationship. We believe that understanding how supervisor trust affects employees' level of identification would contribute to existing literature because much of the research has been conducted primarily in individualistic cultures, not in collectivist cultures. This shortcoming raises questions about the generalizability of the results to collectivist cultures, typical of Eastern societies. Collectivist cultures stresses the importance of relatedness, community and expressive ties, which could shape the exchanges among employees, supervisors and organizations in an unpredictable or different way compared to individualistic cultures. Being conducted in Turkey characterized with relatively collectivistic culture (Hofstede, 1980), this study could contribute the existing literature by revealing the motivational underpinning of organizational identification.

2. LITERATURE REVIEW

2.1. Organization Identification

Despite the voluminous number of research, there seems to be lack of agreement regarding the definition of organizational identification. Although some researchers (e.g., Hall, Schneider, & Nygren, 1970; Pratt, 1998; Stengel, 1987) conceptualize identification as a cognitive construct, others (e.g., O'Reilly and Chatman, 1986) define and conceptualize it by giving reference to affective-motivational terms. The researchers following the first approach (cognition approach) generally define identification by drawing attention to perceived similarity between organization and self-identity. For example, Stengel (1987, p.175) defines organizational identification as a process whereby an individual's beliefs about organization become self-referential or self-defining. Dutton, Dukerich and Harquail (1994) gave a similar definition such that "identification is a process of incorporating the perception of oneself as a member of a particular organization into one's general self-definition. Having a different focus, first Kelman (1961), then O'Reilly and Chatman (1986) stresses affective-motivational side of identification by giving reference to desires and attraction. According to Kelman (1961) identification develops when an individual accepts the influence of others to establish or maintain a satisfying relationship. Thanks to identification, individual feels proud to be a part of group and respect its values and accomplishments.

Today, the concept of organizational identification is explained mostly with "Social Identity" theory, which incorporates both cognitive and affective terms. The theory simply proposes that individual's self-concept partly derives from his [or her] knowledge of his [or her] membership of a group (or groups) together with the value and emotional significance attached to that membership'' (Tajfel, 1978, p. 63). Accordingly, if an individual conceives of himself or herself in terms of the membership of a group, that is, if s/he identifies with the group, his/her self-concept, attitudes and behaviors are governed by this group membership (Deaux, 1996). Defining it as "employees' perception of oneness with or belongingness to the organization" (Tolman, 1943, cited in Mael & Ashforth, 2001), Ashforth and Mael (1989; 2001) accept organizational identification as 'a specific form of social identification'. Through identification, the organization provides the employees with a sense of identity; as a result, employees take the organization's perspective and act in the organization's best interest. As Riketta (2005) points out all definitions share similarity despite the different phrases and words utilized. These definitions suggest that through identification the employees seem to associate his or her organizational membership with his or her self-concept, either cognitively (e.g., feeling a part of the organization; internalizing organizational values), emotionally (pride in membership), or both (Riketta, 2005). In

this study, we will adopt the definition of Ashforth and Mael (1989) and regard identification as "*perception of belongingness to a group and a sense of oneness with the group*" (p.21).

Despite the lack of agreement about the definition of identification, there is no doubt that the concept of identification is important for organizations because it explains interpersonal relations (why employees prefer interacting with others in a particular way), work values (i.e., why employees approach their work the way they do) and reasons for joining or leaving the organization (DeConnick, 2011).

2.2. Trust & Supervisory-Trust

Trust was found to be associated with different organizational outcomes such as reduced transaction costs, improved inter organizational and manager-subordinate relationships (Doney, Cannon & Mullen, 1998), and increased job satisfaction, organizational commitment and job performance (Dirks & Ferrin, 2001). Despite the voluminous number of research about its consequences, there is no agreed upon definition of trust. Some researchers (e.g., Axelrod, 1984; Deutsch, 1960; cited in Lewicki, Tomlinson & Gillespie, 2006) define trust by giving reference to people's behaviors whereas others define it by means of expectations, intentions, affect and dispositions (e.g., Mayer et al., 1995, Fukuyama, 1995). Focusing on behaviors, Deutsch (1962) defines trust as "actions that increase one's vulnerability to another" (p.276). Accordingly, the trustor must decide how much to cooperate with the trustee and his/her level of trust is inferred from the level and frequency of cooperative behaviors shown (Lewicki et al., 2006). Focusing on expectations, intentions, affect and dispositions, Fukuyama (1995; cited in Doney et al., 1998, p.603) conceptualizes trust as "the expectation of regular, honest, and cooperative behavior based on commonly shared norms and values". Like Fukuyama (1995), Mayer et al (1995) focuses on expectations and defines trust as "the willingness of a person to be vulnerable to the actions of fellow coworkers whose behavior and actions that person cannot control." (p.709). Rather than focusing solely on one side, Donney et al (1998) provide more comprehensive definition such that trust reflects "*willingness to rely on another party and to take action in circumstances where such action makes one vulnerable to the other party"(p.604).* Trust, in a way, refers to a positive expectation that another person will not act opportunistically through words, actions or decisions (Puusa & Tolvanen, 2006).

Despite the abundance of trust definitions and increasing anticipation of its importance, trust has mostly been studied at a general level without acknowledging the different referents. However as Dirks and Skarlicki (2004) points out, identification of the different referents of trust such as organizational, supervisory or coworker trust enables organizations to better leverage the benefits of trust given the fact each type of trust has its own unique antecedents and consequences. In this study, we will focus on supervisory trust, which is argued to be different from organizational or coworker trust in terms of power differences and asymmetry of information. Adapting Mayer et al's (1995) definition of trust, we will conceptualize trust in supervisors as "the willingness of a person to be vulnerable to the actions of supervisors whose behavior and actions that person cannot control". In contrast to many studies adopting this definition, we will operationalize supervisory trust as a multi dimensional construct reflecting emotional / affective and cognitive side of interpersonal relations. In other words, following the suggestion of McAllister (1995), we will treat trust as "a single, super ordinate factor with cognitive and affective dimensions.

Cognition-based trust reflects the beliefs and judgments about other party's trustworthiness about fulfillments of prescribed responsibilities (Chen, Chen & Meindl; 1998; Lewicki et al., 2006). As part of the professionalism, cognition-based trust provides both trustee and trustor with confidence that they will abide by their contract and treat each other equitably (Chen et al, 1998). Affect-based trust, on the other hand, represents emotional bond between trustee and trustor that goes beyond business or professional relationships. This type of trust manifests itself as personal care of and concern for others (Chen et al., 1998). Cognitive and affective dimensions of trust are argued to differ from each other based on interests. While affect-based trust has social side and relies on one's desire to be committed to the relationship and meet collective interests, cognition based trust has calculative-side and relies on one's desire to meet his/her self-interests. Although cognition and affect-based trust seem to represent the distinct dimensions, they are argued to reciprocally affect each other (Lewicki et al., 2006). Some researchers claim that cognition-based trust could evolve into affect-based trust because calculative and professional relationships may facilitate the development of more personalized and emotional relationships over time (Chen et., 1998).

2.3. The Relationship between Organizational Identification and Supervisory Trust

Given the fact that trust is the basis of quality interpersonal relations, many researchers directed their attention to how trust permeates its effects on organizations and their members. Even though they have focused on different trust foci such as such as supervisory, coworkers or organizational trust, the researchers reached the same conclusion: Trust shapes variety of employee attitudes and behaviors such as job satisfaction, commitment, citizenship behavior and identification. Social Identity Theory (Tajfel, 1978), Social Exchange and Norm of Reciprocity (Gouldner, 1960; Blau, 1964) could shed light on how trust influences aforementioned attitudes and behaviors, including identification with the organization.

According to Social Identity Theory, individuals want to boost their self-esteem and worth by identifying themselves with trustworthy groups and organizations. Put in another way, defining themselves with reliable, honest and dependable organizations could help people portray to positive self-image to both themselves and other people. Compared to others, it would be easier for employees to identify with themselves with their organizations, whose actions and sayings are trustworthy. Similarly, if employees regard their supervisors as trustworthy, reliable and hones, they could feel sense of belongingness to the organization, which is represented and managed by these supervisors.

Social exchange theory, which is argued to provide conceptual underpinning of research on work attitudes and behaviors (Wayne, Shore & Liden, 1997; cited in Aryee, Budhwar & Chen, 2002), could also explain the relationship between trust and identification. The theory (Blau, 1964) claims that individuals feel obligation to treat other people favorably in exchange for a favorable treatment or reward they expect to receive. In a way, individuals create a “norm of reciprocity” in their relations, which leads them to show positive attitude and behavior in response to other individuals’ constructive attitude and behaviors (Gouldner, 1960; Blau, 1964). The discretionary nature of when favors rendered will be reciprocated makes trust important parts of any exchange (Aryee et al., 2002). Following this corollary, norm of reciprocity and social exchanges within the organizations may force employees to reciprocate the favorable treatment of their supervisors with positive attitude and behaviors and increase their tendency to have trust in them. In other words, employees seem to respond supervisor’s supportive behaviors and faith in them with the increased supervisory trust and the identification with organization.

Majority of the research focused on the antecedents and consequences of trust and identification, however they failed to integrate these two concepts and investigate their relations. Only the limited number of research (e.g., Edwards & Cable, 2009; Restubog, 2008; Tuzun, 2006) investigated the effect of trust, especially the effect of organizational trust, on identification without taking into account different trust foci. For instance, Restubog et al. (2008) reported the mediating effect of organizational trust on the relationship between psychological contract breach and identification as significant, thereby demonstrated the positive linkage between trust and identification. Similarly, while testing the mediating effect of organization identification, Edwards and Cable (2009) found trust as an antecedent of identification, which in turn influences turnover intention.

Having the significant position power, managers usually shape the relation between organizations and employees (Van Knippenberg et al, 2007). Besides being a power-figure, managers are regarded as prototypes reflecting the characteristics of the organizations, therefore their attitudes and behaviors are usually generalized to overall organization. Employees trusting their supervisors could regard their organizations as trustworthy, thus feel themselves part of the organization and identify with it. Trust could also strengthen the bond between employees and managers, increase identification by developing collective feeling. In line with this, DeConnick (2011) reported positive relationship between supervisory trust and identification in a study conducted with sales people. Similarly, Tseng, Chen and Chen (2005) tested whether supervisory trust and reliability predict identification and reported positive and significant effects of both variables. Although testing the effect of supervisory trust, majority of the studies did not take the effects of different trust dimensions into account. To fill this gap, recently Erturk (2010) examined the moderating effects of trust in supervisor on the relationships among psychological empowerment, perceived organizational support (POS), and organizational identification. The researcher found both cognition and affect-based trust in supervisor to be strongly and positively associated with organizational identification.

It is noteworthy to mention that the trust could also be an outcome rather than antecedent of identification. Employees feeling themselves part of their organization and sharing its values and beliefs could be more inclined to feel trust toward their supervisors. In fact, empirical studies (e.g., Puusa & Tolvanen, 2006) suggested the existence of reciprocal relationship between trust and identification in which trust act as antecedent or consequence of identification. Although acknowledging the existence of reciprocal relationship, we still expect supervisor trust to predict identification because trust seems to encompass more general feelings than identification. Given the fact that the antecedents of identification (e.g., justice; perceived support) also predicted the trust, it is reasonable to expect both variables to be related to each other. We believe that employees are more likely to form bonds that foster identification when they trust their organizations, leaders and supervisors. Therefore, we propose that two distinct dimensions of trust (affective and cognition based trust) would positively predict organizational identification. In other words, employees perceiving their supervisors trustworthy both emotionally and cognitively are expected to feel more belongingness and oneness with the organization.

H1a: Affect- based trust positively predicts organizational identification

H1b: Cognition-based trust positively predicts organizational identification

Although both affect and cognition-based is expected to predict identification, gender may play a crucial role in this linkage. Trust and identification are related to perceptions shaped mostly by cognitive and affective processes. Since cognitive and affective processes are influenced by individual differences, it is reasonable to expect women and men to feel different levels of identification and trust in response to same organizational climate and managerial practices. According to Social Role Theory, women and men sometimes act differently because of the normative pressures forcing them to act consistent with gender typical roles and different skills acquired throughout the socialization process (Eagly & Wood, 1991). The theory claims than women and men differ with respect to agentic versus communal tendencies. The gender role ascribed to women promotes communal behaviors, which stress processes and procedures. On the other hand, gender role ascribed to men promotes agentic behaviors, which stress outcomes and instrumentality (Bakan, 1966; cited in Buchan, Croson & Solnick, 2008). Having agentic orientation, men are found to be more task-oriented and aggressive. Representing the other side, women seem to be more relationship oriented, display more empathy and emphasize harmony in their social interactions (Cross and Markus, 1993; cited in Buchan, Croson & Solnick, 2008). Such differences could make women more sensitive to emotions, which led them to seek affect-based trust in their relations and make affect-based trust prominent in the development of identification. On the other hand, men's preference to use problem-focused coping strategies and task orientation could lead them to focus on calculative side of the relations, thereby seek cognition-based trust. Such a tendency could strengthen the effect of cognition-based trust on identification for male employees. This leads to our hypothesis:

H2: The effect of affect-based trust on identification is stronger than that of cognition-based trust for women employees compared to men employees.

3. DATA & METHODOLOGY

3.1. Participants

We collected data from the employees of a public organization in defense sector. During the data collection period, the total number of white collar employees was 389. Acknowledging the possibility of low response rate, we aimed to collect data from all employees. Although anonymity and confidentiality of the responses were ensured, we were able to obtain 170 questionnaires. Before proceeding with hypothesis testing, data from respondents (9 questionnaires) who had not evaluated more than 50 % of the items were completely removed from analyses. For the remaining participants, missing values were replaced with mean values calculated for each variable. Total number of usable questionnaire turned out to be 161 questionnaires, constituting 41% response rate.

The sample comprised 79 females (49%) and 82 males (51%). Majority of participants were between 26 and 30 years of age (30.7%) and between 31 and 35 years of age (28.7%). Approximately 96% of the participants had

bachelor or graduate degree, while only 4% had high school degree. 13% of the respondents had less than 1, %34 had 1-5, 16% had 6-10; 26% had 11-15 year tenure; 6% had 16-20; 4% had more than 21 years tenure.

3.2. Measures

The questionnaire package consists of three sections. While the first section includes items about demographic variables such as sex, age and education, and tenure, the second and third sections compose of supervisory trust and organizational identification items respectively.

Supervisor Trust: Supervisor trust was measured with McAllister's Interpersonal Trust scale (1995). The original scale intends to measure affect and cognition based trust with 11-items. Cognition-based trust items (i.e., six items) measure one's rational assessment of the other party's trustworthiness (Sample item: "*I can rely on this person not to make my job more difficult by careless work*"), while affect-based trust items measure (i.e., five items) emotional bonds between another party (Sample item: *"We have a sharing relationship. We can both freely share our ideas, feelings, and hopes*"; McAllister, 1995). Responses to trust items were measured on a 5-point scale format with "1=Strongly Disagree to 5=Strongly Agree". Higher scores are indicative of higher cognition and affect based trust. The reliabilities of cognition-based trust (α =.85); and affect based trust (α =.77) were found to be well above the criteria suggested by Nunnally (1978).

Organizational Identification: Riketta (2005:374) suggests researchers to use Mael and Ashforth's (1992) scale given the scale's widely accepted status in the field, its length and remarkably high validity and reliability figures obtained in various studies. Considering this suggestion, we used Mael and Ashforth's Orgaizational Identification scale, which measures employee's feelings of identification as a single dimension. Since Polat (2009) had translated the scale into Turkish and tested its validity, we used this translation without any alteration. In this six item scale, participants evaluated the items (e.g., "*When someone criticizes my organization, it feels like a personal insult*") using 5 point Likert type scale (1: Strongly Disagree, 5: Strongly Agree). Participants with higher scores were assumed to feel themselves as part of the organization. The internal consistency of the items was found be satisfactory in previous studies (e.g., Cronbach's α =.87 in Mael & Ashforth's study; Cronbach's α =.84 in Polat's study) and in the current study (Cronbach's α =.84).

3.3. Analyses

Hypothesis 1a and 1b were tested with full latent variable modeling, which incorporates measurement and structural models at the same time. The measurement model was examined to determine whether the number of factors (i.e. affect-based trust, cognition-based trust and organizational identification) and the loadings of the questionnaire items were in line with the 3-factor structure. After examining factor structures, structural model part was assessed for testing hypothesized relations.

Hypothesis 2 was tested using multi-group structural analysis, which again includes both measurement and structural models .In multi group analysis, firstly measurement invariance, and then structural invariance needs to be established. While measurement invariance involves the test of whether instruments designed to measure aforementioned variables (i.e., trust dimensions and identification) were invariant, structural invariance involves the test of whether hypothesized relations were invariant across different samples. Following the suggestions of Jöreskog (1971), we firstly conducted baseline tests in which we examined the same model (including measurement and structural models) for women and men samples both separately and simultaneously. After these baseline tests, we made multi group analyses which involve the test of same model for women and men samples simultaneously, yet this time by imposing equality constraints. First factor loadings (Model 1), secondly structural weights (Model 2), thirdly structural covariances (Model 3), fourthly structural residuals (Model 4) and lastly measurement residuals (Model 5) were constrained to be equal across women and men samples. Nested model comparisons were made comparing the fit indices and analysis of chi square different differences for aforementioned 5 models.

In all analyses detailed above, maximum-likelihood-estimation was preferred given the adequacy of sample size and existence of normal distribution in the data (see, Tabachnick & Fidell, 2001, p.697). AMOS 17 (Arbuckle, 2008), which enables the test of hypothesized relations and goodness of the model was utilized. The significance of hypothesized relations was assessed by examining the standardized estimates and t-values.

Goodness of the model, that is whether the proposed model fit to the data, was examined through various statistics and indices (e.g., Chi Square / degrees of freedom, Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA)). Measuring the degree of similarity between observed covariance matrix and covariance matrix predicted by the model, chi-square value was desired to be insignificant. Given the fact that $\chi 2$ is sensitive to sample size, thereby turn out to be significant, most researchers prefer to take into account $\chi 2$ /df value (Schermelleh-Engel, Moosbrugger & Müller, 2003). Accordingly, $\chi 2$ /df value between 0 and 2 is indicative of good fit and between 2 and 3 indicative of acceptable fit. For CFI, if the value is equal to .97 or above, this suggests the existence of good fit, whereas the value between .95 and .97 suggests acceptable fit (Schermelleh-Engel et al., 2003). As for RMSEA, value of less than .05 was considered evidence of a good fit, between .05 and .08 a fair fit, between .08 and .10 a mediocre fit, and greater than .10 a poor fit (MacCallum, Browne, & Sugawara, 1996).

4. FINDINGS & DISCUSSIONS

4.1. Results of Preliminary Analyses

Prior to analysis, organizational identification, affect and cognition-based trust were examined through various statistical programs for accuracy of data entry, missing values and normality. Missing values were replaced with mean values of respective items. No severe violations of univariate and multivariate normality were detected based on the results of Kolmogorov –Smirnov and Mardina coefficient tests (Kline, 2011). Before going further with path and multigroup analyses, we examined the variance inflation factor (VIF) and the condition index (CI) to test multicollinearity. If VIF is larger than 10.0, it is regarded as an indication of multicollinearity (Kleinbaum, Lawrence, Muller, & Nizam, 1998). In our study, VIFs ranged from 1.16 to 2.81, which were well below the threshold value. As for the other criterion, CI, values greater than 30 are accepted as the problem of collinearity (Tabachnick & Fidell, 2001). Although the largest CI was found to be very close to threshold value (i.e., 29.34), multicollinearity was not regarded as a pervasive problem considering VIF values.

4.2. Results of Main Analyses

After data screening, the measurement model was examined to see whether the items were able to measure organization identification, affective and cognition-based trust constructs. All items loaded satisfactorily on their respective constructs/factors, meaning, item and construct relations resulted as expected (see Table 1). After assessing measurement model, hypothesized relations were examined. According to the results, hypotheses 1a and 1b were not supported. The path from cognition-trust to identification (β = .30; p =.07) and the path from affective trust to identification (β = .31; p =.07) were found to be insignificant; though close to the significance level. The covariance term indicated the existence of strong relationship between two dimensions of trust. After the examination of hypothesized relations, model fit was assessed using the criteria detailed in analysis section. The degree of fit between model and data was found to be acceptable, if not perfect. ($\chi 2$ /df = 2.14; RMSEA = .08 and CFI =.93)

Table 1: Results of the Full-Latent Variable Analysis: Estimates

	Unstandardized Estimate	Standard Error	Standardized Estimates (β)	p
Affect-Based Trust				
AT1	1.04	.10	.83	<.001
AT2	1.10	.10	.87	<.001
AT3	1.14	.11	.87	<.001
AT4	.85	.09	.78	<.001
AT5	1.00	--	.71	<.001
Cognition-Based Trust				
CT1	1.01	.08	.82	<.001
CT2	1.07	.08	.88	<.001

CT3	.99	.07	.87	<.001
CT4	1.02	.09	.82	<.001
CT5	1.00	--	.81	<.001
CT6	.66	.09	.54	<.001
Identification				
ID1	1.00	--	.58	<.001
ID2	.70	.15	.42	<.001
ID3	.85	.13	.62	<.001
ID4	1.22	.16	.84	<.001
ID5	1.44	.18	.88	<.001
ID6	1.18	.17	.68	
Covariance				
A.Trust-C.Trust	.54	.09	--	<.001
Paths				
A.Trust >> Identification	.24	.14	.31	.08
C.Trust>>Identification	.24	.14	.30	.07

Considering the possibility of attenuation of effect sizes, which seems to be evidenced by strong covariance between two trust dimensions, we conducted multiple regression analysis that treat social desirability and demographics as controlling variables, cognition and affect-based trust as independent variables, identification as dependent variable. Unlike the results obtained from full-latent variable modeling, cognition based trust positively predicted the identification with the organization after controlling the effects of social desirability and demographic variables (see Table 2). The effect of affect-based trust, on the other hand, was found to be very close to significance level.

Tablo 2: Results of the Hierarchical Regression Analysis

	B	SE (B)	β	t	p
Step 1					
Gender	1.50	.64	.19	2.33	.02
Age	-.07	.28	-.03	-.26	.79
M.Status	.30	.70	.04	.43	.67
Step 2					
Gender	1.52	.64	.19	2.37	.02
Age	-.04	.28	-.01	-.14	.89
Marital Status	.24	.70	.03	.34	.73
S.Desirability	.20	.24	.09	.82	.41
Step 3					
Gender	1.01	.55	.14	2.04	.05
Age	-.10	.24	-.03	-.43	.66
Marital Status	.57	.60	.07	.95	.34
S.Desirability	.17	.21	.06	.82	.42
Affect Trust	.20	.10	.22	1.94	.05
Cognition Trust	.28	.09	.34	2.92**	.01**

Note - Gender: 1: Male; 2: Female; M.Status: 1: Married, 2: Single; S.Desirability is measured with 1: Right; 2: Wrong. B: Unstandardized Estimate; SE (B): Standard Error of unstandardized estimate; β: Standardized Estimate.

To test the hypothesis 2, first baseline tests and then multi-group model tests were conducted. Within the framework of baseline tests, we tested the validity of hypothesized model first separately and then simultaneously for both samples. For both gender, three latent variables (i.e., affect based trust, cognition-based trust and organizational identification) were hypothesized to be measured with 17 items and trust

dimensions were assumed to predict organizational identification. Initial results indicated poor fitting model for both female ($\chi2$ (117) = 269.5, p <.05; CFI = .84; RMSEA =.13) and male samples ($\chi2$ (117) = 315.6, p <.05; CFI = .78; RMSEA =.15). The reason for poor fit was found to be related to lack of covariance terms among latent variables. Given the conceptual similarity of the constructs (albeit not same), it seemed theoretically logical to add the covariance terms for trust dimensions. After this modification, the model improved substantially for both female ($\chi2$ (116) = 189.4, p <.05; CFI = .92; RMSEA =.07) and male samples ($\chi2$ (116) = 247.2, p <.05; CFI = .85; RMSEA =.08). These results indicated the similarity of factor structures for males and females. After checking the patterns of factor structure separately for each group, we tested the baseline model for both gender simultaneously and obtained acceptable model with $\chi2$ /df = 1.88; CFI = .90; RMSEA =.08. Simultaneous (multigroup) test of baseline model yielded similar results with the separate tests such that all indicators /items were found to be significantly associated with their respective factors. After multi-group and single group baseline tests, we assessed the invariance of full constrained model. To assess invariance, we specified 5 different models in which all factor loadings, structural weights, structural covariances, structural residuals and measurement residuals were constrained to be equal across male and female samples. Firstly, the unconstrained model was compared with Model 1 in which all factor loadings were constrained to be equal across both samples. A $\chi2$ difference test suggested the existence of measurement invariance across two samples ($\Delta\chi2$ (14) = 9.89; p > .05). Once the measurement invariance model (Model 1) was accepted, the more restrictive Model 2, in which both factor loadings and structural weights were constrained to be equal, was compared with Model 1. Again, the $\chi2$ difference test suggested the existence of invariance across two samples ($\Delta\chi2$ (2) = .24; p > .05). This result indicated the similarity of the hypothesized paths from trust dimensions to identification. In other words, the paths from cognition and affect based trust to identification were almost equal in magnitude for both samples. After demonstrating the hypothesized paths' invariance, the more restrictive Model 3 was specified. In Model 3, structural covariances between trust dimensions were assumed to be equal. Nested comparison of Model 3 and Model 2 yielded insignificant $\chi2$ difference value, meaning that the magnitude of the relationship between affect and cognition-based trust did not differ across two samples ($\Delta\chi2$ (3) = 5.77; p > .05. Nested comparison of Model 3 and Model 4, which constrains structural residuals to be equal again resulted in insignificant $\chi2$ difference ($\Delta\chi2$ (1) = 6.40; p > .05, suggested the similarity of structural residuals for women and men samples. The last model comparison, however, yielded significant $\chi2$ difference value ($\Delta\chi2$ (17) = 69.48; p < .05, suggesting that measurement residuals differed across two samples. After nested model comparisons, the fit between data and models was assessed using several indices. The fit between data and models deteriorated, as more restrictive models were utilized, but this deterioration was not considerable. The fit indices for Model 4, which suggested the existence of measurement, structural weights, structural covariance and structural residual invariances, indicated existence of an acceptable model (RMSEA = .07; CFI =.94; $\chi2$ /df = 2.55).

Looking at multi group analysis results (see Table 3), we concluded that the effects of cognition and affect-based trust on identification were similar in magnitude for women and men employees, which rendered Hypothesis 2 unsupported. Again, affect and cognition based trust could not predict the prevalence of organizational identification in both women (for affect-based trust, β = .37, p >.05; for cognition-based trust, β = .18, p >.05) and men samples (for affect-based trust, β = .42, p >.05; for cognition-based trust, β = .19, p >.05). Remarkably, the relationship between two trust dimensions turned out to be strong for both men and women.

Table 3: Results of the Multi Group Analyses

	Women				Men			
	B	**SE (b)**	**(β)**	**p**	**B**	**SE(b)**	**β**	**p**
Affect-Based Trust								
AT1	1.02	.18	.76	<.001	.99	.13	.86	<.001
AT2	1.17	.19	.87	<.001	1.01	.13	.86	<.001
AT3	1.20	.20	.82	<.001	1.06	.13	.90	<.001
AT4	.92	.17	.75	<.001	.82	.11	.82	<.001
AT5	1.00	--	.65	<.001	1.00	--	.75	<.001

Cognition-Based Trust								
CT1	1.04	.09	.89	<.001	1.02	.15	.76	<.001
CT2	1.04	.08	.94	<.001	1.16	.15	.86	<.001
CT3	.95	.09	.87	<.001	1.11	.14	.88	<.001
CT4	.95	.010	.76	<.001	1.12	.16	.79	<.001
CT5	1.00	--	.87	<.001	1.00	--	.76	<.001
CT6	.66	.12	.58	<.001	.65	.16	.48	<.001
Identification								
ID1	1.00	--	.77	<.001	1.00	--		<.001
ID2	.66	.15	.51	<.001	.71	.26	.52	<.001
ID3	.59	.12	.57	<.001	.94	.25	.38	<.001
ID4	.85	.11	.84	<.001	1.35	.31	.61	<.001
ID5	1.10	.12	.92	<.001	1.53	.34	.79	<.001
ID6	.81	.14	.64	<.001	1.51	.36	.72	<.001
Covariance								
A.Trust-C.Trust	.44	.11	--	<.001	.58	.14	--	<.001
Paths								
A.Trust >Identification	.46	.38	.37	.22	.25	.15	.42	.09
C.Trust>Identification	.20	.32	.18	.53	.14	.17	.19	.42

Note. B: Unstandardized Estimate; SE (B): Standard Error of unstandardized estimate; β: Standardized Estimate.

4.3. Discussion

The primary purpose of this paper is to determine whether affect and cognition based trust affect the employee's propensity to identify themselves with their organizations. Additionally, the paper questions which type of trust, affect or cognition based, stronger predictor of organizational identification and whether the relationship between the dimensions of trust and organizational identification differs with respect to gender. The results of full-latent variable model failed to support the association between trust dimensions and organizational identification, although the results of traditional regression analyses suggested the opposite. The conflicting results could emanate from the strong relationship between affect and cognition-based trust. Although found to be distinct dimensions in previous studies (e.g., Holste & Fields, 2005; Ng & Chua, 2006; Webber & Klimoski, 2004; Wilson, Straus, & McEvily, 2006), in this study cognition and affect based trust was found to be strongly related to each other, which is evidenced by strong zero order correlation. This reciprocal relation seems to attenuate and render the effects of trust dimensions insignificant. As Grewal, Cote and Baumgartner (2004) state, the strong correlation between variables (i.e., trust dimensions) might have resulted in Type II error, which leads us not to detect significant relations (i.e., reject a false null hypothesis) (Banerjee, Chitnis, Jadhav, Bhawalkar, & Chaudhury, 2009).

Looking at the results of traditional regression analysis, we can still claim that supervisory trust as a whole plays significant role in the development of identification. The voluminous literature on leadership has clearly demonstrated the influence of supervisors on employees (e.g., Bass, Avalio, & Pointon,1990). Through critical decisions such as pay raises, promotions, demotions, and training opportunities that affect employees, supervisors have a potential to shape work environment, set the tone for interpersonal relationships and influence employee's attitude toward organization and their coworkers. While attaching utmost importance to the messages of supervisors (Levinson, 1965; Liden, Bauer, & Erdogan, 2004), employees usually regard supervisors' attitudes as the representation of the organization's attitudes. As the Social Identity Theory suggests, individuals want to boost their self-esteem and worth by identifying themselves with trustworthy groups, organizations and people. When employees see their supervisors trustworthy, dependable, and reliable, they tend to feel belongingness to their organizations (e.g., DeConninck 2001; Erturk, 2006). Besides, norm of reciprocity and social exchanges within the organizations may force employees to reciprocate the favorable treatment of supervisors with positive attitude and behaviors (Blau, 1964). Supervisor's supportive behaviors seem to be reciprocated with the increased supervisory trust and the identification with organization.

Our data failed to support the main thrust of the study, that gender affects the linkage between supervisory trust and identification. The study's findings show that male and female employees have similar patterns regarding the effect of affect and cognition-based trust on identification. This result seems to be consistent with Riordan and Shore's (1997) argument, which indicates that much of differences in work attitudes are due to situational factors rather than gender per se. As Lefkowitz (1994) found that when the effects of systematic differences in the jobs held and the rewards received by women as compared with men were controlled, there could be no differences between men and women in their responses to work. In this study, women and men employees have white collar jobs having similar characteristics in terms of gender segregation of the work responsibilities and rewards. We believe that lack of differences regarding the effect of trust on identification could be explained with the similar situational factors affecting women and men employees.

The study has some conceptual and methodological limitations, which should be acknowledged while interpreting the findings and giving advice for future research. Conceptually, the nature and number of variables included in this study provided limited perspective regarding the development of organizational identification. Our article centers on the influence of only affect and cognition-based trust on the development of organizational identification although one's level of identification may be influenced by variety of organizational, relational, or individual factors (Doney & Cannon, 1997; McAllister, 1995). We suggest researchers to investigate the effects of individual and organizational level variables such as propensity to trust and organizational culture in order to provide more comprehensive perspective regarding organizational identification. For example future research may integrate personality theories to identification and trust literatures to better understand why trust in organizations, supervisors or coworkers do not have similar power on identification for different employees. This study examined only the direct effects. However, moderators that could affect the relationship between identification and trust are also conceivable.

Since this study focused only on supervisor trust, its findings have limited generalizability to other types of trust, namely coworker or organizational trust, which could be shaped by more calculative factors like reward structures and appraisal procedures or affective factors like friendship. Therefore we suggest researchers to examine the same hypotheses for different referents of trust such as coworker, organization and subordinates. Furthermore, although no evidence was found as to the effect of demographics on the hypothesized relationships, it should be acknowledged that the variables may not operate identically in all contexts, thereby cast doubt about the generalizability of the results.

As indicated above, the study has methodological limitations as well. The data of this research relied on self-reports of the employees. Given the fact that people have a better access to intrapsychic information such as thoughts, feelings and sensations that are unavailable to other people (Robins, Norem, & Cheek, 1999; cited in Paulhus & Vazire, 2007), we thought that other sources (i.e., supervisor or peer reports) or techniques (i.e., experimental designs) might not provide the detailed information about employees' feelings of trust and identification. In other words, we preferred self-report technique because of easy interpretability and sheer practicality. However, the use of purely self-reporting casts doubts about the validity of the results. As Paulhus and Vazire (2007) point out, this technique suffers from many measurement artifacts and credibility-related problems. Motives like consistency seeking, self-enhancement and self-presentation could affect people's ability and desire to report their actual feelings and thoughts. Apart from these motives, responses could be affected by many factors that have not been anticipated and controlled in this study. For example people may differ from each other with respect to their propensity to trust-a personality trait which could influence their perceptions regarding dyadic relations. Besides that, although Harman's one-factor test (Podsakoff & Organ, 1986) and multi-group confirmatory factor analysis demonstrated the distinctiveness of the constructs, collecting single source data with self-report methodology might still cause common method variance problem. As shown by Spector (1987), the impact of common method variance on self-report measures of affective and perceptual constructs was found to be mediocre, if not zero. This problem could have inflated the correlations between variables and result in spurious results. Several remedies such as data collection from different sources at different times could have taken to rule out this problem and increase the validity of the results. The current study is a promising beginning; future research might be enriched with measures complementary to self-reports.

Other limitation may arise from strong associations among several antecedents. Although there is no sign of multi-collinearity or singularity among variables, strong associations among trust dimensions made it difficult to disentangle their impact on organization identification. As indicated before, high correlation between affect and cognition based trust could have attenuated the impact of these trust dimensions on organizational identification. Therefore, we suggest researchers to examine the impact of overall supervisory trust on identification, in addition to the impact of different trust dimensions.

The last methodological limitation is related to relatively low response rate. Although Visser, Krosnick, Marquette and Curtin (1996) demonstrated that surveys with low response were not necessarily low in validity, we still acknowledge that low response rates could cast doubts about the validity of the results. Therefore we suggest researchers to obtain data from samples having comparable characteristics, yet with high response rates.

5. CONCLUSION

Given their effects on absenteeism, turnover, and job dissatisfaction, planned interventions should be designed to boost both trust and identification within the organization. Organizations with high levels of internal trust are argued to be more successful, adaptive and innovative than organizations with low level of trust or characterized with distrust (Shockley-Zalabak, Ellis, & Winogrard, 2000). Trust in organization and a supervisor is associated with number of positive individual and organizational outcomes such as enhanced teamwork, collaboration, employee satisfaction and commitment. Therefore it becomes imperative to understand the antecedents or predictors of trust and boost the level of trust within the organization. Results of the current investigation demonstrate the powerful role of supervisory trust in the formation of employees' attitudes such as employee's identification with the organization. As Mayer et al. (1995) points out, demonstrating the integrity, ability and benevolence of supervisors could enhance trustworthiness of supervisors in the eyes of subordinates. Also good treatment by the supervisors could create obligation in employees that they should treat their supervisors well in return. If the supervisors act fairly when allocating the rewards and resources, communicate with employees in a constructive way, and show genuine interest toward the interest of employees, they could build both cognition and affect based trust, which in turn could enhance identification. We believe that managers / supervisors could contribute the success of their organization through the selection of other managers and employees who possess talent to build an environment that fosters organizational identification.

Despite the aforementioned limitations, we hope that this study contributed to existing knowledge by examining the role of supervisory trust on the development of identification with the organization. Based on the results, we suggest both practitioners and researchers to treat affect and cognition based trust as two important, even indistinguishable components of overall feelings of trust that could boost employee's level of identification.

REFERENCES

Arbuckle, J. 2008, "Amos 17.0 user's guide". Spring House, PA: AMOS Development Corporation.

Aryee, S., Budhwar, P. S. & Chen, Z. X. 2002, "Trust as a mediator of the relationship between organizational justice and work outcomes: Test of a social exchange model", *Journal of Organizational Behavior*, Vol. 23, no.3, pp.267-285.

Ashforth, B. E. & Mael, F. 1989, "Social identity theory and the organization", *Academy of Management Review*, Vol. 14, no.1, pp. 20-39.

Axelrod, R. 1984, "The evolution of cooperation". New York: Basic Books.

Banerjee, A., Chitnis, U. B., Jadhav, S. L., Bhawalkar, J. S. & Chaudhury, S. 2009, "Hypothesis testing, type I and type II errors", *Industrial Psychiatry Journal*, Vol.18, no.2, pp.127-131

Bass, B. M., Avolio, B. J. & Pointon, J. 1990, "The implications of transactional and transformational leadership for individual, team, and organizational development". *Research in Organizational Change and Development*, Vol.4, pp.231-272.

Blau, P. M. 1964, "Exchange and power in social life". New York: Wiley.

Buchan, N. R., Croson, R. T. & Solnick, S. 2008, "Trust and gender: An examination of behavior and beliefs in the Investment Game", *Journal of Economic Behavior & Organization*, Vol. 68, no.3, pp. 466-476.

Chen, C. C., Chen, X. P. & Meindl, J. R. 1998, "How can cooperation be fostered? The cultural effects of individualism-collectivism", *Academy of Management Review*, Vol.23, no.2, pp. 285-304.

Davis, J. H., Schoorman, F. D., Mayer, R. C. & Tan, H. H. 2000, "The trusted general manager and business unit performance: Empirical evidence of a competitive advantage", *Strategic Management Journal*, Vol. 21, no.5, pp.563-576.

Deaux, K. 1996, "Social Identification". Higgins, Edward Tory (Ed); Kruglanski, Arie W. (Ed), (1996). Social psychology: Handbook of basic principles. , (pp. 777-798). New York, NY, US: Guilford Press, x, 948 pp.

DeConinck, J. B. 2011, "The effects of ethical climate on organizational identification, supervisory trust, and turnover among salespeople", *Journal of Business Research*, Vol. 64, no.6, pp. 617-624.

Deutsch, M. 1962, "Cooperation and trust: Some theoretical notes". Nebraska Symposium on Motivation, 1962. , (pp. 275-320). Oxford, England: Univer. Nebraska Press, xiii, 330.

Dirks, K. T. 2000, "Trust in leadership and team performance: Evidence from NCAA basketball", *Journal of applied psychology*, Vol. 85, no. 6, 1004-1012.

Dirks, K. T. & Ferrin, D. L. 2001, "The role of trust in organizational settings". *Organization Science*, Vol. 12, no.4, 450-467.

Dirks, K. T. & Skarlicki, D. P. 2004, "Trust in leaders: Existing research and emerging issues", *Trust and distrust in organizations: Dilemmas and approaches*, Vol.7, pp. 21-40.

Doney, P. M., Cannon, J. P. & Mullen, M. R. 1998, "Understanding the influence of national culture on the development of trust". *Academy of Management Review*, Vol.23, no.3, pp. 601-620.

Dutton, J. E., Dukerich, J. M. & Harquail, C. V. 1994, "Organizational images and member identification". Administrative Science Quarterly, Vol.39, no.2, pp. 239-263.

Eagly, A. H. & Wood, W. 1991. "Explaining sex differences in social behavior: A meta-analytic perspective". *Personality and Social Psychology Bulletin*, Vol.17, no.3, pp. 306-315.

Edwards, J. R. & Cable, D. M. 2009, "The value of value congruence", *Journal of Applied Psychology*, Vol. 94, no.3, pp.654-677.

Ertürk, A. 2010, "Exploring predictors of organizational identification: Moderating role of trust on the associations between empowerment, organizational support, and identification", *European Journal of Work and Organizational Psychology*, Vol.19, no.4, pp.409-441.

Fukuyama, F. 1995, "Trust: The social virtues and the creation of prosperity". New York, NY: The Free Press.

Gouldner, A. W. 1960, "The norm of reciprocity: A preliminary statement", *American Sociological Review*, Vol. 25, pp. 161-178.

Grewal, R., Cote, J. A. & Baumgartner, H. 2004, "*Multicollinearity and measurement error in structural equation models: Implications for theory testing"*, *Marketing Science*, Vol.23, no.4, pp. 519-529.

Hall, D. T., Schneider, B. & Nygren, H. T. 1970, "Personal factors in organizational identification". *Administrative Science Quarterl*y, Vol. 15, no.2. pp. 176-190.

Hofstede, G. 1980. *"Culture's Consequences"*, Beverly Hills, CA: Sage Publications.

Holste, J. S. & Fields, D. 2005, August, "The Relationship of Affect and Cognition Based Trust with Sharing and Use of Tacit Knowledge", In Academy of Best Management Proceedings (Vol. 2005, No. 1, pp. B1-B6).

Jöreskog, K. G. 1971, "Simultaneous factor analysis in several populations". *Psychometrika*, Vol.36, no.4, pp. 409-426.

Kelman, H.C. 1961, "Processes of opinion change", *Public Opinion Quarterly*, Vol.25, pp. 57–78.

Kleinbaum, D. G., Lawrence, L. L., Muller, K. E. & Nizam, A. 1998, "Applied regression analysis and other multivariable methods" (3rd ed.). New York: Duxbury.

Kreiner, G. E. & Ashforth, B. E. 2004, "Evidence toward an expanded model of organizational identification", *Journal of Organizational Behavior*, Vol 25, no.1, pp. 1-27.

Lefkowitz, J. 1994, "Sex-related differences in job attitudes and dispositional variables: Now you see them,…." *Academy of Management Journal*, Vol. 37, no. 2, pp. 323-349.

Levinson, H. 1965, "Reciprocation: The relationship between man and organization", Administrative Science Quarterly, Vol.9, no.4, pp. 370-390.

Lewicki, R. J., Tomlinson, E. C. & Gillespie, N. 2006, "Models of interpersonal trust development: Theoretical approaches, empirical evidence, and future directions". *Journal of Management*, Vol 32, no.6, pp. 991-1022.

Liden, R. C., Bauer, T. N., & Erdogan, B. 2004. "The role of leader-member exchange in the forming and dynamic relationship between employee and employer". In J. Coyle-Shapiro, L. Shore, S. Taylor, & L. Tetrick (Eds.). *The Employment Relationship: Examining Psychological and Contextual Perspectives*. (pp. 226-250). Oxford University Press.

MacCallum, R. C., Browne, M. W. & Sugawara, H. M. 1996, "Power analysis and determination of sample size for covariance structure modeling", *Psychological Methods*, Vol.1, no.2, pp.130-149.

Mael, F. & Ashforth, B. E. 1992, "Alumni and their alma mater: A partial test of the reformulated model of organizational identification", *Journal of Organizational Behavior*, Vol. 13, no.2, pp. 103-123.

Mael, F. A. & Ashforth, B. E. 2001, "Identification in work, war, sports, and religion: Contrasting the benefits and risks". *Journal for the Theory of Social Behaviour*, Vol.31, no.2, pp. 197-222.

Mayer, R. C., Davis, J. H. & Schoorman, F. D. 1995, "An integrative model of organizational trust". Academy of Management Review, Vol. 20, no.3, pp. 709-734.

McAllister, D. J. 1995, "Affect-and cognition-based trust as foundations for interpersonal cooperation in organizations". Academy of Management Journal, Vol. 38, no.1, pp.24-59.

Mulki, J. P., Jaramillo, F. & Locander, W. B. 2006, "Effects of ethical climate and supervisory trust on salesperson's job attitudes and intentions to quit", *Journal of Personal Selling & Sales Management*, Vol. 26, no.1, pp.19-26.

Ng, K. Y. & Chua, R. Y. 2006, "Do I contribute more when I trust more? Differential effects of cognition-and affect-based trust", *Management and Organization Review*, Vol 2, no.1, pp. 43-66.

Nunnally, J. 1978. "Psychometric methods". New York: McGraw Hill.

O'Reilly, C. A. & Chatman, J. 1986, "Organizational commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior", *Journal of Applied Psychology*, Vol.71, no.3, pp.492-499.

Paulhus, D. L., & Vazire, S. 2007, "The self-report method". In R. W. Robins, R. C. Fraley, and R. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology* (pp. 224-239). New York: Guilford Press.

Podsakoff, P. M. & Organ, D. W. 1986, "Self-reports in organizational research: Problems and prospects, Journal of management", Vol. 12, no.4, pp. 531-544.

Polat, M. 2009, "Örgütsel özdeşleşmenin öncülleri ve ardılları üzerine bir saha araştırması". [A field study about the antecedents and consequences of organizational identification], Doktora tezi [Unpublished PhD Thesis]. Bursa: Uludağ Universitesi Sosyal Bilimleri Enstitüsü.

Pratt, M. G. 1998, "Central Questions in Organizational Identification". Whetten, David A. (Ed); Godfrey, Paul C. (Ed), (1998). Identity in organizations: Building theory through conversations. Foundations for organizational science., (pp. 171-207). Thousand Oaks, CA, US: Sage Publications, Inc, xi, 308 pp.

Puusa, A. & Tolvanen, U. 2006, "Organizational identity and trust", *EJBO Electronic Journal of Business Ethics and Organization Studies*, Vol. 11, no.2, Retrieved from http://ejbo.jyu.fi.

Restubog, S.L.D., Hornsey, M.J., Bordia, P. & Esposo, S.R. 2008, "Effects of psychological contract breach on organizational citizenship behavior: Insights from the group value model", *Journal of Management Studies*, Vol. 45, no. 8, pp. 1377-1400.

Riketta, M. 2005. "Organizational identification: A meta-analysis", *Journal of Vocational Behavior*, Vol. 66, no.2, pp. 358-384.

Riordan, C. M. & Shore, L. M. 1997, "Demographic diversity and employee attitudes: An empirical examination of relational demography within work units", *Journal of Applied Psychology*, Vol. 82, no.3, pp. 342-358.

Schermelleh-Engel, K., Moosbrugger, H. & Müller, H. 2003, "Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures", Methods of Psychological Research Online, Vol. 8, no. 2, pp. 23-74.

Shockley-Zalabak, P., Ellis, K. & Winograd, G. 2000, "Organizational trust: What it means, why it matters", *Organization Development Journal*, Vol. 18, No.4, pp.35-48.

Spector, P. E. 1987, "Method variance as an artifact in self-reported affect and perceptions at work: Myth or significant problem?", *Journal of Applied Psychology*, Vol. 72, no.3, pp.438-443.

Stengel, M. 1987, "Identifikationsbereitschaft, Identifikation, Verbundenheit mit einer Organisation oder ihren Zielen" [Readiness for identification, identification with, and commitment to, an organization or its goals]. *Zeitschrift fuer Arbeits- und Organisationspsychologie*, Vol. 31, pp. 152–166

Tabachnick, B. G., & Fidell, L. S. 2001, "Using multivariate statistics". Needham Heights, Massachusetts: Allyn and Bacon.

Tajfel, H. E. 1978, "Differentiation between social groups: Studies in the social psychology of intergroup relations". London: Academic Press.

Tseng, H. C., Chen, T. F. & Chen, F. I. 2005, "Constructing and testing a model of trustworthiness, trust behavior and organizational identification". *Journal of Nursing Research*, Vol.13, no.4, pp. 293-304.

Tüzün, İ. K. 2006, "Örgütsel güven, örgütsel kimlik ve örgütsel özdeslesme iliskisi: uygulamali bir çalisma" (An empirical research on the relationships between organizational trust, organizational identity and organizational identification).Unpublished PhD Thesis

Van Knippenberg, D., Van Dick, R. & Tavares, S. 2007, "Social identity and social exchange: Identification, support, and withdrawal from the job", *Journal of Applied Social Psychology*, Vol. 37, no.3, pp. 457-477.

Visser, P. S., Krosnick, J. A., Marquette, J. & Curtin, M. (1996), "Mail surveys for election forecasting? An evaluation of the Columbus Dispatch poll", *Public Opinion Quarterly*, Vol. 60, no.2, pp. 181-227.

Webber, S. S. & Klimoski, R. J. 2004, "Client–project manager engagements, trust, and loyalty", *Journal of Organizational Behavior*, Vol. 25, no.8, pp. 997-1013.

Wilson, J. M., Straus, S. G. & McEvily, B. 2006, "All in due time: The development of trust in computer-mediated and face-to-face teams", *Organizational Behavior and Human Decision Processes*, Vol. 99, no.1, pp. 16-33.

PressAcademia

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

ADOPTION OF MOBILE PAYMENT SYSTEMS: A STUDY ON MOBILE WALLETS

DOI: 10.17261/Pressacademia.2016116555

Gokhan Aydin[1], Sebnem Burnaz[2]

[1] Istanbul Arel University. aydin.gokhan@gmail.com

[2] Istanbul Technical University. burnaz@itu.edu.tr

ABSTRACT

This study aims to understand the factors contributing to consumer attitude development towards and intention to use mobile payment systems. One of major mobile network operators' mobile wallet application in Turkey was used as a proxy of the mobile payment systems. Survey methodology is used to collect data from subscribers by stratified random sampling among two distinct groups (users and non-users). A total of 1395 questionnaires were collected from subscribers and analyzed using partial least squares structural equation modeling. The findings highlight the importance of ease of use and usefulness in attitude development. On the other hand, security concerns were found to have low level of effects on attitudes and use intentions. Effect of social influence was found to be insignificant among the users. There were differences between users' and non-users' perceptions and beliefs indicated by significant differences in the majority of the constructs employed in the study.

Keywords: Mobile payment, mobile wallet, innovativeness, mobile app, technology adoption.

JEL Classification: M30, M31, M39

1. INTRODUCTION

New technologies and digitalization of life are shaping the ways of doing business as well as the behaviors of consumers. Finding opportunities in the dynamic business scape and benefiting from them using new technologies is a major area of focus for organizations in creating value. In this new digital era, mobile devices have become one of the most prominent consumer products ever to be launched. These devices and the services provided by them rapidly became basic necessities of daily life throughout the world. The increasing popularity of the mobile devices around the globe may be attributed to their omni-present access to a wide-range of services (communication, access to information, entertainment, or commerce). Mobile devices create value in a multitude of dimensions for their users. Another trend emerged with the increasing mobile device adoption is the move towards mobile devices in accessing the Internet. The mobile traffic is replacing desktop reach as indicated by a research by ComScore (2014), 60% of the consumers in the U.S. prefer mobile devices as their primary method of Internet access. Another indicator of the increasing importance of these devices is the finding that 65% of the emails are opened on mobile devices (Burdge, 2014). These changes in behavior revealed by the aforementioned statistics from developed countries have also been spilling over to developing countries. For instance, in Turkey 28.4% Internet page views originated from mobile devices as of June 2015, and time spent on mobile devices increased by 115% annually between June 2015 and 2014 (IAB Turkey, 2015).

Increasing adoption of mobile devices and e-commerce led to the emergence of m-commerce. Use of mobile devices for buying products and services is getting more common every year. According to a research on 3,000 retailers by Criteo in 2015, mobile devices accounted for 31% of e-commerce transactions in the U.S. (that corresponds to a 15% annual increase) and half of the transactions in Japan and South Korea (Criteo, 2015).

This increasing popularity is also evident in the recent report by IBM analyzing the so-called Black Friday sales in the U.S. IBM's report (IBM Commerce, 2015) revealed that 40% of the online transactions and nearly 60% of the online traffic originated from mobile devices. The increase in the use of mobile devices in e-commerce coupled with the popularity of mobile phones also led to the emergence of mobile payment tools. Within this context mobile payment (MP) can be defined as ''payments for goods, services, and bills with a mobile device such as mobile phone etc. by taking advantage of wireless and other communication technologies'' (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). A similar definition by Pousttchi (2008) highlights the initiation, authorization, or completion processes of payment via mobile communication techniques and devices. In agreement with these definitions, MP is considered as an important alternative method of payment to credit cards and cash. MP systems are expected to be major tools in various transactions owing to the increasing popularity of mobile devices and rapidly emerging mobile commerce activities (Ondrus & Pigneur, 2006). Mobile payment systems around the world haven't reached mass adoption however in certain developed countries they are used by a significant portion of active mobile users. According to a report from 2011, 33% of active mobile users in Japan have used their mobile devices for payment in the last six months (Vodafone, 2013). A more recent report by Capgemini forecasts an annual growth of 60.8% through 2015 as mobile devices have become common devices for shopping online. Nearly 80 million U.S. consumers, which corresponds to half of digital buyers in this country are expected to make purchases using mobile devices (Capgemini & RBS, 2015). Forrester forecasts mobile payments in the U.S. to reach 142 billion US$ by 2019 up from 52 billion US$ in 2014 (Carrington, 2014). The increasing popularity of mobile payment systems in developed countries is expected to reflect into developing countries. In fact, the mobile payments in China increased by 170% and reached 4.5 billion transactions in 2013 according to Capgemini and RBS (2015). Another developing country of interest with a promising mobile market is Turkey. This country offers an attractive market to mobile service providers with a young rapidly developing market (half of the population aged under 30) and around 72 million mobile subscriptions. This corresponds to over 90% mobile penetration rate as of 2015 Q2. Moreover, the penetration rates exceed 100% when the population aged 0-9 are excluded from the calculations (ICTA, 2015). In accordance with the high adoption rates of mobile devices, the mobile applications market is also thriving in Turkey, which ranked among the most rapidly growing markets with 60% annual increase rate in application download numbers in 2014 (App Annie & MEF, 2014). Within this booming market mobile payment systems are also getting the attention of mobile users. As of 2015, all the three mobile operators active in the country offer various mobile payment systems, first of which was launched in 2009.

The alternative mobile payment forms are increasing worldwide with the addition of Apple and Samsung Pay to the ones offered by telecom companies and financial institutions. Understanding motivations and barriers of adoption will help all the participants of the mobile payment ecosystem ranging from smart phone producers to banks and small and large vendors to design sustainable strategies.

1.1.Mobile Wallets

New technologies and digitalization of life are shaping the ways of doing business as well as the behaviors of consumers. Finding opportunities in the dynamic business scape and benefiting from them using new technologies is a major area of focus for organizations in creating value. In this new digital era, mobile devices have become one of the most prominent consumer products ever to be launched. These devices and the services provided by them rapidly became basic necessities of daily life throughout the world. The increasing popularity of the mobile devices around the globe may be attributed to their omni-present access to a wide-range of services (communication, access to information, entertainment, or commerce). Mobile devices create value in a multitude of dimensions for their users. Another trend emerged with the increasing mobile device adoption is the move towards mobile devices in accessing the Internet. The mobile traffic is replacing desktop reach as indicated by a research by ComScore (2014), 60% of the consumers in the U.S. prefer mobile devices as their primary method of Internet access. Another indicator of the increasing importance of these devices is the finding that 65% of the emails are opened on mobile devices (Burdge, 2014). These changes in behavior revealed by the aforementioned statistics from developed countries have also been spilling over to developing countries. For instance, in Turkey 28.4% Internet page views originated from mobile devices as of June 2015, and time spent on mobile devices increased by 115% annually between June 2015 and 2014 (IAB Turkey, 2015).

Increasing adoption of mobile devices and e-commerce led to the emergence of m-commerce. Use of mobile devices for buying products and services is getting more common every year. According to a research on 3,000 retailers by Criteo in 2015, mobile devices accounted for 31% of e-commerce transactions in the U.S. (that corresponds to a 15% annual increase) and half of the transactions in Japan and South Korea (Criteo, 2015). This increasing popularity is also evident in the recent report by IBM analyzing the so-called Black Friday sales in the U.S. IBM's report (IBM Commerce, 2015) revealed that 40% of the online transactions and nearly 60% of the online traffic originated from mobile devices. The increase in the use of mobile devices in e-commerce coupled with the popularity of mobile phones also led to the emergence of mobile payment tools. Within this context mobile payment (MP) can be defined as ''payments for goods, services, and bills with a mobile device such as mobile phone etc. by taking advantage of wireless and other communication technologies'' (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). A similar definition by Pousttchi (2008) highlights the initiation, authorization, or completion processes of payment via mobile communication techniques and devices. In agreement with these definitions, MP is considered as an important alternative method of payment to credit cards and cash. MP systems are expected to be major tools in various transactions owing to the increasing popularity of mobile devices and rapidly emerging mobile commerce activities (Ondrus & Pigneur, 2006). Mobile payment systems around the world haven't reached mass adoption however in certain developed countries they are used by a significant portion of active mobile users. According to a report from 2011, 33% of active mobile users in Japan have used their mobile devices for payment in the last six months (Vodafone, 2013). A more recent report by Capgemini forecasts an annual growth of 60.8% through 2015 as mobile devices have become common devices for shopping online. Nearly 80 million U.S. consumers, which corresponds to half of digital buyers in this country are expected to make purchases using mobile devices (Capgemini & RBS, 2015). Forrester forecasts mobile payments in the U.S. to reach 142 billion US$ by 2019 up from 52 billion US$ in 2014 (Carrington, 2014). The increasing popularity of mobile payment systems in developed countries is expected to reflect into developing countries. In fact, the mobile payments in China increased by 170% and reached 4.5 billion transactions in 2013 according to Capgemini and RBS (2015). Another developing country of interest with a promising mobile market is Turkey. This country offers an attractive market to mobile service providers with a young rapidly developing market (half of the population aged under 30) and around 72 million mobile subscriptions. This corresponds to over 90% mobile penetration rate as of 2015 Q2. Moreover, the penetration rates exceed 100% when the population aged 0-9 are excluded from the calculations (ICTA, 2015). In accordance with the high adoption rates of mobile devices, the mobile applications market is also thriving in Turkey, which ranked among the most rapidly growing markets with 60% annual increase rate in application download numbers in 2014 (App Annie & MEF, 2014). Within this booming market mobile payment systems are also getting the attention of mobile users. As of 2015, all the three mobile operators active in the country offer various mobile payment systems, first of which was launched in 2009.

The alternative mobile payment forms are increasing worldwide with the addition of Apple and Samsung Pay to the ones offered by telecom companies and financial institutions. Understanding motivations and barriers of adoption will help all the participants of the mobile payment ecosystem ranging from smart phone producers to banks and small to large vendors in designing sustainable strategies.

2. LITERATURE REVIEW

A considerable amount of research is dedicated to understand user motivation and behavior in a wide range of settings related to new technologies and systems. In extant literature, the theory of reasoned action (TRA) by Fishbein and Ajzen (1975), the Theory of planned behavior (TPB) by Ajzen (1991) and the Technology Acceptance Model (TAM) by Davis (1989) emerge as the most popular models explaining the attitudes and behavior. In TRA attitude and subjective norms were accepted as the major factors affecting behavioral intention (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Attitude in this context was defined as 'the degree of a person's favorable or unfavorable evaluation or appraisal of the behavior in question'. TRA is extended into TPB by Ajzen with the addition of perceived behavioral control construct that is defined as "the perceived ease or difficulty of performing the behavior". In TPB, which also assumes individuals are rational decisions makers, the behaviors of individuals are assumed to be determined by intention to perform the particular behavior (Ajzen, 1991). On the other hand, in TAM by Davis (1989), which was founded upon TRA, individuals' intention to adopt a new information technologies (IT) is accepted to be determined by perceived usefulness and

perceived ease of use. Albeit some criticism from researchers TAM is probably the most widely used model in studies that try to explain adoption of new technology and information systems. TAM in its basic form was found to fare better than TRA and TPB and also benefited from the inclusion of various other constructs to explain user adoption intention in a wide range of technology products (Hong, Thong, & Tam, 2006). The popularity of TAM and many variations developed upon it led to the development of Unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, B.Davis, & Davis, 2003). This model founded upon the aforementioned models introducing similar constructs with slightly different definitions and different names. Consequently effort expectancy, performance expectancy, social influence and facilitating conditions are considered as factors affecting behavioral intention in UTAUT.

The research on mobile payments and mobile wallets have benefited from the relevant models highlighted in foundations section. Unfortunately most of the studies on mobile payment have rather limited sample sizes ranging between 200 and 300. This creates an important research gap and a need to repeat and confirm the findings to establish generalizability of the findings. The relevant studies on mobile payment in the literature revealed the following:

- Pousttchi and Wiedemann study on consumer's use intention of mobile payment systems found performance expectancy, effort expectancy, facilitating conditions and social influence as significant factors affecting intentions (Pousttchi & Wiedemann, 2007).
- Chen and Nath found out that perceived transaction speed, transaction convenience, compatibility, security and privacy concerns have significant effects on adoption intention (Chen & Nath, 2008).
- Shin, in a study on mobile wallets found that in addition to perceived security, social influence and trust, the TAM constructs ease of use and perceived usefulness have significant effects on users' attitudes towards mobile wallets (Shin, 2009).
- Yang et.al. found social influence, perceived risk, compatibility, personal innovativeness, and relative advantage as significant predecessors of intention to adopt mobile payment systems (Yang, Lu, Gupta, Cao, & Zhang, 2012).
- Liébana-Cabanillas found ease of use, external influences, usefulness, trust and risk, and costs as significant factors affecting attitudes and use intentions of mobile payment systems (Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014).
- Phonthanikitithaworn and Fong found compatibility, subjective norms, perceived trust and perceived cost as significant factors that have impacts on intention to adopt in their study in Thailand (Phonthanikitithaworn, Sellitto, & Fong, 2015).

All the relevant factors that were found to affect the attitudes and use intentions in mobile services that are incorporated into the present study are defined and analyzed in depth in the following sections.

Personal traits (innovativeness), perceptions on mobile payment system (ease of use, usefulness, compatibility, and risks) and extrinsic motivators (rewards) are considered as antecedents of attitudes and intention to adopt mobile payment systems.

2.1.Personal Innovativeness (INO)

Innovativeness is defined as "willingness of an individual to try out any new information technology" (Midgley & Dowling, 1978) and also refers to the extent to which a customer adopts an innovation earlier than others in accordance with the diffusion of innovations theory (Rogers, 2003). Personal innovativeness, similarly, denotes the inclination of an individual to try out new products and technologies (Agarwal & Prasad, 1998; Chang, Cheung, & Lai, 2005). Innovative individuals are more open to new technologies and intent to try them more than their non-innovative counterparts. To test this effect in various IT systems applied studies were carried out and INO was found to affect adoption behavior of various innovations in IT systems (Agarwal & Prasad, 1998; Chang & Chin, 2011) in online shopping environments (Blake, Neuendorf, & Valdiserri, 2003) and also mobile services (Zarmpou, Saprikis, Markos, & Vlachopoulou, 2012). Individuals with high personal innovativeness are more curious, more open to trying new things (Kim, Mirusmonov, & Lee, 2010). Mobile payment systems, a new technology, can accurately be considered in its initial life stages as a service product. It

is intuitive to expect highly innovative consumers to try and adopt this new technology in line with the diffusion of innovations theory. Furthermore, highly innovative users will have more profound knowledge of the mobile payment system's features and use it more easily. Adopting this perspective, high personal innovativeness is expected to lead to positive attitudes towards and use intention of mobile wallets, thus the following were developed:

H_1: Personal innovativeness has a positive effect on mobile wallet's perceived ease of use.
H_2: Personal innovativeness has a positive effect on attitudes towards the mobile wallet.
H_3: Personal innovativeness has a positive effect on use intention for the mobile wallet.

2.2.Perceived Ease of Use (EAS)

One of the major factors concerning consumers' acceptance of a system is how easy they perceive the system to use. It is considered as one of the dimensions that have the largest influence on the acceptance of new technologies (Davis, Bagozzi, & Warshaw, 1992; Moore & Benbasat, 1991). The perceived ease of use refers to the individual's perception that using a certain system is effortless or easy to do (Davis, 1989). Depending on TAM developed by Davis et al. (Davis et al., 1992; Davis, 1989), if a system is perceived as easy to use, it also provides more usefulness to its users (Davis et al., 1992). This is related to instrumentality of the ease of use construct and approved by various researchers in mobile services context (Liébana-Cabanillas et al., 2014; Phonthanikitithaworn et al., 2015; Wang, Wang, Lin, & Tang, 2003). As proposed in related theories and confirmed in empirical studies, perceptions on a technological system's ease of use has an impact on users' attitudes towards that system and also their use intentions (i.e. Gefen, Karahanna, & Straub, 2003; Teo, Lim, & Lai, 1999). This construct have also appeared in other models in relevant literature, for instance the meta-analysis by Tornatzky and Klein (1982) revealed complexity (opposite of the ease of use construct) as a factor affecting adoption behavior. Also UTAT, a model developed on and after TAM accepts "effort expectancy" again a similar construct to EAS as the major antecedents of attitude and adoption behavior. In MP applications, the users should find the system easy enough to use compared to their current payment methods to adopt it, otherwise may not be worth trying and adopting a new payment system. Consequently, EAS should be established in a better way or at least on par with comparative payment methods such as credit cards. In the mobile payments setting, this factor appeared to be one of the most important elements in providing value and shaping attitudes (Dahlberg & Mallat, 2002; Liébana-Cabanillas et al., 2014; Ovum, 2012).

H_4: Perceived ease of use has a positive effect on perceived usefulness of the mobile wallet.

H_5: Perceived ease of use has a positive effect on attitudes towards mobile wallet.

2.3.Perceived Compatibility (CMP)

Compatibility in the related literature is defined as the degree to which using a new system (an innovation) is perceived as consistent with the existing values, beliefs, experiences, and needs of individuals (Moore & Benbasat, 1991; Schierz, Schilke, & Wirtz, 2010). Compatibility is considered as an important element of technology adoption models and incompatibility of the individual's values with the innovation is accepted to impede the adoption (Rogers, 2003). Moore and Benbasat (1991) showed that perceived relative advantage, compatibility, complexity were among the antecedents of technology acceptance behavior. These three dimensions were also found to be three significant elements of innovation characteristics related to adoption by Tornatzky and Klein (1982). Previous research on technology adoption has revealed positive effects of compatibility on attitudes towards and perceived usefulness of various information systems (Karahanna, Agarwal, & Angst, 2006; Schierz et al., 2010). These effects were also observed in mobile commerce, mobile and financial services contexts (Chen & Nath, 2008; Dash, Bhusan, & Samal, 2014; Mallat, Rossi, Tuunainen, & Öörni, 2009; Wu & Wang, 2005; Yang et al., 2012). Moreover, Chen and Nath (2008) found compatibility to have the strongest effect on acceptance of mobile payment systems. We expect people's lifestyles to affect their view towards MP services. An individual preferring cash as his/her major payment method due to the lifestyle or values will have low compatibility with MP systems. Consequently it is expected for that individual to develop a negative attitude towards these systems (Shatskikh, 2013). Compatibility is expected to affect consumer's attitudes towards MP systems and use intentions (Kim et al., 2010; Lu, Yang, Chau, & Cao, 2011):

H_6: Perceived compatibility has a positive effect on perceived usefulness of the mobile wallet.
H_7: Perceived compatibility has a positive effect on attitudes towards the mobile wallet.
H_8: Perceived compatibility has a positive effect on use intention for the mobile wallet.

2.4.Perceived Usefulness (USE)

The lack of actual benefits or a clear understanding of these benefits offered by mobile payment systems is one of the major barriers of mass adoption of mobile payment systems (Shatskikh, 2013). When a user finds a system to be useful he or she develops a positive attitude towards it, furthermore if able, he or she uses the system to obtain the perceived benefits. This is one of the underlying assumptions of TAM and the usefulness offered by a system / new technology is operationalized as the perceived usefulness construct in the relevant literature (Davis, 1989; Davis et al., 1992). This construct is also incorporated into similar models, one being relative advantage by Tornatzky and Klein (1982) another being performance expectancy by Venkatesh et al. (2003). Perceived usefulness was originally defined by Davis (1989) as "the degree to which a person believes that using a particular system would enhance his or her performance", another definition more relevant to the present study is that "the use of a given technology should be useful for someone in achieving a particular result" (Vijayasarathy, 2004). In different contexts usefulness of a system/service appeared among the key factors shaping attitudes and also explaining use intentions (Davis, 1989; Jackson, Chow, & Leitch, 1997; Kim & Lee, 2011; Leng & Lada, 2011; Malhotra, Galletta, & Kirsch, 2008; Taylor & Todd, 1995). Within the mobile payments context, customers indicate new payment solutions as useful if these systems make their lives easier and this construct incorporates the performance (Davis, 1989; Moore & Benbasat, 1991) and mobility factors (Arvidsson, 2013). Consequently we hypothesize that:

H_9: Perceived usefulness has a positive effect on attitudes towards the mobile wallet.

2.5.Perceived Security (SEC)

Security concerns are a hindrance to the use of many paid digital services and e-commerce activities (Linck, Pousttchi, & Wiedemann, 2007; Pousttchi & Wiedemann, 2007). Accordingly, concerns regarding the security of mobile payment systems appear among the key factors affecting attitudes (Liébana-Cabanillas et al., 2014; Linck et al., 2007; Shatskikh, 2013). The objective security of the mobile payment systems can be considered not inferior to other payment methods such as online credit cards. Use of various technologies including cryptography provides high-level of security in related transactions (Crowe & Tavilla, 2012). However concerns on the perceived security of mobile payment systems, not the actual security, create a barrier in the adoption of these systems (Kim et al., 2010; Linck et al., 2007; Ovum, 2012). Losing mobile phones, which is not an uncommon occurrence and identity theft are the major concerns of the consumers (Gross, Hogarth, & Schmeiser, 2012). In addition, number of parties involved including in mobile payments such as banks, telecom companies, numerous merchants also may lead to increases in the privacy and security related concerns among populace. The effect of risk perceptions and the security offered to counter these concerns within the mobile payment system are incorporated into the study by the perceived construct. The following two assumptions were proposed to link perceived security to attitudes and use intentions:

H_{10}: Perceived security has a positive effect on attitudes towards the mobile wallet.
H_{11}: Perceived security has a positive effect on use intention for the mobile wallet.

2.6.Rewards (REW)

Rewards, in the form of tangible benefits (monetary incentives, coupons, free sample gifts, sweepstakes etc.), can motivate consumers. This type of motivation is extrinsic (Davis et al., 1992) and applies to certain behavior of individuals that aims to achieve particular outcomes. Consumers are willing to make an effort to obtain these rewards/tangible incentives (Kim & Han, 2014; Varnali, Yilmaz, & Toker, 2012). In terms of marketing communication and advertisements, it was observed that customers' concentration on ads increase when the message includes benefits (Kim & Han, 2014). It is assumed by scholars that the extrinsic motivation elements are internalized (taking in values and goals as one's own) in the long run (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000). In this way the externally regulated behavior may become internally regulated by consumers through the use of penalties or rewards (Ryan & Connell, 1989). In mobile payment context, the

tangible benefits offered for downloading and using mobile wallets (i.e. free value-added services, discounts, internet access etc.) may lead consumers to develop positive attitudes and improve use intentions. Adopting this perspective, the rewards construct was incorporated into the model to reflect the tangible incentives and assumed to have positive effect on attitudes and use intentions.

H_{12}: Rewards have a positive effect on attitudes towards the mobile wallet.
H_{13}: Rewards have a positive effect on use intention for the mobile wallet

2.7.Social Influence (SOC)

The beliefs of the people important to an individual including family, friends and reference groups have effects on individuals' intention to behave in a certain way. This statement as one of the postulations of TRA creates the subjective norms, which corresponds to social influence concept in the context of the present study (Ajzen & Fishbein, 1980). When consumers encounter a new technology product, they may feel a certain uncertainty regarding the product and the consequences of its use. This uncertainty may be minimized by getting the opinions of others that an individual value. In mobile payment systems, this effect may be defined as the way the individuals' social environment perceives MP systems (Schierz et al., 2010). This concept in its classical form was defined by Fishbein & Ajzen (1975, p. 302) as "the person's perception that most people who are important to him think he should or should not perform the behavior in question". Empirical evidence confirming this assumption was found in the literature on various new technology systems and services settings (Hu, Poston, & Kettinger, 2011; Leng & Lada, 2011; Venkatesh & Davis, 2000) and in mobile services context (Liébana-Cabanillas et al., 2014; Lu, Yao, & Yu, 2005; Oliveira, Faria, Thomas, & Popovič, 2014). In line with the theoretical foundations and relevant studies SOC is expected to affect attitudes towards MP systems and following is proposed:

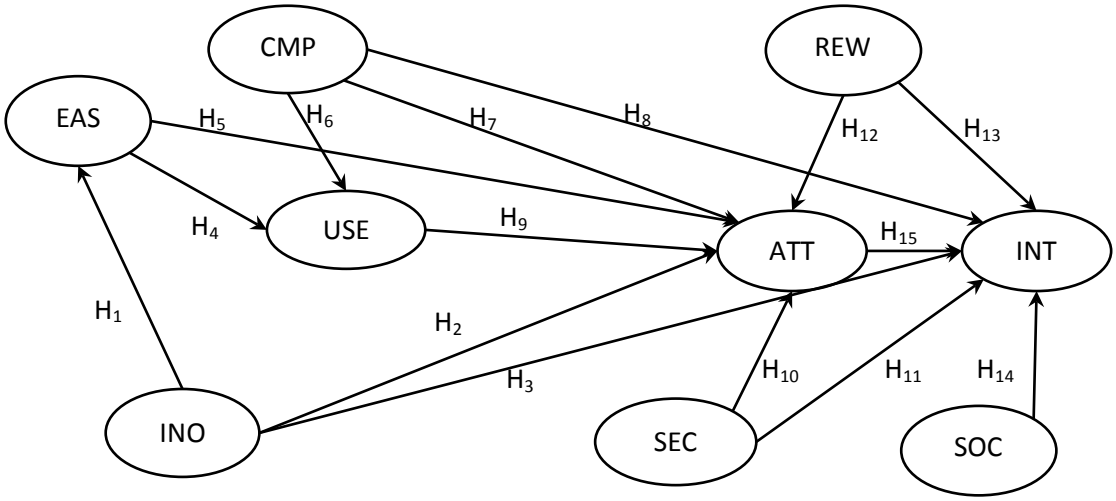
H_{14}: Social influence has a positive effect on attitudes towards the mobile wallet.

3. DATA AND METHODOLOGY

The research model developed using the hypotheses based on theoretical foundations is visualized in Figure 1.

To test the model and uncover the relationships between the constructs, the mobile wallet application of one of the leading mobile network operators in Turkey was chosen. The network provider helped in creating the resources needed to carry out the research on a large scale by employing a global professional market research company and also providing the user database. Respondents were asked to indicate the extent of their agreement with a series of statements on a five-point Likert scale (1 = "strongly disagree" and 5= "strongly agree"). The constructs and scales used in the study are summarized in Table 1 and also provided in detail in Appendix-1.

Figure 1: Proposed Model



INO: Personal Innovativeness, SEC: Perceived Security, EAS: Ease of Use, COM: Compatibility, USE: Perceived Usefulness, SOC: Social Influence, REW: Rewards, ATT: Attitude, INT: Use Intention

Table 1: Scales and Constructs

Construct	# of Items	Source(s)
Attitude	4	(Ajzen, 1991)
Compatibility	4	(Agarwal & Prasad, 1998; Moore & Benbasat, 1991; Plouffe, Huland, & Vandenbosch, 2001)
Perceived Ease of Use	5	(Davis, 1989; Venkatesh & Davis, 2000)
Personal Innovativeness	6	(Agarwal & Prasad, 1998)
Perceived Security	5	(Luarn & Lin, 2005; Parasuraman, Zeithaml, & Malhotra, 2005)
Social Influence	4	(Ajzen, 1991; Venkatesh & Davis, 2000)
Perceived Usefulness	6	(Bhattacherjee, 2001; Van der Heijden, 2004)
Rewards	3	Author generated
Use Intention	4	(Bhattacherjee, 2001; Venkatesh & Davis, 2000)

3.1. Data Collection & Sampling

Stratified random sampling was used in selection of the sample. The two basic groups among the population were 54,000 registered downloaders of the MP application and over 10 million registered users that gave prior permission to be contacted by the network provider company. Targeted sample sizes were selected as 700 for the users and 750 for non-users with 95% confidence level and 3.68 and 3.58 confidence intervals respectively. The research was implemented by GfK Research, one of the major global marketing research firms active in Turkey. The contact data on potential respondents selected randomly from the telecom operators' database were used to carry out the study. The user database was contacted via computer aided telephone interview (CATI) method and data was collected from the respondents with a maximum interview length of 20 minutes. Ordering of the questions was randomized each time a call was made to reduce respondent fatigue effect. As an outcome of the CATI survey, 1395 questionnaires were collected. A total of 3940 people declined to participate in the research and an additional 483 interviews could not be completed fully (line dropped or survey takes too long). After a careful screening process to eliminate low quality surveys (all answers coded the same etc.) a total of 1305 questionnaires; 639 from mobile wallet users and 666 from non-users with smartphones were used in the analysis. These numbers are over the recommended sample size of 548 for SEM analysis of the proposed model as calculated by Daniel Soper's "A-priori Sample Size Calculator" (Soper, 2016).

Basic demographic information of these two sample groups is presented in Table 2. It can be noticed that the user profile is mostly male and younger on average than non-users. Overall the sample is well-educated and young, which is a result of excluding mobile phone users that don't have smartphones.

Table 2: Main Characteristics of the Sample

Demographic	Value	Users (N=639)		Non-Users (N=666)	
		Frequency	Percent	Frequency	Percent
Age	18-24	192	30%	88	13%
	25-32	259	41%	256	38%
	33-47	164	26%	261	39%
	48+	24	3%	62	9%
Gender	Male	590	92%	233	35%
	Female	50	8%	434	65%
Education	Elementary & Middle School	90	14%	130	19%
	High School	291	45%	259	39%
	University	224	35%	221	33%
	Graduate Degree	35	5%	57	9%
Employment Status	Working	507	79%	482	72%
	Not Working	133	21%	185	28%
Socio-Economic Status	A/B	224	35%	268	40%
	C1	209	33%	188	28%
	C2	169	26%	159	24%
	D/E	38	6%	51	8%

4. FINDINGS AND DISCUSSIONS

The descriptive statistics of the data collected, which are presented in Appendix-2 were examined before carrying out the path analysis. An important finding of descriptive statistics analysis was the detection of non-normality in the data. On average 27 out of 34 items showed significant Kurtosis and 23 items showed significant Skewness. To handle the detected non-normality, the data collected was analyzed using a component based partial least squares structural equation modeling (PLS-SEM) application that does not assume normal distributions. PLS technique among SEM tries to maximize the explained variance of the indicators in the model instead of maximizing the co-variation among all indicators. This approach is considered a useful technique for prediction-oriented analysis where the research aims to predict key target constructs / key driver constructs or testing an extension of an existing theory (Anderson & Gerbing, 1988; Hair, Ringle, & Sarstedt, 2011; Henseler, Ringle, & Sinkovics, 2009). These are in parallel with the aims of the present study. PLS have gained popularity among other SEM applications due to various advantages such as ability to work with formative constructs or non-normal data with relatively small sample sizes (Ringle, Sarstedt, & Straub, 2012). The significance of loadings and path coefficients were assessed by a non-parametric method, the bootstrap procedure, due to the fact that parametric significance tests cannot be applied to PLS-SEM (Davison & Hinkley, 1997) to test the significance of estimated path coefficients. In this approach subsamples are created from the original dataset with drawing random observations and then each subsample is used to estimate the model. This process was repeated 3,000 times in the present study.

As the first step of SEM analysis, the validity and reliability of the measures in the study were evaluated and the findings are provided in Table 3. First of all the internal consistency reliability of the model is tested using composite reliability (CR) and Cronbach's alpha (CA), all of which were higher than 0.7 as suggested in literature (Carmines & Zeller, 1979; Fornell & Larcker, 1981; Nunnally, 1978). This led to the conclusion that the internal consistency reliability conditions are met. Following the initial analysis, a total of five indicators, one of each from EAS, INO, INT and two from SEC constructs were left out of further analysis due to low outer loadings (Churchill, 1979). As the second step, the convergent validity of the model was evaluated using

average variance extracted (AVE) and the indicators' loadings on their own constructs (outer loadings). The discriminant validity was assessed by comparing the indicators' loadings on their own constructs to the loadings on all other constructs (cross-loadings). The loading data, which is presented in the Appendix-2, reveals that the outer loadings were higher than cross-loadings for all the items. Square root of AVE was compared to the between-item-correlations (Fornell & Larcker, 1981) to assess the validity. All the outer loadings were greater than recommended level of 0.50; AVE was also above the recommended 0.50 value and the inter-item correlations were lower than the square root of AVE (Hair, Tomas, Hult, Ringle, & Sarstedt, 2013). These findings led to the conclusion that the convergent and discriminant validity conditions were satisfied.

Table 3: Quality Criteria, Construct and Discriminant Validity Analysis for User Sample

Latent Var.	AVE	CR	CA	Avg. I.I.C.	ATT	CMP	EAS	INO	INT	REW	SEC	SOC	USE
ATT	0.854	0.959	0.943	0.458	**0.924**								
CMP	0.656	0.883	0.821	0.438	0.647	**0.810**							
EAS	0.638	0.876	0.812	0.411	0.686	0.558	**0.798**						
INO	0.581	0.873	0.818	0.201	0.269	0.285	0.255	**0.762**					
INT	0.610	0.859	0.809	0.434	0.746	0.574	0.566	0.274	**0.781**				
REW	0.671	0.800	0.540	0.335	0.480	0.552	0.384	0.204	0.451	**0.819**			
SEC	0.615	0.864	0.802	0.380	0.585	0.532	0.490	0.265	0.530	0.368	**0.784**		
SOC	0.757	0.926	0.893	0.320	0.452	0.485	0.428	0.139	0.441	0.384	0.450	**0.870**	
USE	0.672	0.909	0.871	0.445	0.747	0.707	0.623	0.250	0.641	0.504	0.478	0.479	**0.820**

* The square root of AVE is provided on the diagonal. Avg-IIC: Average Inter-item correlations.

Table 4: Quality Criteria, Construct and Discriminant Validity Analysis for Non-User Sample

Latent Var.	AVE	CR	CA	Avg. I.I.C.	ATT	CMP	EAS	INO	INT	REW	SEC	SOC	USE
ATT	0.849	0.957	0.940	0.498	**0.921**								
CMP	0.754	0.902	0.836	0.495	0.665	**0.868**							
EAS	0.643	0.878	0.817	0.470	0.627	0.601	**0.802**						
INO	0.621	0.891	0.847	0.287	0.361	0.375	0.389	**0.788**					
INT	0.812	0.928	0.884	0.493	0.797	0.653	0.588	0.397	**0.901**				
REW	0.740	0.851	0.654	0.431	0.548	0.618	0.532	0.391	0.534	**0.860**			
SEC	0.620	0.866	0.799	0.463	0.615	0.621	0.588	0.275	0.580	0.475	**0.787**		
SOC	0.751	0.923	0.889	0.341	0.500	0.506	0.415	0.169	0.466	0.373	0.474	**0.867**	
USE	0.806	0.943	0.920	0.497	0.735	0.721	0.697	0.374	0.676	0.651	0.618	0.404	**0.898**

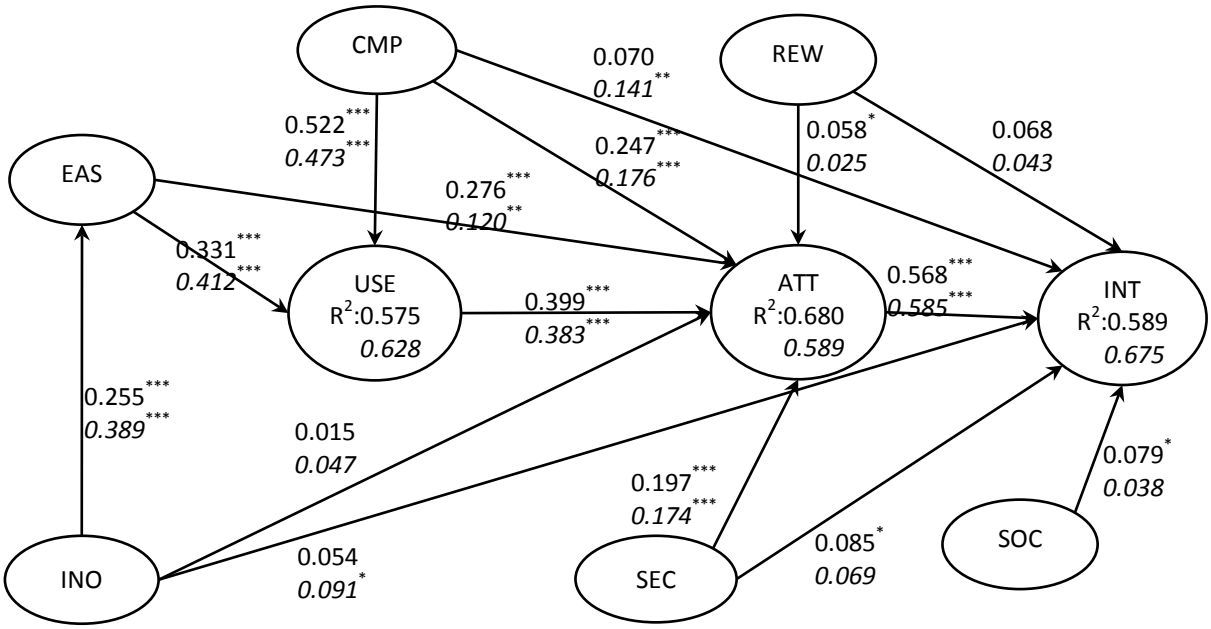
* The square root of AVE is provided on the diagonal. Avg-I.I.C.: Average Inter-item correlations.

After confirming the validity and reliability of the analyzed model, the path model results are evaluated. The lack of a universal good-of-fit criteria for PLS-SEM analysis lead to the use of coefficients of determination (R^2), significance of the path coefficients and predictive relevance (Q^2) criteria to evaluate the quality of the model as suggested by Hair et al. (Hair et al., 2013). The hypotheses related path coefficients and their significance for both groups are visualized in Figure 2 and also provided in Table 4.

R^2 of ATT construct was calculated 0.680 for users and 0.612 for non-users. These figures indicate high level of predictive accuracy for the proposed model (Hair et al., 2013). Stone-Geisser's Q^2 value (Geisser, 1974; Stone, 1974) was calculated using blindfolding procedure to evaluate the predictive power of the model. In blindfolding procedure the sample is reused by omitting every nth data point, in this case 7 was used as omission distance. With the blindfolding procedure, each data point of the indicators of selected latent variables has been removed from the dataset and then predicted using the model. In this way the blindfolding procedure compares the original values in the sample with the predicted values of a construct (Henseler et al., 2009). When the prediction error is small (the predicted and the original values are close to each other), the

path model shows high predictive accuracy (Hair et al., 2013). As an outcome of the calculations the Q^2 values obtained for ATT among users were 0.576 and 0.516 for non-users. The same figures for INT were calculated as 0.371 for users and 0.539 for non-users. All the values exceeding 0.350 suggest large predictive relevance for the model (Hair et al., 2013; Henseler et al., 2009).

Figure 2: Path Analysis Results for Users and Non-users



*p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001. Italicized text denotes results for non-users.

Four hypotheses among the users and five among non-users out of the fifteen tested were rejected as an outcome of the path analysis. The expected effects of INO on ATT and REW on INT were not detected for both groups. In addition, the direct effects of INO and CMP on INT were insignificant among users and the effects of REW, SEC and SOC on INT were insignificant among non-users. All the effects detected were positive; consequently increases/improvements in a construct lead to improvements in the related constructs. When the strength of the effects were analyzed, the largest direct effect on ATT was observed in usefulness construct for both groups. This effect is followed by ease of use for users and compatibility for non-users in terms of strength. CMP appeared as the strongest contributor affecting the USE construct. EAS appeared as the construct creating the second strongest effect on USE and also the fourth largest effect on ATT.

To better evaluate the results and understand the strength of a construct's effect on another construct, the total effects between constructs were calculated and presented in Table 6. The total effects were obtained adding indirect effects through other paths into the path coefficients (direct effects). When the total effects were analyzed, all the tested effects were found to be significant for the user group. On the other hand, the effects of REW on ATT and INT in addition to the effect of SOC on INT were found to be insignificant for the non-user group. The largest total effects on ATT were observed in EAS, USE and CMP constructs for the user group. Ordered by their strength USE, CMP and EAS were the three constructs with highest effects on ATT towards mobile wallet in the non-user group. CMP's effect on ATT was partially generated by an indirect effect through USE construct.

INT was dominantly affected by ATT in both groups as expected. The other factors of note that affect INT were CMP, USE and EAS for users and CMP and USE for non-users. The effect of INO on ATT and INT were moderated by EAS construct for both sample groups. SEC appeared as a significant factor that has an impact on ATT and INT for the both groups. However the strength of this factor on ATT and INT were less than the aforementioned

three constructs. SEC appeared as the factor with the fourth or fifth largest effect on ATT and INT for both groups. CMP's effect on ATT and INT were partly generated by the indirect effect through USE construct.

Table 5: Paths and Hypothesis Testing

Hyp.	Path	Users			Non- Users			Users vs. Non-Users		
		Path Coef.	St.Dev.	t- stat.	Path Coef.	St.Dev.	t-stat	|Path coef. difference|	t-value	p-value
H_1	INO->EAS	0.255	0.042	6.071	0.389	0.040	9.735	**0.134**	**2.321**	**0.021**
H_2	INO->ATT	0.015	0.026	0.572	0.047	0.034	1.380	0.032	0.747	0.455
H_3	INO->INT	0.054	0.055	1.643	0.091	0.028	3.290	0.037	0.857	0.391
H_4	EAS->USE	0.331	0.041	8.022	0.412	0.038	10.892	0.081	1.451	0.147
H_5	EAS->ATT	0.276	0.037	7.407	0.120	0.046	2.589	**0.156**	**2.624**	**0.009**
H_6	CMP->USE	0.522	0.036	14.528	0.473	0.034	13.895	0.049	0.999	0.318
H_7	CMP->ATT	0.247	0.037	6.646	0.176	0.048	3.658	0.106	1.716	0.086
H_8	CMP->INT	0.070	0.044	1.576	0.141	0.043	3.322	0.071	1.162	0.246
H_9	USE->ATT	0.399	0.047	8.464	0.383	0.062	6.203	0.016	0.204	0.838
H_{10}	SEC->ATT	0.197	0.031	6.281	0.174	0.042	4.167	0.023	0.442	0.658
H_{11}	SEC->INT	0.085	0.041	2.097	0.069	0.039	1.762	0.016	0.264	0.769
H_{12}	REW->ATT	0.058	0.029	2.005	0.025	0.034	0.748	0.033	0.731	0.465
H_{13}	REW->INT	0.068	0.038	1.797	0.043	0.034	1.277	0.025	0.480	0.631
H_{14}	SOC->INT	0.079	0.034	2.327	0.038	0.029	1.285	0.041	0.924	0.356
H_{15}	ATT->INT	0.568	0.048	12.165	0.585	0.042	14.004	0.017	0.260	0.795

$^{*}p \leq 0.05$; $^{**}p \leq 0.01$; $^{***}p \leq 0.001$. Greyed out text indicates insignificant paths.

The differences in paths for the two sample groups were assessed by two approaches to test for potential differences in attitudes and use intentions formation. The first one is a parametric approach offered by Keil et al. (2000) and the latter is a non-parametric approach based on bootstrapping results offered by Henseler et al. (2009). Both methods are explained briefly below, for a detailed explanation please see Sarstedt et al. (2011). In the first approach, the path coefficients and standard errors were used to test for differences. In the latter approach, each bootstrapping result (path coefficient) of the first group is compared to the second groups' all other bootstrapping results. This process leads to 9 million comparisons per path between groups for 3,000 bootstrapping cases. Both approaches led to the same conclusion highlighted in Table 4. Only two paths; EAS towards ATT and INO towards EAS, were significantly different at 95% confidence level. The remaining 13 paths were not significantly different between two sample groups, which can also be interpreted as the two structural models were fairly similar to each other.

Table 6: Total Effects

	Users			Non-Users		
Path	**Direct Effect**	**St. Dev.**	**t- stat.**	**Total Effect**	**St.Dev.**	**T-stat**
ATT -> INT	0.568	0.052	10.929	0.585	0.042	14.004
CMP -> ATT	0.279	0.038	7.415	0.357	0.045	7.868
CMP -> INT	0.228	0.043	5.295	0.350	0.046	7.586
CMP -> USE	0.522	0.036	14.436	0.473	0.034	13.895
EAS -> ATT	0.408	0.038	10.624	0.278	0.045	6.222

EAS -> INT	0.232	0.030	7.758	0.163	0.028	5.741
EAS -> USE	0.331	0.041	8.022	0.412	0.038	10.892
INO -> ATT	0.119	0.032	3.741	0.155	0.035	4.479
INO -> EAS	0.255	0.042	6.077	0.389	0.040	9.735
INO -> INT	0.122	0.037	3.319	0.182	0.036	5.121
INO -> USE	0.084	0.017	4.872	0.160	0.022	7.308
REW -> ATT	0.058	0.029	2.005	0.025	0.034	0.748
REW -> INT	0.101	0.040	2.493	0.043	0.034	1.277
SEC -> ATT	0.197	0.031	6.281	0.174	0.042	4.167
SEC -> INT	0.197	0.038	5.161	0.170	0.040	4.261
SOC -> INT	0.079	0.034	2.327	0.038	0.029	1.285
USE -> ATT	0.399	0.047	8.464	0.383	0.062	6.203
USE -> INT	0.226	0.030	7.644	0.224	0.039	5.720

$^{*}p \leq 0.05$; $^{**}p \leq 0.01$; $^{***}p \leq 0.001$

In addition to assessing differences in paths using the aforementioned techniques, a paired t-test was performed on factor scores to gain insights on potential dissimilarities in each dimension between two groups. The results of this analysis that are provided in Table 7 indicate significant differences in 8 of the 9 constructs employed in the study.

As can be seen from Table 7 all factor scores excluding social influence were different between the users and non-users. It is evident that users and non-users have distinct attitudes towards mobile payment systems and have dissimilar perceptions on the various constructs tested in the present study.

The users perceive themselves more innovative than non-users. This was an intuitive outcome given that the mobile wallet applications are in their preliminary steps of life-cycle and adoption. The security concerns are lower among users compared to non-users. Non-users have a slightly negative perception of the security provided by the mobile wallet. No significant differences between groups were detected in social influence mainly attributable to the low penetration and awareness levels of the MP systems among general populace. Overall attitudes towards the mobile wallet are positive, user group being significantly more positive than the non-users. Similar to the attitudes, the intentions to use or continue using the mobile wallet are considerably higher for users.

Table 7: T-test Results between Users and Non-Users Factor Scores

Factor(s)	Users		Non-users		Difference		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean Difference	Std. Error Difference	Sig.
Innovativeness	3.928	0.897	3.342	1.008	-0.586	0.051	.000
Attitude	3.726	1.068	3.198	1.085	-0.528	0.058	.000
Intention	3.774	1.062	3.184	1.143	-0.591	0.059	.000
Ease of use	3.764	0.981	3.405	0.989	-0.359	0.053	.000
Security	3.357	1.004	2.886	0.954	-0.471	0.053	.000
Social Influence	2.506	1.102	2.474	1.034	-0.032	0.057	.580
Compatibility	3.280	1.181	2.817	1.143	-0.464	0.062	.000
Rewards	3.332	1.178	3.117	1.183	-0.215	0.063	.001
Usefulness	3.660	1.092	3.289	1.151	-0.371	0.060	.000

5. CONCLUSION

The present study on the adoption of mobile wallet was carried out by one of the leading global market research companies in a large developing country thus offers a good point of reference for future studies. In addition to testing relevant theories and models in mobile payments context and contributing to the theoretical understanding of consumer attitudes towards the mobile payments, the study also offers comparable findings by the use of well-established scales. Thus far there are no similar studies carried out in Turkey in such a scale and similar studies in other developing countries are also limited in supply.

One important finding of the study is the lack or the low impact of social influence on use intentions. This may be attributed to the low number of users in this new product category which is actually at the beginning of its life cycle. One upside of this finding is that without a strong effect from others, consumers' attitudes are influenced by individual factors or perceptions, the latter of which can be influenced by direct marketing activities.

Personal innovativeness, which was expected to be a significant factor, had no direct impact on attitudes. In addition, this construct's effect on use intentions was also not significant for users and only a low level of effect was detected for non-users. On the other hand, as a result of the indirect effects through ease of use, innovativeness affected attitudes and use intentions. It was seen that users who perceive themselves more innovative (high INO scores) find the mobile wallet easier to use, develop a more positive attitude towards and intent to use the mobile wallet.

The most important factor affecting users' attitudes appeared to be the ease of use of the mobile wallet among users. This factor is the second most important in attitude formation for non-user group. Taking into account its positive effect on usefulness, ease of use appears among the primary areas to focus on to improve attitudes among potential users of mobile wallets. Providing an intuitive and easy to use interface will both increase perceived usefulness of the system and increase chance of adoption. The increasing proliferation of mobile devices should be kept in mind in developing related applications and interfaces.

One of the findings that should be pondered by the marketing practitioners is the strong effect of usefulness on attitudes and use intentions. This finding indicates that the users should perceive superior benefits in mobile wallets compared to alternative payment methods. The lack of a clear understanding of these benefits appears as a major barrier in developing positive attitudes and use intentions. Within the mobile payments context, customers expect payment solutions to make payment processes easier by offering benefits related to mobility and performance.

Unlike particular studies in literature (Kim et al., 2010; Linck et al., 2007), in which the perceived security appeared among the major barriers of mobile payment systems acceptance, this factor appeared among the factors with lower impact on attitudes and use intentions in the present study. This finding is in accordance with Pousttchi and Wiedmann's (2007) study that showed that subjective security was not an important influencer of mobile payment acceptance. The relatively low concern among the consumers towards security indicates that the users are overcoming this barrier slowly. This creates opportunities for marketers to focus on other dimensions to promote however this finding should not be interpreted as perceived security is not important at all. More accurately, the consumers' security concerns are less important than their concerns regarding the mobile wallets' usefulness and ease of use.

Compatibility was another factor to note influencing attitudes towards mobile wallets. This factor had a stronger effect on the non-user group's attitudes and use intentions compared to users. The total effect generated partly by the indirect effect through perceived usefulness makes this factor the second most important factor influencing the attitudes for non-users. When the consumers find an application to be compatible with their behavior they more easily accept and adopt it. To enable this, marketers may focus on developing and utilizing marketing communication that highlights the compatibility of the application with use cases and benefits for differing lifestyles among their target markets.

The results of the between group analysis of direct effects lead to the conclusion that trial of the product increases the perceived usefulness of the system. The user group perceives the mobile wallet easier to use and more useful than the non-users. An implication of this finding is that when the consumers try and use mobile wallet applications their perceptions improve in many dimensions including ease of use, usefulness, security and find the application more compatible with their lifestyle. Companies should offer more and innovative ways to let users try the mobile app.

The present study in spite of its large sample size and random sampling employed was carried out only in one country, which can be counted among its basic limitations. Another limitation is focusing on one method of mobile payment, which was needed to create a basis to work on and to associate the mobile payment with a real product that the consumers can use. The third limitation is the use of subscriber base of only one mobile network services provider. A specific network provider and application was chosen to help in creating the resources needed to carry out the research on a large scale.

REFERENCES

Agarwal, R., & Prasad, J. 1998, "A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology", *Information Systems Research*, Vol.9, no.2, pp. 204–215.

Ajzen, I. 1991, "The theory of planned behavior." *Organizational behavior and human decision processes*, No.50, pp. 179–211.

Ajzen, I., & Fishbein, M. 1980, *Understanding Attitudes and Predicting Social Behaviour*, Englewood Cliffs, NJ: Prentice Hall PTR.

Anderson, J., & Gerbing, D. 1988, "Structural equation modeling in practice: A review and recommended two-step approach." *Psychological Bulletin*, Vol.103, no.3, pp. 411–423.

App Annie & MEF. 2014, "Emerging Markets and Growth in the Global App Economy". http://blog.appannie.com/app-annie-mef-global-app-economy-q3-2014/

Arvidsson, N. 2013, "Consumer attitudes on mobile payment services – results from a proof of concept test." *International Journal of Bank Marketing*, Vol.32, no.2, pp. 150–170.

Bhattacherjee, A. 2001, "An empirical analysis of the antecedents of electronic commerce service continuance." *Decision Support Systems*, Vol.32, no.2, pp. 201–214.

Blake, B. F., Neuendorf, K. a., & Valdiserri, C. M. 2003, "Innovativeness and variety of Internet shopping". *Internet Research*, Vol.13, no.3, pp. 156–169.

Burdge, B. 2014, "New Research Shows Mobile Dominates Desktops". MovableInk. Retrieved from http://blog.movableink.com/new-research-shows-mobile-dominates-desktops-with-65-of-total-email-opens-in-q4-2013/

Capgemini, & RBS. 2015, *World Payments Report 2015*. https://www.worldpaymentsreport.com

Carmines, E. G., & Zeller, R. A. 1979, *Reliability and Validity Assessment*. Beverly Hills, California: Sage Publications.

Carrington, D. 2014, US Mobile Payments Will Reach $142B by 2019. Forrester. Retrieved November 25, 2015, from http://blogs.forrester.com/denee_carrington/14-11-17-us_mobile_payments_will_reach_142b_by_2019

Chang, C.-C., & Chin, Y.-C. 2011, "Predicting the Usage Intention of Social Network Games: An Intrinsic-Extrinsic Motivation Theory Perspective", *International Journal of Online Marketing*, Vol.1, no.3, pp. 29–37.

Chang, M. K., Cheung, W., & Lai, V. S. 2005, "Literature derived reference models for the adoption of online shopping." *Information and Management*, Vol.42, no.4, pp. 543–559.

Chen, L., & Nath, R. 2008, "Determinants of mobile payments: an empirical analysis", *Journal of International Technology and Information*, Vol.17, no.1, pp. 9 – 20.

ComScore. 2014, "The US Mobile App Report." http://www.slideshare.net/LudovicP/comscore-us-mobile-app-report-june-2014-datatheusmobileappreport

Criteo. 2015, "State of Mobile Commerce." Http://www.criteo.com/resources/mobile-commerce-report/

Crowe, M., & Tavilla, E. 2012, "Mobile Phone Technology: "Smarter" Than We Thought How Technology Platforms are Securing Mobile Payments in the U.S.", Boston, USA. http://www.bostonfed.org/bankinfo/payment-strategies/index.htm

Dahlberg, T., & Mallat, N. 2002, "Mobile Payment Service Development - Managerial Implications of Consumer Value Perceptions", *Proceedings of the Tenth European Conference on Information Systems*, pp. 649–657.

Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. 2008, "Past, present and future of mobile payments research: A literature review", *Journal of Commerce Research and Applications*, 7, pp. 165–181.

Dash, M., Bhusan, P. B., & Samal, S. 2014, "Determinants of Customers' Adoption of Mobile Banking: An Empirical Study by Integrating Diffusion of Innovation with Attitude", *Journal of Internet Banking and Commerce*, Vol.19, no.3, pp. 1–21.

Davis, F. D. 1989, "Perceived usefulness, perceived ease of use, and user acceptance of information technology". *MIS Quarterly*, Vol.13, no.3, pp. 319–340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. 1992, "Extrinsic and intrinsic motivation to use computers in the workplace". *Journal of Applied Social Psychology*, Vol.22, no.14, p. 1111.

Davison, A. C., & Hinkley, D. V. 1997, "Bootstrap Methods and Their Application". Cambridge, UK: Cambridge University Press.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. 1991, "Motivation and Education: The Self-Determination Perspective". *Educational Psychologist*, Vol.26, no.3-4, pp. 325–346.

Fishbein, M., & Ajzen, I. 1975, *Belief, attitude, intention, and behavior: an introduction to theory and research* Reading: Addison-Wesley.

Fornell, C., & Larcker, D. F. 1981, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research*, Vol.18, no.1, pp. 39–50.

Gefen, D., Karahanna, E., & Straub, D. 2003, "Trust and TAM in online shopping: an integrated model" *MIS Quarterly*, Vol.27, no.1, pp. 51–90.

Geisser, S. 1974, "A predictive approach to the random effect model", *Biometrika*, No.61, pp. 101–107.

Gross, M. B., Hogarth, J. M., & Schmeiser, M. D. 2012, "Use of Financial Services by the Unbanked and Underbanked and the Potential for Mobile Financial Services Adoption", *Federal Reserve Bulletin*, No.98, pp. 1–20.

Hair, J. F., Ringle, C. M., & Sarstedt, M. 2011, "PLS-SEM: Indeed a Silver Bullet", *The Journal of Marketing Theory and Practice*, Vol.19, no.2, pp. 139–152.

Hair, J. F., Tomas, G., Hult, M., Ringle, C. M., & Sarstedt, M. 2013, *A Primer on Partial Least Squares Structural Equation Modeling* (PLS-SEM). Thousand Oaks: Sage Publications, Inc.

Van der Heijden, H. 2004, "User acceptance of hedonic information systems", *MIS Quarterly*, Vol.28, no.4, pp. 695–704.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. 2009, "The use of partial least squares path modeling in international marketing", *Advances in international marketing*, No.20, pp. 277–320.

Hong, S., Thong, J. Y. L., & Tam, K. Y. 2006, "Understanding continued information technology usage behavior: A comparison of three models in the context of mobile internet", *Decision Support Systems*, Vol.42, no.3, pp. 1819–1834.

Hu, T., Poston, R., & Kettinger, W. 2011, "Nonadopters of online social network services: Is it easy to have fun yet?", *Communications of the Association of IS*, No.29, pp. 441–458.

IAB Turkey. 2015, "The Locomotive of Page View: Mobile", IAB Bulletin. Retrieved October 10, 2015, from http://www.iabturkiye.org/sites/default/files/infografik_haziran_ing.pdf.

IBM Commerce. 2015, "Black Friday Report 2015", Somers NY. http://www-01.ibm.com/software/marketing-solutions/benchmark-reports/black-friday-2013.html

ICTA. 2015, "ELECTRONIC COMMUNICATIONS MARKET IN TURKEY". Ankara. http://www.btk.gov.tr/en-US/Pages/Market-Data

Jackson, C. M., Chow, S., & Leitch, R. A. 1997, "Toward an Understanding of the Behavioral Intention to Use an Information System", *Decision Sciences*, Vol.28, no.2, pp. 357–389.

Karahanna, E., Agarwal, R., & Angst, C. M. 2006, "RECONCEPTUALIZING COMPATIBILITY BELIEFS IN TECHNOLOGY ACCEPTANCE RESEARCH", *MIS Quarterly*, Vol.30, no.4, pp. 781–804.

Keil, M., Tan, B. C. Y., Wei, K. K., Saarinen, T., Tuunainen, V., & Wassenaar, A. 2000, A cross-cultural study on escalation of commitment behaviour in software projects. *MIS Quarterly*, No.24, pp. 299–325.

Kim, C., Mirusmonov, M., & Lee, I. 2010, ""An empirical examination of factors influencing the intention to use mobile payment", *Computers in Human Behavior*, Vol.26, no.3, pp. 310–322.

Kim, J., & Lee, J. E. R. 2011, "The Facebook Paths to Happiness: Effects of the Number of Facebook Friends and Self-Presentation on Subjective Well-Being", *Cyberpsychology Behavior and Social Networking*, Vol.14, no.6, pp. 359–364.

Kim, Y. J., & Han, J. 2014, "Why smartphone advertising attracts customers: A model of Web advertising, flow, and personalization", *Computers in Human Behavior*, No.33, pp. 256–269.

Leng, G., & Lada, S. 2011, "An Exploration of Social Networking Sites (SNS) Adoption in Malaysia Using Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB) And Intrinsic Motivation", *Journal of Internet Banking & Commerce*, Vol.16 No.2, pp. 1–27.

Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. 2014, Antecedents of the adoption of the new mobile payment systems: The moderating effect of age. *Computers in Human Behavior*, No.35, pp. 464–478.

Linck, K., Pousttchi, K., & Wiedemann, D. G. 2007, "Security Issues in Mobile Payment from the Customer Viewpoint", *Proceedings of the 14th European Conference on Information Systems (ECIS 2006),* pp. 1–12.

Lu, J., Yao, J. E., & Yu, C. S. 2005, "Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology", *The Journal of Strategic Information Systems*, Vol.14, no.3, pp. 245–268.

Lu, Y., Yang, S., Chau, P. Y. K., & Cao, Y. 2011, "Dynamics between the trust transfer process and intention to use mobile payment services: A cross-environment perspective", *Information and Management*, Vol.48, no.8, pp. 393–403.

Luarn, P., & Lin, H.-H. 2005, "Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, Vol.21, no.6, pp. 873–891.

Malhotra, Y., Galletta, D. F., & Kirsch, L. J. 2008, "How Endogenous Motivations Influence User Intentions: Beyond the Dichotomy of Extrinsic and Intrinsic User Motivations", *Journal of Management Information Systems*, Vol.25, no.1, pp. 267–300.

Mallat, N., Rossi, M., Tuunainen, V. K., & Öörni, A. 2009, "The impact of use context on mobile services acceptance: The case of mobile ticketing", *Information & Managemen*t, Vol.46, no.3, pp. 190–195.

Midgley, D. F., & Dowling, G. R. 1978, "Innovativeness: The Concept and Its Measurement", *Journal of Consumer Research*, Vol.4, no.4, p. 229.

Moore, G., & Benbasat, I. 1991, "Development of an instrument to measure the perceptions of adopting an information technology innovation", *Information systems research*, Vol.2, no.3, pp. 192–222.

Nunnally, J. C. 1978, *Psychometric theory*. New York: McGraw-Hill, c1978.

Oliveira, T., Faria, M., Thomas, M. A., & Popovič, A. 2014, "Extending the understanding of mobile banking adoption: When UTAUT meets TTF and ITM", *International Journal of Information Management*, Vol.34, no.5, pp. 689–703.

Ondrus, J., & Pigneur, Y. 2006, "Towards a holistic analysis of mobile payments: A multiple perspectives approach", *Electronic Commerce Research and Applications*, Vol.5, no.3, pp. 246–257.

Ovum. 2012, Digital Wallet Dynamics. , pp. 1–12. Retrieved from http://www.mahindracomviva.com/wp-content/uploads/2015/02/Mahindra-Comviva-Digital-Wallet-Whitepaper.pdf

Parasuraman, a., Zeithaml, V. a., & Malhotra, A. 2005, "E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality", *Journal of Service Research*, 7(Feb.), pp. 1–21.

Phonthanikitithaworn, C., Sellitto, C., & Fong, M. 2015, "User Intentions to Adopt Mobile Payment Services: A Study of Early Adopters in Thailand", *Journal of Internet Banking and Commerce*, Vol.20, no.1, pp. 1–29.

Plouffe, C. R., Huland, J. S., & Vandenbosch, M. 2001, "Research report: richness versus parsimony in modeling technology adoption decisions-- understanding merchant adoption of a smart card- based payment system", *Information systems research*, Vol.12, no.2, pp. 208–222.

Pousttchi, K. 2008, "A modeling approach and reference models for the analysis of mobile payment use cases", *Electronic Commerce Research Applications*, Vol.7, no.2, pp. 182–201.

Pousttchi, K., & Wiedemann, D. G. 2007, "What Influences Consumers ' Intention to Use Mobile Payments?" *LA Global Mobility Round table*, pp. 1–16.

Ringle, C. M., Sarstedt, M., & Straub, D. W. 2012, "A Critical Look at the Use of PLS-SEM in MIS Quarterly", *MIS Quarterly*, Vol.36, no.1, pp. iiv–8.

Rogers, E. M. 2003, *Diffusion of Innovations*. New York, USA: Free Press.

Ryan, R., & Deci, E. 2000, "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions", *Contemporary educational psychology*, Vol.25, no.1, pp. 54–67.

Ryan, R. M., & Connell, J. P. 1989, "Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, Vol.57 No.5, pp. 749–761.

Sarstedt, M., Henseler, J., & Ringle, C. M. 2011, "Multigroup Analysis in Partial Least Squares (PLS) Path Modeling: Alternative Methods and Empirical Results" in: C. R. T. Marko Sarstedt, Manfred Schwaiger (Ed.), *Measurement and Research Methods in International Marketing* Vol.22, pp. 195–218.

Schierz, P. G., Schilke, O., & Wirtz, B. W. 2010, "Understanding consumer acceptance of mobile payment services: An empirical analysis". *Electronic Commerce Research and Applications*, Vol. 9, no.3, pp. 209–216.

Shatskikh, A. 2013, "Consumer acceptance of Mobile Payments in Restaurants". Master Thesis, University of South Florida, Department of Hospitality Administration, (January), pp. 1–57.

Shin, D.-H. 2009, "Towards an understanding of the consumer acceptance of mobile wallet", *Computers in Human Behavior*, Vol.25, no.6, pp. 1343–1354.

Soper, D. 2016, "A-priori Sample Size Calculator for Structural Equation Models" Retrieved January 23, 2016, from http://www.danielsoper.com/statcalc3/calc.aspx?id=89

Stone, M. 1974, "Cross-validatory choice and assessment of statistical predictions", *Journal of the Royal Statistical Society*, No.36, pp. 111–147.

Taylor, S., & Todd, P. 1995, "Understanding information technology usage: A test of competing models", *Information Systems Research*, Vol.6, no.2, pp. 144–176.

Teo, T. S. ., Lim, V. K. ., & Lai, R. Y. 1999, "Intrinsic and extrinsic motivation in Internet usage", *Omega International Journal of Management Science*, Vol.27, no.1, pp. 25–37.

Tornatzky, L., & Klein, K. 1982, Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, Vol. 29, no.1, pp. 28–43.

Varnali, K., Yilmaz, C., & Toker, A. 2012. "Predictors of attitudinal and behavioral outcomes in mobile advertising: A field experiment", *Electronic Commerce Research and Applications*, Vol.11, no.6, pp. 570–581.

Venkatesh, V., & Davis, F. 2000, "A theoretical extension of the technology acceptance model: four longitudinal field studies", *Management Science*, Vol.46, no.2, pp. 186–204.

Venkatesh, V., Morris, M. G., B.Davis, G., & Davis, F. D. 2003, "User acceptance of information technology: toward a unified view", *MIS Quarterly*, Vol.27, no.3, pp. 425–478.

Vijayasarathy, L. R. 2004, "Predicting consumer intentions to use on-line shopping: The case for an augmented technology acceptance model", *Information and Management*, Vol. 41, no.6, pp. 747–762.

Vodafone. 2013, "Tokyo-drift-how-japan-leads-the-way-on-m-payments", Retrieved from http://www.vodafone.com/business/global-enterprise/tokyo-drift-how-japan-leads-the-way-on-m-payments-2013-08-13

Wang, Y.-S., Wang, Y.-M., Lin, H.-H., & Tang, T.-I. 2003, "Determinants of user acceptance of Internet banking: an empirical study", *International Journal of Service Industry Management*, Vol.14, no.5, pp. 501–519.

Wu, J. H., & Wang, S. C. 2005, "What drives mobile commerce? An empirical evaluation of the revised technology acceptance model", *Information and Management*, No.42, pp. 719–729.

Yang, S., Lu, Y., Gupta, S., Cao, Y., & Zhang, R. 2012, "Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits", *Computers in Human Behavior*, Vol.28, no.1, pp. 129–142.

Zarmpou, T., Saprikis, V., Markos, A., & Vlachopoulou, M. 2012, "Modeling users' acceptance of mobile services", *Electronic Commerce Research*, Vol.12, no.2, pp. 225–248.

APPENDIX – 1: CONSTRUCTS

Construct	Items	Source(S)
Perceived Usefulness	I think MP is useful for me to buy products or services.	Bhattacherjee (2001), Van der Heijden (2003)
	I think MP makes it easier for me to buy products or services.	
	I think MP saves time for me to buy products or services.	
	Using mobile payments would make it easier for me to conduct transactions.	
	Overall, I find the mobile wallet to be useless for making payments.	
	Using mobile wallet would take more time and effort than using traditional payment methods.	
Perceived Ease of Use	I think using mobile wallet is easy.	Venkatesh and Davis 2000; Davis 1989
	My interaction with a mobile wallet would be clear and understandable.	
	It would be difficult for me to become skillful at using a mobile wallet.	
	I think it is easy for me to learn how to use mobile wallet.	
	It is easy to perform the steps required to use mobile wallet.	
Perceived Security	The risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile wallet.	Luarn and Lin (2005), Parasuraman et al. (2005)
	The risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile wallet.	
	I find mobile payment services secure for conducting my payment transactions.	
	I am afraid for unreasonable or fraudulent charges if using mobile wallet.	
	I am comfortable with having my credit card integrated into my mobile phone.	
Social Influence	People who are important to me would find using mobile services beneficial.	Ajzen 1991; Venkatesh and Davis (2000)
	People who influence my behavior think I should use mobile wallet.	
	People who are important to me think I should use mobile wallet.	
	People who I appreciate would encourage me to use mobile wallet.	
Compatibility	I would appreciate using mobile payment services in a restaurant/cafe/bar instead of alternative modes of payment (e.g., credit card, cash).	Moore and Benbasat (1991) Plouffe et al. (2001)
	I think mobile wallet is not compatible with my lifestyle.	
	Using mobile wallet at a restaurant/cafe/bar fits well with the way I like to purchase products and services.	
	Using mobile wallet is compatible with all aspects of my shopping behavior.	
Personal innovativeness in IT	When I hear about a new IT, I would look for ways to experiment with it.	Agarwal and Prasad (1998)
	Among my peers, I am usually the first to explore new information technologies.	
	I like to experiment with new information technologies.	
	In general, I am hesitant to try out new information technologies.	
	I know more about new products before other people do.	
	New products excite me.	
Rewards	I have / would like to benefit from promotions offered by the mobile wallet	Author generated
	I wouldn't (have) download(ed) mobile wallet if no promotions were offered	
	I would like to use/continue to use mobile wallet as long as promotions are offered	
Intention to Use / Continued Use Intention	I am likely to use/continue using mobile payment services in the near future	Venkatesh and Davis 2000 ; Bhattacherjee, 2001
	I am willing to use/continue using MP services in near future rather than not use it.	
	I intend to use / continue using mobile payment services at least as often within the next month as I have previously used.	
	I intend to use mobile payment services when the opportunity arises	
Attitudes	Using mobile wallets is a good idea.	Ajzen, 1991
	Using mobile wallets is beneficial.	
	Using mobile wallets is favorable.	
	Using mobile wallets is a wise thing to do.	

APPENDIX – 2: Descriptive Statistics & Cross Loadings

Items (Range: 1-5)	Mean	Std.Dev	ATTI	COMP	EOUS	INNO	SECU	SOCI	USEF
INOV_1	3.980	1.207	0.238	0.248	0.189	0.826	0.194	0.078	0.220
INOV_2	3.525	1.290	0.199	0.213	0.175	0.749	0.139	0.060	0.163
INOV_3	4.373	0.964	0.178	0.219	0.203	0.833	0.185	0.015	0.207
INOV_5	3.906	1.075	0.201	0.186	0.182	0.741	0.209	0.088	0.169
INOV_6	3.958	1.155	0.150	0.200	0.123	0.646	0.117	0.013	0.153
EOUS1	3.755	1.292	0.540	0.492	0.804	0.152	0.354	0.329	0.578
EOUS2	3.664	1.225	0.533	0.464	0.770	0.219	0.395	0.390	0.511
EOUS4	4.014	1.174	0.478	0.283	0.797	0.197	0.326	0.224	0.371
EOUS5	3.945	1.149	0.497	0.311	0.775	0.162	0.322	0.223	0.384
SECU1	3.500	1.349	0.248	0.216	0.245	0.137	0.671	0.208	0.160
SECU2	3.505	1.345	0.322	0.230	0.248	0.120	0.750	0.178	0.192
SECU3	3.527	1.242	0.546	0.475	0.413	0.228	0.871	0.317	0.447
SECU6	3.236	1.289	0.543	0.505	0.419	0.187	0.813	0.442	0.469
COMP1	3.431	1.444	0.526	0.811	0.443	0.203	0.408	0.436	0.614
COMP2	3.758	1.314	0.391	0.644	0.348	0.165	0.325	0.197	0.437
COMP3	3.348	1.309	0.516	0.874	0.424	0.262	0.429	0.402	0.554
COMP4	3.213	1.328	0.536	0.875	0.408	0.264	0.432	0.372	0.591
USEF1	3.638	1.210	0.606	0.589	0.456	0.226	0.355	0.368	0.797
USEF2	3.614	1.228	0.669	0.610	0.522	0.230	0.426	0.414	0.890
USEF3	3.839	1.222	0.629	0.564	0.528	0.236	0.373	0.348	0.872
USEF4	3.755	1.229	0.626	0.567	0.546	0.154	0.368	0.347	0.863
USEF5	3.681	1.342	0.413	0.420	0.324	0.109	0.287	0.222	0.567
SOCI1	2.927	1.479	0.342	0.374	0.338	0.018	0.390	0.825	0.361
SOCI2	2.748	1.483	0.364	0.400	0.362	0.092	0.357	0.882	0.399
SOCI3	2.447	1.454	0.325	0.375	0.299	0.069	0.321	0.884	0.345
SOCI4	2.531	1.489	0.309	0.400	0.310	0.062	0.285	0.876	0.375
ATTI1	3.795	1.153	0.919	0.555	0.597	0.263	0.512	0.360	0.689
ATTI2	3.766	1.147	0.935	0.580	0.603	0.223	0.540	0.358	0.677
ATTI3	3.777	1.143	0.922	0.554	0.613	0.209	0.526	0.360	0.682
ATTI4	3.780	1.108	0.912	0.581	0.599	0.249	0.527	0.352	0.675

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

QUALIFICATION PROBLEMS WITH AN UPPER BOUND

DOI: 10.17261/Pressacademia.2016116556

Ipek Gursel Tapki[1], Azar Abizada[2]

[1] Kadir Has University. ipek.tapki@khas.edu.tr

[2] ADA University. aabizada@ada.edu.az

ABSTRACT

We study qualification problem introduced by Kasher and Rubinstein (1997) and introduce an upper bound on the number of people who can be qualified. Following Abizada and Tapkı (2015), we analyze *consistency* requirement for this model. We introduce *Priority Based Liberal rule,* which is an extension of the Liberal rule, which has been analyzed widely in the literature. We characterize Priority *Based Liberal Rule* based on *consistency* and *unanimity.*

Keywords: Consistency, liberal rule, group identification, qualification problems, unanimity.

JEL Classification: D70, D71, D72

1. INTRODUCTION

We study the group identification (or qualification) problem introduced by Kasher and Rubinstein (1997). Consider a group of people, who need to make a collective decision on who among them are qualified to be experts in a certain field. Usually there is an upper bound on number of people who can be qualified. Each person has an opinion about his qualification as an expert in this field. Opinions are dichotomous: a person either thinks the other person is qualified or is not. Once everyone shares their opinions, the question is how to aggregate them in order to make a decision on who among these people are qualified.

A rule is a systematic way of aggregating opinions of people into a collective decision. We introduce a generalization of well-known *Liberal Rule, Priority Based Liberal Rule, which* works as follows: a person is qualified if (i) he qualifies himself as an expert and (ii) the upper bound for qualified people is greater than the number of people who have higher priority than this person and consider themselves as qualified.

We analyze *consistency* requirement. To understand the intuition, suppose a rule has been applied and a collective decision has been made. After a while, suppose we need to make the same type of qualification decision. However, suppose some of the people who were present for the initial decision, are not present this time. *Consistency* requires that the decision made about the remaining people should be the same as the initial decision made about them.

We characterize *Priority Based Liberal Rule* using *consistency* together with a *unanimity* requirement which says (a) if everyone unanimously agree on qualification of a person, then that person should be qualified if the upper bound for qualification is sufficient, (b) if there are more such people than the upper bound, then the qualified people should be a subset of such people, (c) if everyone unanimously agree on disqualification of a person, then that person should be disqualified.

The rest of the paper is organized as follows: in Section 2, we mention the related literature. In Section 3, we provide our model, our methodology and our result. In Section 4, we conclude.

2. LITERATURE REVIEW

Qualification problem is introduced by Kasher and Rubinstein (1997). Authors provide axiomatic characterization of liberalism, where qualification of a person depends only on his opinion about himself. Several other papers consider axiomatic analysis of this problem: Sung and Dimitrov (2005) show that five axioms used in Kasher and Rubinstein (1997)'s characterization of the "liberal" aggregator are not independent and prove that only three of their original axioms are necessary and sufficient for the results; Çengelci and Sanver (2010) study the same model and characterize voting rules satisfying *monotonicity, independence, self-duality* and a weaker version of *anonymity*.

Liberal Rule is widely studied in the literature and several characterizations of this rule has been provided. Samet and Schmeidler (2003) characterize a class of voting rules which they call consent rules. This class contains liberalism at one extreme and majoritarianism, where personal opinions about the qualification of an individual are aggregated according to the majority rule, at the other extreme. Ju (2013) characterizes *Liberal rule* using exclusive self-determination and affirmative self-determination together with other plausible requirements. Although, intuitively these two requirements seem similar to our *consistency* requirement, Abizada and Tapkı (2015) show that they are independent.

Consistency idea has been formulated and studied for different models. It has been analyzed extensively in the context of bargaining by Lensberg (1988), single-peaked preferences by Thomson (1994), coalitional form games by Peleg (1986) and Hart and Mas-Colell (1989), taxation by Aumann and Maschler (1985) and Young (1987), cost allocation by Moulin (1985), and matching by Sasaki and Toda (1992).

In Abizada and Tapkı (2015), we analyze qualification problems and introduce two *consistency* requirements for this model. Also, we propose two new characterizations of the *Liberal Rule* based on these *consistency* requirements. Differently from that work, in this paper we introduce an upper bound on the number of qualified people. In real life, there are so many situations requiring a limit on number of qualified people. For example, there cannot be more than certain number of people in a dissertation committee or a project.

3. DATA AND METHODOLOGY

In this paper, we theoretically analyze qualification problems with an upper bound on the number of qualified people and we axiomatically characterize *Priority Based Liberal Rule* using *consistency* and *unanimity* requirements. Now, we will introduce our model and our characterization.

Let $\mathbb{N}$ be the infinite set of "potential" people. Let ***I*** be the class of finite subsets of $\mathbb{N}$ with cardinality of at least two. Each person $i \in \mathbb{N}$ has an opinion about qualifications of all the people, including himself. For each pair $i, j \in \mathbb{N}$, let $\boldsymbol{P_{ij}} \in \{0,1\}$ be the **opinion of person *i* about person j**, where $\boldsymbol{P_{ij}} = 1$ means that i considers j as qualified, and $\boldsymbol{P_{ij}} = 0$ means that i considers j as disqualified. Given $\mathrm{I} = \{i_1, i_2, \dots, i_{|I|}\} \in I$, and person $j \in I$, let $P_j^I \equiv (P_{i_1 j}, P_{i_2 j}, \dots, P_{i_{|I|} j})$ be the vector of opinions of all people in *I* about person *j*. For each$\mathrm{I} = \{i_1, i_2, \dots, i_{|I|}\} \in I$, let $\boldsymbol{P^I} = \left(P_{i_1}^I, P_{i_2}^I, \dots, P_{i_{|I|}}^I\right)$ be the **opinion profile for *I*** or **opinion matrix for *I***. Let $\mathcal{P}^I$ be the set of all possible opinion matrices for *I*. For each $\mathrm{I} = \{i_1, i_2, \dots, i_{|I|}\} \in I$, let $q^I \in \{1,2, \dots, |I|\}$ be an upper bound on the number of people that can be qualified, that is, at most q^I people can be qualified.

A **qualification problem for *I* with an upper bound** is a pair of an opinion profile for *I*, P^I and an upper bound on the number of people that can be qualified q^I, that is (P^I, q^I). A **(qualification) decision for *I*** is a vector of 0's and 1's, $x \equiv \left(x_{i_1}, \dots, x_{i_{|I|}}\right) \in \{0,1\}^{|I|}$ where 1 in i^{th} component means that the person i is **qualified** and 0 in i^{th} component means that the person i is **disqualified**. For each problem (P^I, q^I), a **rule $\boldsymbol{\varphi}$** makes a decision for I, i.e.

$$\varphi : \bigcup_{\substack{\mathrm{I} \in I \\ q^I \in \{1,2,\dots,|I|\}}} \mathrm{P}^I \times q^I \to \{0,1\}^{|I|}$$

such that $x_{i_1} + \dots + x_{i_{|I|}} \leq q^I$.

For each qualification problem (P^I, q^I) and each rule φ, let $Q(\varphi(P^I, q^I)) \equiv \{i \in I: \varphi_i(P^I, q^I) = 1\}$ be the set of people who are qualified by φ, at (P^I, q^I). Similarly, let $DQ(\varphi(P^I, q^I)) \equiv \{i \in I: \varphi_i(P^I, q^I) = 0\}$ be the set of people who are disqualified by φ, at (P^I, q^I). Let π be a strict priority relation which is a complete ordered list of agents. That is, if for $i, j \in \mathbb{N}$, $\pi(i) < \pi(j)$, then person i has higher priority than person j. For each I∈ I and $i \in I$, let $\mathrm{Pr}^{I,\pi}(i) = \{j \in I: \pi(j) < \pi(i)\}$ be the set of people who have higher priority than i in I.

We define the *Priority Based Liberal rule* which is an extension of standard *Liberal rule* that has been widely studied in the literature. It works as follows: a person i is qualified if he considers himself as qualified and if the upper bound for qualified people is greater than the number of people who have higher priority than i and who consider themselves as qualified. Otherwise, he is disqualified.

Priority Based Liberal Rule, $\boldsymbol{\varphi^{L,\pi}}$: For each (P^I, q^I) and $i \in I$,

$$\varphi_i^{L,\pi}(P^I, q^I) = \begin{cases} 1 & \text{if } P_{ii} = 1 \text{ and } \sum_{j \in \mathrm{Pr}^{I,\pi}(i)} P_{jj} < q^I \\ 0 & \text{otherwise} \end{cases}$$

4. FINDINGS AND DISCUSSIONS

We define two plausible properties of a rule. Let φ be a rule. Before the requirement, for each I∈ I and each $P^I \in \mathcal{P}^I$, let $I^{\mathbf{1}}(P^I) = \{i \in I: P_i^I = (1, \dots, 1)\}$ be the set of people such that everyone unanimously agree on qualification.

Our requirement states the following: (i) if everyone unanimously agree on qualification of a person, then that person should be qualified if the upper bound for qualification is sufficient, (ii) if there are more such people than the upper bound, then the qualified people should be a subset of such people, (iii) if everyone unanimously agree on disqualification of a person, then that person should be disqualified. Formally,

Unanimity: For each qualification problem (P^I, q^I),

(i) if $|I^{\mathbf{1}}(P^I)| \leq q^I$, then each $i \in I^{\mathbf{1}}(P^I), \varphi_i(P^I, q^I) = 1$,
(ii) if $|I^{\mathbf{1}}(P^I)| > q^I$, then $Q(\varphi(P^I, q^I)) \subseteq I^{\mathbf{1}}(P^I)$ and $|Q(\varphi(P^I, q^I))| = q^I$,
(iii) each $i \in I$ such that $P_i^I = (0, \dots, 0), \varphi_i(P^I, q^I) = 0$.

Before defining our next requirement, we need to define some notations. For each pair I *and* I' with $I' \subset I$, each $P^I \in \mathcal{P}^I$, let $P^I|_{I'} \in \mathcal{P}^{I'}$ be the P^I-reduced opinion profile for I', which is obtained from P^I by deleting opinions of people in I\I' and opinions of everyone about them. To illustrate this point, let I= {i_1, i_2, i_3} and I'= {i_1, i_2}. Also let be P^I as follows

$$P^I = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

Then, we define $P^I|_{I'}$ as follows: $P^I\Big|_{I'} = \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$.

Next we define our *consistency* (robustness) requirement. Let the rule make a (qualification) decision for a group of people. Let some people (qualified or disqualified) accept the decisions made about them and leave. If the rule is applied to the problem with remaining people where only opinions of the remaining people are considered, then decision about each remaining person should be same as it was before. Before defining it formally, we have to define a reduced problem. If some people accept the decisions made about them and leave and if some of them are qualified, then we need to update the upper bound for the remaining qualified people. For each problem (P^I, q^I), and $I' \subset I$, let $r_{I'}^{\varphi}(P^I, q^I) = (P^I|_{I'}, q^I - |(I/I') \cap Q(\varphi(P^I, q^I))|$ be the reduced problem. Formally,

Consistency: For each pair I and I' with $I' \subset I$, each (P^I, q^I), and each $i \in I'$, we have $\varphi_i(P^I, q^I) = \varphi_i\left(r_{I'}^{\varphi}(P^I, q^I)\right)$.

This is the natural application of *consistency* idea to our model. But as our next result shows, this version of *consistency* turns out to be very strong: we show that the only rule that satisfies *consistency* together with very mild *unanimity* requirement is *Priority Based Liberal rule*.

Theorem. A rule φ is *consistent* and *unanimous* if and only if it is a *Priority Based Liberal rule*, $\varphi = \varphi^{L,\pi}$ for some π.

Proof. Let φ be a rule satisfying *consistency* and *unanimity*. Let (P^I, q^I) be a problem. Let π^{φ} be a strict priority relation for I such that each $k \in Q(\varphi(P^I, q^I))$ and l $\in DQ(\varphi(P^I, q^I))$, $\pi^{\varphi}(k) < \pi^{\varphi}(l)$. Let $i \in I$.

First, suppose $P_{ii}^I = 1$ and $\sum_{k \in Pr^{I,\pi}(i)} P_{kk}^I < q^I$. Suppose for a contradiction, $\varphi_i(P^I, q^I) = 0$. Note that by the choice of π^{φ}, since $\varphi_i(P^I, q^I) = 0$, $\pi^{\varphi}(i) \neq 1$.

Case 1. Suppose there is $j \in I$ such that $P_{ji}^I = 1$. Then, let $I' = \{i, j\}$ and $r_{I'}^{\varphi}(P^I, q^I) = (P^I|_{I'}, q^I - |(I/I') \cap Q(\varphi(P^I, q^I))| \equiv (P^{I'}, q^{I'})$. Note that, since $\sum_{k \in Pr^{I,\pi}(i)} P_{kk}^I < q^I$, $q^{I'} \geq 1$. By *consistency*, $\varphi_i(P^{I'}, q^{I'}) = 0$.

Case 1.1. Let $\pi^{\varphi}(i) < \pi^{\varphi}(j)$. Since $q^{I'} \geq 1$, by *unanimity*, $\varphi_i(P^{I'}, q^{I'})$ =1, which is a contradiction to *consistency*.

Case 1.2. Let $\pi^{\varphi}(j) < \pi^{\varphi}(i)$. Since $\sum_{k \in Pr^{I,\pi}(i)} P_{kk}^I < q^I$, by the choice of π^{φ}, $q^{I'} \geq 2$. Then, by *unanimity*,

$\varphi_i(P^{I'}, q^{I'})$ =1, which is a contradiction to *consistency*.

Case 2. Suppose for each $l \in I$ such that $P_{li}^I = 0$. Let $j \in I$ and $I' = \{i, j\}$. Let $k \in \mathbb{N} / I$ and $I'' = \{i, j, k\}$. Suppose $P_k^{I''} = (0,0,0)$ and $P_{ki}^{I''} = 1$. By *unanimity*, $\varphi_k(P^{I''}, q^{I'}) = 0$.

Case 2.1. Let $\pi^{\varphi}(i) < \pi^{\varphi}(j)$. By Case 1, $\varphi_i(P^{I''}, q^{I'}) = 1$. By *consistency*, $\varphi_i\left(r_{I'}^{\varphi}((P^I, q^I)\right) = \varphi_i(P^{I'}, q^{I'}) = \varphi_i\left(r_{I'}^{\varphi}((P^{I''}, q^{I'})\right) = 1$, a contradiction.

Case 2.2. Let $\pi^{\varphi}(j) < \pi^{\varphi}(i)$. Then, $q^{I''} \geq 2$. Then, by *consistency*, $\varphi_i\left(r_{I'}^{\varphi}((P^I, q^I)\right) = \varphi_i(P^{I'}, q^{I'}) = \varphi_i\left(r_{I'}^{\varphi}((P^{I''}, q^{I'})\right) = 1$, a contradiction.

Second, suppose $P_{ii}^I = 1$ and $\sum_{k \in Pr^{I,\pi}(i)} P_{kk}^I \geq q^I$. If $\varphi_i(P^I, q^I) = 1$, then by the choice of π^{φ}, each $j \in Pr^{\pi^{\varphi},I}(i)$, $j \in Q(\varphi((P^I, q^I))$. But then $|Q(\varphi((P^I, q^I))| > q^I$, a contradiction. Thus, $\varphi_i(P^I, q^I) = 0$.

Lastly, suppose $P_{ii}^I = 0$. Since the proof of this case is very similar to first part, we omit it.

Therefore, $\varphi = \varphi^{L,\pi}$ for $\pi = \pi^{\varphi}$.

5. CONCLUSION

We study group qualification problem. Differently from the earlier literature, we introduce an upper bound on the number of people that can be qualified. We extend the results in Abizada and Tapkı (2015) to our model with proper adjustments in definitions of the requirements and the rules. We propose a new rule, *Priority Based Liberal,* which is an extension of standard *Liberal rule* in the literature and characterize this rule using *consistency* requirement together with *unanimity.*

In this model, we assume that each person either thinks that the other person is qualified as an expert or not. However, he may have neutral opinion about qualification of some person. Extending this model by allowing neutral opinions is an open question.

REFERENCES

Abizada, A. and Tapki, I. G. (2015), Two simple characterizations of the Liberal rule based on consistency requirement, *mimeo*.

Aumann, R. and Maschler, M. (1985), Game Theoretic Analysis of a Bankruptcy Problem from the Talmud, Journal of Economic Theory, Vol. 36, pp.195-213.

Çengelci, M. A. and Sanver, M. R. (2010), Simple collective identity functions, Theory and decision, Vol. 68, No. 4, pp. 417-443.

Ergin, H. (2000), Consistency in house allocation problems, Theory and Decision, Vol. 68, pp.77-97.

Hart, S. and Mas-Colell, A. (1989), Potential, Value and Consistency, Econometrica, Vol. 57, pp. 589-614.

Ju, B. (2013), On the characterization of liberalism by Samet and Schmeidler, Vol. 40, pp. 359-366.

Kasher, A. and Rubinstein, A. (1997), On the question 'Who is J?' A social approach, Logique Analyse, Vol.160, pp. 385-395.

Lensberg, T. (1988), Stability and the Nash solution, Journal of Economic Theory, Vol. 45, No. 2, pp. 330-341.

Moulin, H. (1985). The separability axiom and equal-sharing methods.Journal of Economic Theory, Vol. 36, No. 1, pp.120-148.

Peleg, B. (1986), On the reduced game property and its convers, International Journal of Game Theory, Vol. 15, pp.187-200.

Samet, D. and Schmeidler, D. (2003), Between Liberalism and Democracy, Journal of Economic Theory, Vol. 110, pp.203-233.

Sasaki, H., and Toda, M. (1992), Consistency and characterization of the core of two-sided matching problems, Journal of Economic Theory, Vol. 56, No. 1, pp. 218-227.

Sung, S. C., & Dimitrov, D. (2005), On the Axiomatic Characterization of Who is a J?, Logique et Analyse, Vol. 48, pp. 101-112.

Tadenuma, K. and Thomson, W. (1991), No-envy and consistency in economies with indivisible goods, Econometrica, Vol.59, pp.1755-1767.

Thomson, W. (1990), The Consistency Principle, in Game Theory and Applications, ed. By Ichiishi, T., Neyman, A., and Tauman, Y., New York: Academic Press: 187-215.

Thomson, W. (1994). Consistent solutions to the problem of fair division when preferences are single-peaked, Journal of Eonomic Theory, Vol. 63, 219-245.

Young, P. (1987), On dividing an amount according to individual claims or liabilities, Mathematics of Operations Research, Vol. 12, pp.398-414.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

FISCAL POLICY AND GROWTH: COMPERATIVE ANALYSIS OF RUSSIA AND THE OTHER POST SOVIET UNION COUNTRIES

DOI: 10.17261/Pressacademia.2016116557

Eda Balikcioglu
Kirikkale Uiversity. edabalikcioglu@kku.edu.tr

ABSTRACT

After the seperation of the Soviet Union and the transformation of the economic systems from socialism to capitalism, public policies of old Soviet Nations have also changed. Among these countries, Russia has a special importance due to its economic and fiscal potential and in terms of its inheritance of a strict centralist system. On the other hand, aftermath of the scatter of Soviet Union in 1991, Russia met two important economic crises. This study aims to investigate Russian economic and fiscal performance in 1992-2014 after the disintegration and also to compare Old Soviet Nations including 12 countries by using dynamic panel data analysis with the variables of GDP growth, inflation, unemployment, current account balance, public revenues, public expenditures, primary balance, budget balance and public debt. Finally, the study examines the effect of public policies during the transition period on economic growth.

Keywords: Economic growth, fiscal policy, public expenditures, primary balance, budget balance, public debt.
JEL Classification: O40, H60, H20

1. INTRODUCTION

Fiscal policy gained importance after the Great Depression with regard to Keynesian politics. Fiscal policy is an important determinant of growth in developing countries due to tightening or expansionary effects on the economy. From this point of view, the relationship between fiscal policy and growth has been widely discussed in the literature. The regarding literature pays a special attention to the transition economies which face with rising public debt as an instrument of fiscal policy.

More clearly, after the demolition of Berlin Wall in 1989, the Soviet Union was dissolved; and consequently after the seperation of the Soviet Union, the economic system in Russia and other post-Soviet economies shifted from socialism to free market economy. In this respect, numerous extensive reforms have been implemented in order to ensure macroeconomic stability. In addition, privatization efforts have also been rapidly put underway. Afterwards of the dissolution, governments prepared lots of reforms. The aim of this transition was to reconstruct the economic conditions of the states. In the Post Soviet countries and specifically in Russia, reforms that aimed at growth and fiscal discipline have been carried out in order to ensure macroeconomic stability and fiscal discipline. In this respect; strategic plans, multi-annual budgeting, and medium term plans have been implemented (Glazev and Fetison, 2014: 70). However, at the end the politics that implemented in these states was not satisfying enough and many unforeseen political and social factors occured (Sancak&Karaman, 2014:3). As a result of the reforms requiring high government expenditures, the public debt problem has arised.

In this regard, this study aims to investigate relationship between fiscal policy instruments and growth of Post Soviet Union Countries. The remainder of the paper is organized as follows: First section examines the overview of Post Soviet Union countries after the dissolution. Second section reviews the literature and the

final section analyses the relationship between fiscal policy and growth. As a result of the study negative correlation was found between growth and public debt. According to these results, the contribution of this study to literature is to decrease public debt ratios for the growth process in Russia and the other Post Soviet Union countries.

2.OVERVIEW OF POST SOVIET UNION COUNTRIES AFTER THE DISSOLUTION

After the seperation of the Soviet Union and the transformation of the economic systems from socialism to capitalism, public policies of old Soviet Nations have also changed. But the transition period has been compulsive and long. All of the countries overcame this period formidably. In Table 1, the transition periods from socialism to capitalism are shown for Post Soviet Union countries.

Table 1: Socialism to Capitalism Transition Periods of Countries

Countries	Start Recession	Finish Recession	Duration
Azerbaijan	1989	1995	7 years
Belarus	1990	1995	6 years
Georgia	1989	1994	6 years
Kazakhstan	1989	1995	7 years
Kyrgyz Republic	1991	1995	5 years
Moldova	1990	1999	10 years
Russia	1990	1998	9 years
Tajikistan	1989	1996	8 years
Turkmenistan	1989	1997	9 years
Ukraine	1990	1999	10 years
Uzbekistan	1991	1995	5 years

Source: (Mickiewicz, 2005: 21)

Firstly, Moldova and Ukraine have the longest transition time of 10 years. They are followed by Russia and Turkmenistan with 9 years, 8 years for Tajikistan and 7 years for Azerbaijan and Kazakhstan. In addition, Belarus and Georgia completed this transition in 6 years and the most fastest transition time belongs to Kyrgyz Republic and Uzbekistan with a period of 5 years.

Among these countries Russia has a special importance due to its economic and fiscal potential which possesses prominent rich oil reserves. Hence, while the increase in oil prices lead to direct growth in economy, decrease in oil prices cause recession. With regards to this situation, table 2 indicates, the growth, inflation, unemployment and current account balance for Russia in the 1993-2000 period

Table 2: Overview of Russian Economy (1993-2000)

	1993	1994	1995	1996	1997	1998	1999	2000
GDP	-8.700	-12.700	-4.100	-3.608	1.381	-5.345	6.351	10.046
Inf	874.622	307.634	197.471	47.742	14.767	27.675	85.742	20.776
Unmp	5.285	7.233	8.534	9.606	10.819	11.889	13.001	10.591
Curact	1.414	2.833	2.221	2.769	-0.020	0.081	12.565	18.036
Buddef	-8	-11.5	-5.9	-8.5	-7.4	-3.4	2	7.6

Source: IMF World Economic Outlook Databases, 2015.

In table 2, the growth rate, which was around 9% in 1993, became still more than -5% during 1998 which was also a year of economic crisis. However, after the crisis, the growth rate increased to 10%. While the rate of inflation was nearly 900%, it has decreased to 20% in year 2000. Unemployment rate and current account deficit show an increasing trend with the years.

Russia encountered two major crisis during the transition period. The first one is the crisis in 1993 which was triggered by the transition itself, and the second one is the foreign debt crisis which emerged in 1998. The main

problem of Russian economy before 1998 was budget deficit and discontinuity of financial and real sector. At the basic structure of the monetary and financial policies implemented in Russia lie the goals such as the ensuring of the macroeconomic stability, decreasing the rate of inflation to reasonable levels, decreasing the interest and budget deficits, a credible currency, and a demand level that matches the supplies. But the distrust of financial markets brought about 1998 crises. In addition three main factors engendered the crises. Firstly, political instability, second, budget deficits and third one is the ability of government (Snelnikov et.al, 2006:38). After the crisis, an extensive package of economic reforms is administered in the country. Besides risen petroleum product prices leads to attainments of these reforms. (Sancak&Karaman, 2014:9).

Table 3: Overview of Russian Economy (2000-2014)

Years	GDP	İnf	Unmp	Rev.	expd	buddef	pridef	debt	curact
2000	10.046	20.776	10.591	36.169	32.840	3.329	7.614	59.859	18.036
2001	5.091	21.461	8.939	36.917	33.712	3.205	5.849	47.613	11.069
2002	4.744	15.783	8.000	36.994	36.272	0.721	2.778	40.305	8.436
2003	7.253	13.666	8.200	36.375	34.928	1.447	2.996	30.359	8.229
2004	7.151	10.887	7.700	36.647	31.746	4.902	6.038	22.316	10.067
2005	6.388	12.683	7.100	39.703	31.563	8.140	8.938	15.912	11.050
2006	8.153	9.679	7.000	39.476	31.115	8.361	8.914	10.504	9.325
2007	8.535	9.007	6.000	40.208	34.224	5.984	5.983	8.607	5.489
2008	5.248	14.108	6.200	39.172	34.298	4.875	5.075	7.978	6.258
2009	-7.800	11.654	8.200	35.044	41.354	-6.310	-6.640	10.627	4.121
2010	4.500	6.854	7.300	34.620	38.042	-3.422	-3.299	11.346	4.423
2011	4.300	8.443	6.500	37.264	35.726	1.538	1.835	11.641	5.107
2012	3.400	5.068	5.500	37.709	37.290	0.419	0.718	12.666	3.537
2013	1.300	6.763	5.500	36.926	38.207	-1.281	-0.910	14.028	1.642
2014	0.622	7.824	5.108	37.142	38.332	-1.190	-0.752	17.920	3.091

Source: IMF World Economic Outlook Databases, 2015.

Table 3 shows, the macroeconomic and financial indicators in Russia for the period after the year 2000. A closer examination of the Russian economy in the post-2000 period reveals that there is a sharp decrease in growth rate after the crisis of 2008, and accordingly there is increase in the budget deficit, primary deficit and debts. The reason behind the vulnerability of Russia to crisis is the fact that the crisis affects the oil prices. As stated in the introduction of this study, while the country's economy and especially growth rate show positive improvements when the oil prices increase, the decrease of the oil prices have negative impact on the country's economy. Although tight fiscal policy and the economic reforms have improved the situation, the role of international oil prices and the real exchange rate in Russia's growth dynamics remain a main policy and a subject of lively debate (Rautava, 2004:316)

The public debt is inclined to decrease while the debts of the private sector have the tendency to increase. The reason behind this is the fact that the investment policies have been altered since 2010 (Zamaraev et.al., 2014:24).

Table 4: Post Soviet Union Countries GDP and Public Debt Performances (2011-2014)

	GDP				PUBLIC DEBT			
	2011	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**
Azerbaijan	0.1	2	5.8	2.8	10.1	11.6	13.8	16.4
Belarus	5.5	1.7	1	1.6	45.9	38.5	38.3	37.9
Georgia	7.2	6.4	3.3	4.7	29.8	30	32.2	35.1

Kazakhstan	7.5	5	6	4.3	10.4	12.4	12.9	15.1
Kyrgz Rep.	6	-0.9	10.5	3.6	49.4	49	46.1	53
Moldova	6.8	-0.7	9.4	4.6	24.1	24.5	23.8	31.5
Russia	4.3	3.4	1.3	0.6	11.6	12.7	14	17.9
Tajikistan	7.4	7.5	7.4	6.7	35.4	32.4	29.2	28.2
Turkmenistan	14.7	11.1	10.2	10.3	10	18.1	21.1	16.8
Ukraine	5.5	0.2	-0.02	-6.8	36.8	37.5	407	71.2
Uzbekistan	8.3	8.2	8	8.1	9.1	8.6	8.3	8.5

By contrast the other post soviet nations, Russia's performance in 2008 crises is not impressive. Russia's level of output is smaller than others and also life expectancy, human development index and fiscal performances(Popov, 2008: 249). Tablo 4 shows GDP and public debt performances of Post Soviet Union Countries. Georgia, Turkmenistan, Uzbekistan, Tajkistan's growth performance seems impressive. But on the other hand Russia, Ukraine, Belarus and Ukraine's GDP performances are not succeed. And the public debt datas indicates that in generel except Tajiksistan public debts increases, growth rates are decreases. In view of the circumstances GDP and Public debt determinants affects in Post Soviet Nations from the perod of 2011-2014.

3. LITERATURE REVIEW

There are several studies with the relationship with growth and fiscal policy. But the emprical literature of growth and fiscal policy of Russia and the other Post Soviet Countries is limited. In the literature mostly finds strong effect between growth and fiscal policy. Firstly, endogenous growth models Ram (1986), Summers and Heston(1988), Barro(1990) find positive relations with growth and government expenditures. Engen and Skinner(1992) attain strong and negative effect between public expenditures and taxes and growth with the sample of 107 countries for the period of 1970-1985 using regression analysis. Easterly and Rebelo (1993) investigate 125 countries from 1970-1988 employing regression analysis and their results has a strong association between growth and fiscal structure. In their study Kneller et. al.(1999) examine 22 OECD countries from the period of 1970-1985 using panel analysis and in contribute to the literature that taxes and government expenditures impacts on economic growth. Table 3 classifies regarding literature with samples and methods.

Table 5: Literature Study

Author	Sample	Method	Result
Engen and Skinner(1992)	107 countries 1970-1985	Regression analysis	Strong and negative effect between public expenditures and taxes and growth
Easterly and Rebelo (1993)	125 countries 1970-1988 period	Regression analysis	Strong association between growth and the fiscal structure
Kneller et.el.(1999)	22 OECD countries 1970-1985 period	Panel data analysis	Taxes and government expenditures impress economic growth
Benos (2009)	14 EU countries 1990-2006	Dynamic Panel Data Analysis	Positive effects of taxes and public expenditures on growth.
Reinhart and Rogoff (2010)	44 countries for 1946-2009	Panel threshold analysis	High debt levels lead to small growth
Kumar and Woo(2010)	38 advanced and emerging economies 1970-2007 period	Panel data analysis	There is a negative impact of debt and growth
Wu, Tang and Lin(2010)	182 countries	Panel Granger Causality	Results supports

	1950-2004	method	Wagners Law and government expenditure is helpful to economic growth
Acosta-Ormaechea and Yoo (2012)	69 countries during the period 1970-2009(21 high income, 23 middle-income and 25 low-income countries)	Pooled Mean Group Estimation(PMG)	Income taxes has a negative relationship with growth but on the other hand property taxes and VAT has a positive relations of growth
Cottarelli and Jaramillo (2012)	G7 countries in 2011	Cross section regression analysis	There is a correlation with growth and fiscal policy in small term but on the other hand there is not a relation in long run.
Panizza and Presbitero (2012)	2003-2008	Instrumental variable approach	High debts do not causes low growth
Baum, Checherita and Rother (2013)	12 euro area countries 1990-2010 period	Dynamic threshold panel analysis	High debt is a negative effect on growth
Dalic (2013)	New member states of EU, over the period of 1999-2010	Panel data analysis	Fiscal policy is not strongly affects the growth performance.
Acosta-Ormaechea and Morozumi (2013)	56 countries (14 low-, 16 medium-, and 26 high-income countries), 1970-2010.	GMM analyses	Public expenditures has a positive effects on growth
Afonso and Jalles (2014)	155 non developed and developed countries, between 1970-2008 period	Panel data analysis	Revenues are not significant but public expenditures has negative effects on growth
Mohammadi and Ram (2015)	6 East African countries 1960-2008	Panel cointegration analysis	In Japan and Korea fiscal polisy effect growth rate contrary to Malaysia, the Philippines, Singapore and Thailand, there is not a relation.

In the recent literature, Benos (2009), examine 14 EU countries from 1990 to 2006 applying dynamic panel data analysis and accordingly finds positive effects of taxes and public expenditures on growth. Wu, Tang and Lin(2010) support Wagner's law and add government expenditure is helpful to economic growth. They used granger causality analysis in 1950-2004 period on 182 countries. In their study Acosta-Ormaechea and Yoo (2012) conclude that income taxes has a negative relationship with growth but on the other hand property taxes and VAT has a positive relations of growth. Acosta-Ormaechea and Morozumi (2013) examine 56 countries with their income structures by using the same method of this study GMM and denote the positive

effects of public expenditures on growth. Afonso and Jalles (2014) also emphasize the public expenditures is the determinant of growth apply panel data analysis to 155 developed and nondeveloped countries betweeen 1970-2008 years. Mohammadi and Ram (2015) analyse 6 East African countries between 1960-2008 using panel cointegration analysis and as a result they support, in Japan and Korea fiscal polisy effect growth rate contrary to Malaysia, the Philippines, Singapore and Thailand, there is not a relation.

On the other hand, there is a small group of studies that find no relationship on fiscal policy and growth. As an example of, Dalic (2013) investigates the effect of fiscal policy on growth and in conclusion imply that there is not any effect on growth on new member states of EU from 1999-2010 as the studies; Durevall and Henrekson (2011), Bergh and Henrekson (2011).

4. DATA AND METHODOLOGY

This study investigate Russian economic and fiscal performance between 2000-2014 years and also to compare Post Soviet Nations including 11 countries by using dynamic panel data analysis with the variables of GDP growth, inflation, unemployment, current account balance, public revenues, public expenditures, primary balance, budget balance and public debt. Finally, the study examines the effect of public policies during the transition period on economic growth. The datas are taken from IMF World Economic Outlook Databases.

Tablo 6: Variable Definitions

Variables	Definitions
GDP	Growth
inf	Inflation(CPI)
Unmp	Unemployment
Expd	Public expenditure/GDP
buddef	Budget deficit/GDP
primdef	Primary deficit/GDP
pubdebt	Public debt/GDP
Curac	Current account deficit/GDP

Source: IMF, World Economic Outlook, Database, 2015

Growth is affected by the previous growth performance of economy so that it has dynamic structure. Due to this, in this study dynamic panel analyses is used since static analysis leads to biased and inconsistent estimators.

The Arellano–Bond (1991) estimator sets up a generalized method of moments (GMM) problem in which the model is specified as a system of equations, one per time period, where the instruments applicable to each equation differ (for instance, in later time periods, additional lagged values of the instruments are available). The unobserved panel data correlated with the lagged dependent variables, making standart estimators inconsistent.

It uses the lagged level variables as instruments. The instrumentation is actually undertaken on a on eper time basis and in so doing the sample length is not reduced. The instruments called as GMM-style instruments. In case of samples with small numbers of time series observations, there is an alternative approach in studying with the dynamics. This method allows a dynamic specification in differences, with a lagged dependent variable. Adaptation of an instrumental variable method is essential in this approach. Because differencing induces a bias in the coefficient on the lagged dependent variable, due to the correlation between it and the unobserved fixed effects in the residual.

The panel data model with no regressors:

$$y_{it} = \ell y_{it-1} + u_{it}$$

First diffrence to eliminate individual effects in model:

$$y_{it} - y_{it-1} = \ell(y_{it-1} - y_{it-2}) + (u_{it} - u_{it-1})$$

$(u_{it} - u_{it-1})$ is MA(1) unit root. We examine this relationship, ex, t=3:

$$y_{i3} - y_{i2} = \ell(y_{i2} - y_{i1}) + (u_{i3} - u_{i2})$$

In this case the valid instrument is y_{i1} and correlated with $y_{i2} - y_{i1}$ and not correlated with $u_{i3} - u_{i2}$ (Baltagi, 1996:127).

If we define the matrix of instruments **Z** = [**Z**1 , **Z**2 ,....., **Z**N] and the moment conditions we can proceed to obtain the Arellano-Bond GMM estimates. The estimation procedure is conducted in two steps. The first step in the procedure estimates the following equation using the GLS procedure:

$$Z'\Delta Y = Z'\Delta_{-1\phi} + Z'\Delta X\beta + Z'\Delta u$$

And the GMM estimator computed as:

$$\hat{\delta}_{GMM} = (\Delta X'Z(Z'\hat{\Phi}Z)^{-1}Z'\Delta X)^{-1}(\Delta X'Z(Z'\hat{\Phi}Z)^{-1}Z'\Delta Y)$$

5. FINDINGS AND DISCUSSIONS

In this study first of all 2 models are estimated by using two different samples due to data availability., In Model 1, the effect of inflation, public expenditures, public revenues, budget deficits, public debts and current account balances on GDP of Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia , Tajikistan, Turkmenistan, Uzbekistan and Ukraine are estimated and In model 2, the effect of inflation, unemployment, public expenditures, public revenues, budget deficits, primary deficits, public debts and current account balances on GDP of Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia and Ukraine are examined. Results are shown two different analyses which are Pooled OLS and Arellano Bond GMM.

Table 7: Pooled OLS Results

	Model 1	**Model 2**
	GDP	
gdp	0.000*** (5.56)	0.000*** (4.48)
inf	0.555 (0.59)	0.556 (-0.39)
unmp	-	0.083* (-1.75)
revenue	0.256 (-1.14)	0.329 (-0.98)
exp	0.373 (0.89)	0.506 (0.67)
buddef	0.256 (1.14)	0.976 (0.03)
primdef	-	0.395 (0.85)
pubdebt	0.133 (-1.51)	0.121 (-1.56)
curac	0.835 (0.21)	0.708 (-0,38)
N	154	112
Prob>F	0.0000	0.0000

Note: ***,**,*shows 1%, 5%, 10% statistically significant or not, N number of observation and in paranthesis t statistics

As seen in the Pooled OLS results in table 7, while one period of delay in growth is significant in 1% level according to model 1, according to model 2, there is a correlation of 1% and 10% between growth and the variables of one period of delay in the growth and unemployment respectively. Fiscal variables show no meaningful impact on the determination of growth. As mentioned before, growth is affected by the previous growth performance of economy so that it has dynamic structure. Due to this, dynamic panel analyses is used since static analysis leads to biased and inconsistent estimators. Arellano Bond Gmm results are shown in table 8;

Table 8: Arellano Bond Dynamic Panel Estimations

	Model 1	**Model 2**
	GDP	
GDP	0.001*** (3.19)	0.074 (1.78)
inf	0.775 (-0.29)	0.051* (-1.95)
unmp	-	0.618 (0.50
revenue	0.029** (-2.19)	0.185 (-1.33)
exp	0.172 (1.32)	0.756 (0.31)
buddef	0.056 (1.91)	0.904 (-0.12)
primdef	-	0.326 (0.98)
pubdebt	0.022 (-2.59)	0.000*** (-3.71)
curac	0.0871 (-0.16)	0.849 (-0.19)
N	143	104
Sargan Test	118.0361	90.7262
2.order Autocorrelation	0.3895	0.5039
Sample	11	8

Note: ***,**,*shows 1%, 5%, 10% statistically significant or not, N number of observation and in paranthesis z statistics.

In Table 8, Sargan and Auto-correlation test statistics at the last two columns indicate that the utilized instruments are suitable and that the null hypothesis of "there is no 2nd degree auto-correlation" is not rejected, respectively. Examination of the analysis results indicate that according to model 1, one period delay of the growth, revenue and public debt are significant at 1% and 5% respectively; and according to model 2, the inflation and public debt variables are correlated at a level of 1% and 5% respectively. According to the results of the analysis, there is a negative correlation between growth and public debt in accordance with the relation between the growth and fiscal variables used in the study. In conclusion, increasing public debt in Russia and the other Post Soviet Nations decrease their growth rates[1].

[1] Consistent with the regarding literature (Reinhart and Rogoff , 2010; Kumar and Woo, 2010; Baum, Checherita and Rother; 2013).

6. CONCLUSION

During the period after the demolition of the Berlin Wall in 1989 and dissolution of the Soviet Union, a number of states emerged. The common characteristic of these states is that they replaced the old socialist system with the market economy almost in a decade. Accordingly, each state has suffered through a challenging transition period. Some have survived through this period taking less damage, while others have faced numerous difficulties. This study examines the growth and fiscal performances during this period, and indicates the reverse correlation between growth and public debt.

The most notable of these countries is Russia which possesses prominent rich oil reserves. Russia has completed its transition period in 9 years and has undergone two major crisis in 1993 and 1998 during this period. Especially after the 1998 debt crisis, public debt has become an important indicator for growth performance in Russia. In this respect, in order to ensure the fiscal discipline in Russia, attempts have been carried out to implement strategic planning, multi-annual budgeting and medium term spending system.

In conclusion, fiscal policy implementations are much more effective rather than macroeconomic policies to improve the growth performance of Russia and the other Old Soviet countries.

REFERENCES

Acosta Ormaechea, S. L., & Yoo, J. (2012). "Tax Composition and Growth: A Broad Cross-Country Perspective."

Acosta-Ormaechea, M. S. , & Morozumi, A. (2013). "Can a government enhance long-run growth by changing the composition of public expenditure?" (No. 13-162). International Monetary Fund.

Afonso, A., Jalles, J. (2014). "Causality for the government budget and economic growth", Applied Economics Letters, 21 (17), 1198-1201.

Arellano, M., & Bond, S. (1991). "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", The review of economic studies, 58(2), 277-297.

Baum, A., Checherita-Westphal, C., & Rother, P. (2013). "Debt and growth: New evidence for the euro area", Journal of International Money and Finance, 32, 809-821.

Baltagi,B., (1996). Econometric Analysis of Panel Data, John Wiley.

Barro, R. (1990). "Government Spending in a Simple Model of Endogenous Growth", Journal of Political

Economy. 98 (5), 103–S125.

Benos,N., (2009). "Fiscal Policy and Economic Growth: EmpricalEvidende From EU Countries", MPRA Paper.

Bergh, A., Henkerson, M., (2011)." Government Size and Growth: A Survey and Interpretation of the Evidence", Journal of Economic Surveys. 25 (5), 872–897.

Cottarelli,C., Jaramillo, L.,(2012)."Walking Hand in Hand: Fiscal Policy and Economic Growth in Advanced Economies, IMF Working Paper, WP/12/137.

Dalić, M. (2013). "Fiscal policy and growth in new member states of the EU: a panel data analysis". Financial theory and practice, 37(4), 335-360.

Durevall, D., and Henrekson, M.,(2011). "The Futile Quest for a Grand Explanation of Long-Run Government Expenditure". *Journal of Public Economics*, Vol.95, Issues 7-8, 708-722.

Easterly, W., & Rebelo, S. (1993). "Fiscal policy and economic growth". Journal of monetary economics, 32(3), 417-458.

Engen, E. M., & Skinner, J. (1992). "Fiscal policy and economic growth" (No. w4223). National Bureau of Economic Research.

Glaz'ev, S., & Fetisov, G. (2014). "On a Strategy for Steady Development of the Russian Economy". Problems of Economic Transition, 56(12), 63-76.

Kumar, M. S. , Woo, J., (2010). Public debt and Growth. IMF working paper, wP/10/174, Washington.

Mickiewicz, T.M. (2005). "Post-Communist Recessions Re-examined". School Of Slavonic&East European Studies Working Paper (55)

Mohammadi, H., Ram, R.,(2015). “Economic Development and Government Spending: An Exploration of Wagner’s Hypothesis During Fifty Years of Growth In East Asia”,Economies, Vol 3, Issue 4, 150-160.

Panizza, U., & Presbitero, A. F. (2012).” Is high public debt harmful for economic growth?.” VoxEU. org, 22.

Rautava, J. (2004). “The role of oil prices and the real exchange rate in Russia's economy—a cointegration approach”. Journal of comparative economics, 32(2), 315-327.

Popov, V., (2008). “Resurgent Russian Economy: Putin’s Policy without Putin”, International Journal, Spring, 247-261.

Ram, R. (1986). “Government Size and Economic Growth: A New Framework and some Evidence from

Cross-section and Time-series Data”, American Economic Review. 76 (1), 191–203.

Reinhart, C. M., & Rogoff, K. S. (2010). “Growth in a Time of Debt (Digest Summary)”. American Economic Review, 100(2), 573-578.

Sancak, E., Karaman, S.C., (2014). “Developments In The Russian Economy In The Post-Soviet Era”. Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 19(4).

Sinelnikov, S., & Batkibekov, S. (2006). “Fiscal Policy and International Cooperation in the Russian Federation”. Problems of Economic Transition, 49(2), 34-70.

Heston, A., and Summers, R., (1988). "What We Have Learned about Prices and Quantities from International Comparisons: 1987," American Economic Review, American Economic Association, vol. 78(2), 467-73.

Wu, S. Y., Tang, J. H., & Lin, E. S. (2010). “The impact of government expenditure on economic growth: How sensitive to the level of development?”. Journal of Policy Modeling, 32(6), 804-817.

Zamaraev, B., Kiiutsevskaia, A., Nazarova, A., & Sukhanov, E. (2014). “The Slowdown of Russian Economic Growth”. Problems of Economic Transition, 57(3), 13-56.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

EMPLOYMENT AND EXCHANGE RATE VOLATILITY RELATIONSHIP: THE TURKISH CASE[1]

DOI: 10.17261/Pressacademia.2016116558

Ahmet Ay[2], Fatih Ayhan[3]

[2] University of Selcuk. ahmetay@selcuk.edu.tr

[3] University of Selcuk. fatih_ayhan@yahoo.com

ABSTRACT

In this paper, exchange rate volatility and employment relationship is investigated for Turkey covering the period from January 2003 to February 2014 period. Exchange rate volatility is added to the model as an independent variable. In the previous researches, effects of exchange rate volatility have been used as an error term. Different from the previous studies, we added this variable to our model as an independent variable in order to analyze the effects of volatility on employment. In empirical analysis; firstly, co integration relationship between variables is analyzed. Then ARDL model is employed in order to investigate long and short term coefficients. In line with findings of the existing literature, the results of the ARDL model, we employed in this paper; reflect that exchange rate volatility negatively affects the employment. However, we found that the volatility coefficient is statistically insignificant. These results are thought to reflect the dynamics of the market, as the exchange markets are sensible to short term changes while labour markets are based on long term contracts.

Keywords: Exchange rate, volatility, employment, foreign trade, labour market, unemployment.

JEL Classification: J23, F16, F41.

1.INTRODUCTION

Changes in exchange rate level affect countries' foreign trade volumes through the economic integration and globalization. Increases and decreases in foreign trade volumes change the employment opportunity in labour markets, as well. That is why the changes in the macro level variables indirectly cause micro level changes.

Fixed exchange rate systems were abandoned after collapse of Bretton-Woods system in 1973 and countries left their currencies to fluctuations. Thus uncertainty in future exchange rate's value resulted in the decrease in foreign trade levels. This decrease made labour markets sensitive to these changes. Developments in exchange rate volatility was paid special attention due to its influence on real sector and indirect employment level.

The relationship between exchange rate markets, exchange rate volatility and labour market is explained theoretically by several different channels such as growth channel, macroeconomic channel, factor intensity channel, foreign market orientation channel, labour cost in export goods channel, imported input price channel and penetration of import channel (Hua (2005), Frenkel(2004), Ngandu(2008), Campa and Goldberg(1999)).

Volatility in financial markets causes important conclusions for investors and policy makers. These are; for investors; higher volatility means potentially higher risk and it causes to delay or cancellation in investment plans. For policy makers; volatility in financial markets causes to raise concerns about passing to real economy side and wrong interventions to system (Becketti and Sellon, 1989).

[1] This paper is prepared from Fatih AYHAN's PHD dissertation which name is "The Relationship Between Exchange Rate Volatility, Foreign Trade And Employment: Turkey Case".

In this paper, effects of exchange rate volatility on employment will be investigated for Turkey. Foreign trade, industrial production and exchange rate variables used as explanatory variables parallel with works of (Kim (2005), Frenkel and Ros (2006), Alexandre et al.(2010), Chimnani et al. (2012) and Mpofu (2013)). In the previous researches, effects of exchange rate volatility have not been taken into consideration and have been considered as an error term. Unlike existing literature, we employ also exchange rate volatility as an independent variable in order to analyze the effects of exchange rate volatility on employment.

The rest of the paper is organized as follows: Section 1 presents the literature review. Section 2 introduces data and the methodology used in our model. Section 3 presents empirical results and section 4 is conclusion.

2.LITERATURE REVIEW

The researches focused exchange rate, exchange rate volatility and employment relationship is presented in Appendix.1. Most of the existing literature focuses only exchange rate and employment relationship. There are few researches which investigate effects of exchange rate volatility on employment. As shown in Appendix.1, exchange rate volatility generally affects employment level negatively. These are (Buscher and Mueller (1999), Belke and Gros (2002), Belke and Kaas (2002), Belke and Setzer (2003), Chang (2006), Chimnani et al. (2012) and Mpofu (2013)). There are some studies focused on Turkey which shows similar findings with the literature (Bilgin (2004) and Boz (2013)). Similarly Demir (2010) is added to exchange rate volatility to analysis by employing firm level data.(see Appendix 1)

3.DATA AND METHODOLOGY

In order to investigate exchange rate volatility and employment relationship, we model employment with industrial production index, export, import, real exchange rate in line with the existing literature, but unlike the existing literature we also model employment with the real exchange rate volatility.

Exchange rate volatility variable is generally remained in error term in previous studies (Campa and Goldberg (2001); Riberio et al.(2004), Kim (2005), Frenkel and Ros (2006)). In this study, this variable is added to the model as an independent variable to evaluate its effect on employment.

We used monthly data covering the period from January 2003 to February 2014. Employment variable includes those people aged above 15 years of age and employed in non-agricultural sectors. Exchange rate variable we used in this study reflects producer price index based real effective exchange rate. Foreign trade, employment and industrial production index variables are obtained from Turkey Statistical Institute database. Exchange rate variable is, on the other hand, taken from Turkey Central Bank database system. For exchange rate volatility, conditional heteroscadasticity of ARCH type models are computed.[2]

For empirical modeling, we firstly investigate stationarity properties of the variables by employing unit root tests in the empirical literature used widely in the empirical literature, including ADF, PP and Ng Perron tests.

After stationarity check, we investigate co-integration relationship between the variables by employing Bound test approach proposed by Peseran at. al (2001) which has superior properties form conventional co-integration models.

These superiorities are as following; cointegration relationship between series aspect of I(0), I(1) or mutually cointegrated series does not matter. With the help of Bound Test, cointegration relationship can be evaluated without considering the same level cointegration relationship. The second advantage of the model is superiority for small samples. Moreover, The Bound Test provides us with a chance to estimate short and long run parameters in the same duration. (Pesaran et al. 2001; Narayan and Narayan, 2004).

Following the co-integration checking, finally, the long and short run elasticities between variables are estimated by employing ARDL model.

[2] EGARCH type model for real exchange rate and EGARCH type model is chosen as the best performed model in this study. Conditional variance is obtained from EGARH model is used as an exchange rate volatility variable for the model. Comparison for estimated coefficients and model forecasting performances are not presented here in order to keep the study compact. The model results could be obtained from the authors, if needed.

4.RESULTS

4.1.Stationarity Analysis

In order to determine stationarity level of series, we used ADF, PP and Ng-Perron test. Ng-Perron test has more powerful features with respect to other tests. In this study, we accepted Ng-Perron test results if there are any mixed results with respect to other studies. According to test results LL, LSAN, LX and LREER series are found I(1) and also VOL and LM series are found I(0).[3]

4.2.Cointegration Analysis

After stationarity checking, for Bound test analysis we firstly formed Unrestricted Error Correction Model (UECM). UECM model specification for our study is presented in equation (1).

$$\Delta LL_t = a_0 + \sum_{i=1}^{m} a_{1i}\Delta LX_{t-i} + \sum_{i=1}^{m} a_{2i}\Delta LM_{t-i} + \sum_{i=1}^{m} a_{3i}\Delta REER_{t-i} + \sum_{i=1}^{m} a_{4i}\Delta LSAN_{t-i}$$
$$+ \sum_{i=1}^{m} a_{5i}\Delta VOL_{t-i} + a_6 LX_{t-1} + a_7 LM_{t-1} + a_8 REER_{t-1} + a_9 LSAN_{t-1} + a_{10} VOL_{t-1} + \mu_t \quad (1)$$

In equation (1); m represents lag number.[4] After defining lag number of UECM model, we analyzed co-integration relationship.

Null hypothesis for F test is established as $H_0 = a_6 = a_7 = a_8 = a_9 = a_{10} = 0$. We compared the computed F-statistic from UECM model with table bottom and upper critical levels in Pesaran et al. (2001). If the estimated F statistics is greater than the upper bound, we reject null hypothesis of no co-integration. If the estimated F statistics is less than the bottom bound, there is no co-integration relationship between the series (Narayan and Narayan, 2004). If the calculated F statistics is between the lower and upper critical values, the result is inconclusive (Karagöl et.al.,2007).

According to F statistics (5,18) is greater than the upper bound of the critical values(4,25), and the null hypothesis of no co-integration is rejected. As a result, we found a significant long run cointegration relationship between the variables.

4.3.ARDL Model

After co-integration check, we investigate the long and short run static relationship between the variables employing the ARDL model. ARDL model specification for our study is presented in equation 2.

$$LL_t = a_0 + \sum_{i=1}^{m} a_{1i} LX_{t-i} + \sum_{i=1}^{n} a_{2i}\Delta LM_{t-i} + \sum_{i=1}^{k} a_{3i} REER_{t-i} + \sum_{i=1}^{l} a_{4i} LSAN_{t-i}$$
$$+ \sum_{i=1}^{p} a_{5i} VOL_{t-i} + \mu_t \quad (2)$$

k, l, m, n and p refer to lag numbers in eq.2. ARDL(2,1,0,1,0,0) is chosen as the best ARDL model . The estimated long and short term coefficient using ARDL (2,1,0,1,0,0) model are shown in Appendix.2. According to diagnostic checks which could also be seen in Appendix.2, error terms in ARDL model are normally distributed. Moreover, there are no serial correlation, heteroscedasticity and misspecification problems in the model.

According to long term coefficients obtained from ARDL (2,1,0,1,0,0) model, industrial production index and export have positive effect on employment, while import and real exchange rate variables have negative effect on employment. The results are compatible with the expectations. Exchange rate volatility variable also

[3] We did not report stationarity test results to keep the article compact. The unit root test results could be obtained from the authors.

[4] Maximum length is accepted as 8 and according to Akaike and Schwarz criterions lag number is accepted as 1 in this paper. And also it's examined whether or not autocorrelation problem through LM test in UECM model which formed with 1 lag number, autocorrelation isn't defined with 1 lag number.

negatively effects employment as expected in line with the existing literature.[5] However exchange rate volatility coefficient is statistically insignificant.

According to short run results, signs of coefficients are also compatible with the expectations. Export and industrial growth affect employment positively while import and real exchange rate growth have negative impact on it. And volatility variable influences the employment level negatively in short term. But volatility coefficient is found statistically insignificant.

Error correction coefficient is found -0,14. This means that when a deviation occurs between short and long run equilibrium, this instability can be dissolved 14% in every period. The system will come back again equilibrium level approximately 7,1 period (month) later.

5.CONCLUSION

We tried to investigate effects of exchange rate volatility on employment employing the monthly data which captured the period from January 2003 to February 2014. We have found a long term cointegration relationship between employment and export, import, industrial production, real exchange rate and exchange rate volatility. After cointegration check, ARDL model is used in order to analyze long and short run relationship between series. Long and short term coefficients from ARDL model results are compatible with expectations and error correction coefficient is also found negative and statistically significant. When volatility added to the model, it's found that volatility influenced employment negatively in accordance with the expectations and findings of the literature. But volatility's coefficient is statistically insignificant. This result is explained with the difference of exchange rate and labour market structures. Since exchange rate markets are sensitive to the short run changes and this situation influences volatility. However, labour markets are based on the long term contracts. Thus volatility cannot influence the labour market in short run.

REFERENCES

Alexandre F., P.Baçao , J.Cerejeira and M.Portela, 2010, "Employment, Exchange Rates and Labour Market Rigidity,"*IZA Discussion Paper Series*, IZA DP No.4891, Institute For The Study of Labor, Bonn.

Becketti, S., and G. H. Sellon, 1989, "Has Financial Market Volatility Increased?," Economic Review, Federal Reserve Bank of Kansas, 17-30.

Belke, A. and G.Daniel, 2002, "Designing EU-US Monetary Relations: The Impact of Exchange Rate Variability on Labor Markets on both Sides of the Atlantic," *The World Economy,* 25, 789–813.

Belke, A. and L.Kaas, 2002, "The Impact of Exchange Rate Volatility on Labor Markets: Europe versus United States," http://iim.uni-flensburg.de/vwl/upload/ lehre/soscob/ba/intoek_aktuelle_the men/download.pdf

Belke, A. and R.Setzer, 2003, "Exchange Rate Volatility And Employment Growth: Empirical Evidence From The CEE Economies," *Economics of Planning,* 36, 153-175.

Bilgin, M.H., 2004, "Döviz Kuru İşsizlik İlişkisi: Türkiye Üzerine Bir İnceleme (The Relationship Between Exchange Rate and Unemployment: An Analysis on Turkey)," *Kocaeli University Journal of Social Sciences*, 8, 2004/2, 80-94.

Boz, Ç., 2013, "Türkiye'de Reel Döviz Kuru ve İşsizlik İlişkisi: 2003-2012 (Real Exchange Rate And Unemployment Relation In Turkey For 2003-2012)," *Marmara University Journal of Economic and Administrative Sciences,* 34(1), 51-61.

Buscher, H., and C.Mueller, 1999, "Exchange Rate Volatility Effects on the German Labour Market: A Survey of Recent Results and Extensions," *IZA Discussion Paper Series*, No. 37.

Campa, J. and G.Linda, 1999, "Employment Versus Vage Adjustment and the U.S. Dolar,", http://www.stern.nyu.edu/eco/wkpapers/workingpapers99/99-07 Campa.pdf

Campa, J. and G.Linda, 2001, "Employment versus Wage Adjustment and the U.S.Dollar," *Review of Economics and Statistics,* 83(3),477-489.

[5] Equation also estimated without volatility in line with the existing literature. But it's found that there is not important difference about coefficient sign and significance level. The results can be obtained from authors, if needed.

Chang, S.C., 2005, "Relationship Between Exchange-Rate Uncertainty and Unemployment," *Journal of Grey System,* 9(2), 93-102.

Chimnani, H., N.A.Bhutto, F.Butt and S.A.Shaikh, 2012, "The Effect of Exchange Rate on Unemployment Rate in Asian Countries," 2nd International Conference on Business Management, http://umt.edu.pk/icobm2012/pdf/2C-84P.pdf

Demir, F., 2010, "Exchange Rate Volatility and Employment Growth in Developing Countries: Evidence from Turkey," *World Development,* 38 (8),1127-1140.

Frenkel, R., 2004, "Real Exchange Rate and Employment In Argentina, Brazil, Chile and Mexico," http://policydialogu.org/files/events/Frenkel_Exchange_Rate_ Employment.pdf.

Frenkel, R. and J.Ros, 2006, "Unemployment and the Real Exchange Rate in Latin America," *World Development,* 34 (4), 631-646.

Galindo, A., A.Izquerdo and J.M.Montero, 2006, "Real Exchange Rate, Dollarization and Industrial Employment in Latin America," http://www.iadb.org/res/publications/pubfiles/pubWP-575.pdf.

Goldberg L., Tracy J., and Aaronson S., 1999, "Exchange Rates and Employment Instability: Evidence from Matched CPS Data," *American Economic Review*, 89(2), 204-210.

Hua, P., 2005, "Real Exchange Rate and Manufacturing Employment in China," *China Economic Review*, 18(3),335-353.

Karagöl, E., E.Erbaykal and H.M.Ertuğrul, 2007, "Economic Growth And Electricity Consumption In Turkey: A Bound Test Approach, *Journal of Dogus Unv*., 8(1), 72-80.

Kim, W., 2005, "Analyses Of The Relationship Between Exchange Rate And Employment In Korea*," Journal Of Economic Development*,30(2),131-153.

Klein, M., Schuh, S. and Triest, R., 2003, "Job Creation, Job Destruction, And The Real Exchange Rate," *Journal of International Economics,* 59(2), 239–265.

Mpofu, T.R., 2013, "Real Exchange Rate Volatility and Employment Growth in South Africa: The Case of Manufacturing," https://umsbe.wufoo.com/cabinet/ m7z8q3/.../plbo_update

Narayan S. And Narayan P. K., 2004, "Determinats of Demand of Fiji's Exports: An Empirical Investigation," *The Developing Economics,* 42(1), 95-112.

Ngandu, S., 2008, "Exchange Rates And Employment," *South African Journal of Economics,* 76(2).

Pesaran, M.H., Shin, Y. and Smith, R.J., 2001, "Bounds Testing Approaches to the Analysis of Level Relationships," *Journal of Applied Econometrics*, 16(3), 289-326.

Ribeiro, P. E., Corseuil, C. H., Santos, D., Furtado, P., Amorim, B., Servo, L. And Souza, A., 2004, "Trade Liberalization, the Exchange Rate and Job Flows in Brazil," *Policy Reform*, 7(4), 209-223.

Xiangquan Z., C.Yuxue, Q.Shisong and Y.Yumei, 2011, "Real Exchange Rate, Foreign Trade And Employment: Evidence From China," *IZA Discussion Paper Series*, AZ DP Nu:5931, Institute For The Study of Labor, Bonn.

Appendix 1: The Empirical Literature Review For The Relationship Between Exchange Rate, Exchange Rate Volatility And Employment

Author	Country	Subject	Results
Buscher and Mueller (1999)	West Germany (1973-1997)	The effects of exchange rate volatility on unemployment.	An increase in Mark volatility increases the unemployment in West Germany.
Goldberg, Tracy and Aaronson (1999)	USA (1977-1996)	The Effects of volatility in Dollar on employment variable.	There are no important effects on volatility in Dollar on employment variable.
Campa and Goldberg (2001)	USA (1972-1995)	The relationship between exchange rate and employment.	An increase in exchange rate value causes negative effects on employment level.
Belke and Gros (2002)	Germany (1973-1999)	The effects of exchange rate volatility on employment growth and unemployment.	A 1% increase in exchange rate volatility causes the 0,6% increase in unemployment and 1,3% decrease in employment.
Belke and Setzer (2003)	The Czech Republic, Bulgaria, Poland and Slovakia	The effects of exchange rate volatility on unemployment.	An increase in exchange rate volatility causes an increase in unemployment and decrease the employment according to the panel data analysis result.
Klein, Schuh and Triest (2003)	USA (1973-1993)	The effects of real exchange rate on job creation and destruction.	An 10% increase in exchange rate causes to 0,33% increase in job destruction and also decrease the net unemployment with the same. Moreover, it causes to 0,02% job creation but it's statistically insignificant.
Ribero et al. (2004)	Brazil (1991-2000)	The effects of exchange rate on employment.	An increase in exchange rate negatively and significantly effects the employment in manufacturing.
Belke and Kaas (2002)	Europe and USA (1973-2001)	The effects of exchange rate volatility on labour markets.	Exchange rate volatility increases the unemployment and decreases employment both in European countries and USA.
Kim (2005)	Korea (1970-1995)	The relationship between exchange rate and employment in manufacturing sector.	Employment reacts to exchange rate positively in economies with higher openness rate and with lower imported input user sectors. It's found that a 1% decrease in exchange rate level, results in an increase in employment by 0,6%.
Chang (2006)	Taiwan and South Korea (1984-2004)	The effects of exchange rate uncertainty on unemployment.	The exchange rate uncertainty effects unemployment negatively for countries both short and long run.
Galindo et.al. (2006)	9 Latin American Countries	The effects of exchange rate on employment.	Decrease in real exchange rates effect employment negatively in higher dollarization countries.
Frenkel and Ros (2006)	17 Latin American Countries	The relationship between real exchange rate and unemployment.	There is negative relationship between unemployment and real exchange rate. According to results 1% change in exchange rate decreases unemployment by 0,57%.
Galindo et.al. (2006)	9 Latin American Countries	The effects of exchange rate on employment.	Decrease in real exchange rates effect employment negatively in higher dollarization countries.
Xiangquan et al. (2011)	China (1985-2007)	The relationship among real exchange rate, foreign trade and employment.	Devaluation in China national currency induces the employment while depreciation in exchange rate causes inverse effect.
Chimnani et al. (2012)	10 Asian Countries (1995-2005)	The relationship between exchange rate volatility and unemployment	It's found that exchange rate volatility effects to unemployment positively and statistically significant way.
Alexandre et al. (2010)	23 OECD Countries	The effects of changes in exchange rate on	When openness increases, the employment to exchange rate elasticity increases. It is found that

	(1988-2006)	employment.	the employment exchange rate elasticity is positive and statistically significant level. For example a decrease in exchange rate an results in increasing in employment. A 1% exchange rate decrease causes to 0,61% increase in employment.
Mpofu (2013)	South Africa (1995-2010)	The effects of real exchange rate volatility on employment in manufacturing sector.	Real exchange rate causes significantly contractionary effect on manufacturing sector employment in short run. It's found that depreciation causes to increase in manufacturing sector employment.
Bilgin (2004)	Turkey (1995-2004)	The relationship between exchange rate and unemployment.	It's found that %1 increase in exchange rate causes to 0,03% decrease in unemployment.
Demir (2010)	Turkey (1983–2005)	Exchange rate and employment relationship.	Exchange rate volatility effects the employment positively and significant level in manufacturing sector firms. According to results 1% increase in exchange rate volatility causes a decrease by 1,4-2,1% in employment.
Boz (2013)	Turkey (2003-2012)	The relationship between real exchange rate level and unemployment rate.	There is a negative relationship between real exchange rate level and unemployment rate.

Appendix 2: ARDL (2,1,0,1,0,0) Model Long And Short Term Coefficients

ARDL (2,1,0,1,0,0) Model's Long Term Coefficients		
Variables	**Coefficients**	**t Statistic**
LSAN	0.46	4.012*
LX	0.06	1.819*
LM	-0.03	-0.566
LREER	-0.14	-1.960**
VOL	-33.18	-1.065
ARDL (2,1,0,1,0,0) Model's Error Correction Coefficient		
Variables	**Coefficients**	**t Statistic**
ECMT(-1)	-0.14	-4.806*
ARDL (2,1,0,1,0,0) Model's Diagnostic Checks		
X^2_{BG}	1.055[0,35]	
χ^2_{NORM}	3.069[0,14]	
χ^2_{WHITE}	0.701[0,89]	
X^2_{RAMSEY}	1,151[0,25]	

X^2_{BG} , χ^2_{NORM} , χ^2_{WHITE} , X^2_{RAMSEY} are accordingly shows autocorrelation, normality, heteroscadasticity and Ramsey tests. Probability values are in brackets.

Note: *%1,**%5 shows significance level.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

IMPACT OF DEMOCRATIC ELECTORAL PROCESS ON BORSA ISTANBUL[1]

DOI: 10.17261/Pressacademia.2016116559

Fatih Konak[1], E.Nur Guner[2]

Hitit University. fatihkonak@hitit.edu.tr

Hitit University. ela.gnr.05@hotmail.com

ABSTRACT

According to the Efficient Market Hypothesis, there is no possibility to predict price movements in the markets which does not allow investors to obtain return above average (abnormal return). However, deviation from the mean of stock returns is observed and patterns appeared during certain periods, so-called anomalies. In this context, the initial aim of this paper is to figure out the relationship between elections and market's movements by determining the influence of 12 elections (general elections, local elections, by-elections and referendum) that took place in Turkey after 2000 on BIST 100 Index. In the overview, negative and statistically significant abnormal returns are observed days around *(-15,+15)* elections that took place in Turkey after 2000 by employing Event Study metedology which is widely used in finance literature.

Keywords: BIST 100, event study, democratic elections.

JEL Classification: G14, G35

1. INTRODUCTION

The issue of efficiency of the market has been an important subject of discussion since 1950. This subject is one of the first to be put forward by Bachelier and subsequently by many scientists such as Fama, Rubinstein, Grossman and Jensen, laying the foundation for the efficient markets hypothesis at a common point. Here they have identified that the investors targeted at high-income, the information that will be used in investments can be reached easily and on the basis of the investments it is needed to make choices based on risk and earnings(Turguttopbaş, 2012). According to the efficient market hypothesis it is impossible to predict price changes occurring in the market. However, in other methods used to test the this theory of market efficiency the studies were made defending that this theory does not function correctly and it contradicts many anomalies (Mandacı, 2003). In theoretical framework it is difficult to verify the findings of servation or meaningful results are needed to explain this finding, this finding is called anomalies (Eger, Topaloglu, & Coates, 2012).

Random Walk Model and efficient-market hypothesis that Eugene Fama put forward in 1970 were divided market activities into 3 groups according to the degree by using the exchange rates in the market. These groups are; activity in weak form, activity in semi-strong form and activity in strong form. In acvtivity in weak-form; because the prices have information about their earnings in the past, the analysis concerning the past prices will not provide high earnings. Semi-strong form activity provides both historical price information and public information. The strong form activity is assumed to reflect all the information that are publicly disclosed and undisclosed (Mutant & Topcu, 2009). In order to test the Fama's efficient market hypothesis that was put forward in 1970; the effect of the behavioral characteristics on the stock earnings/share earnings were

[1] A version of this paper was presented at the 19. Finance Symposium, Çorum-Turkey

examined. As a result of these studies; differences in stock earnings at certain periods have been found and these differences were concluded to be due to seasonal and price abnormalities. Seasonal abnormalities are about differences between stock earnings before and after a certain period such as day, week, month and year with other periods of time. The price anomalies are the anomalies indicating the status of deviation from market activity resulting from insufficient under-reaction or over-reaction reaction (Barak, 2006).

Although there are many academic studies on abnormalities in Turkey, studies about the anomalies occur around the selection period are insufficient. Whereas the risk in a period of general elections included by political risks and their negative / positive effects on stock earnings is a very important knowledge for the investors. better understanding of this situation will provide a high contribution for the investors and will help increase the profits they earn on investments.

In this study, around the dates of the democratic elections held after 2000 in Turkey, price movements occurring in BIST 100 Index was investigated by the event study method. With the help of this method in this study, 15 days before and after the elections abnormal returns were calculated and they were tested for statistical significance. In addition, cumulative abnormal returns are calculated in different search perspectives around elections. In this context, following the introduction in the second part of the study, the studies on efficient market hypothesis Turkey and in the world are referred and the literature related to the election period is mentioned. While the statistical methods used in the study and set of data are mentioned in the third section, the empirical study analyzes appears in the fourth section. In the last section of the study, results and suggestions are given.

2. LITERATURE REVIEW

The researchers in most of the national and international studies, have tried to determine whether there is a predictable trend in stock returns over a certain period. In some of these studies, during certain periods there are claims that these movements existed when in others it has been claimed that the market is active. some studies investigating these allegations that holds a large place in the finance literature are;

Wachtel (1942), in the capital markets in the United States, has calculated the average monthly returns of stocks and has determined in January the average returns are higher than in other months. Similarly, Mehdian and Perry (2002) have found that in the United States 3 of the major stock indexes were the highest in January. Also Alrabadi and Al-Qudah (2012) , in their work, on the Amman stock market in 2002 - 2011 period by using OLS and GARCH models have investigated the effects of the day of the week and the month of the year using and have revealed the existence of January.

If we look at the studies caried out in Turkey, the Dicle and Hasan (2007) in their event study examined the effects of days of the week and they have resulted the importance of the negative returns especially on Monday in a statistically meaning. Erdogan and Elmas (2010), have caried out survey work based on different cities in Turkey and contrary to the Efficient Market Hypothesis they have indicated that the investors achieved the high returns in January whether different techniques were applied. As a support to this study; Ege, Topaloglu and Coşkun (2012) in their research, using power ratio analysis in the IMKB 30 and IMKB 50 indexes, have studied the effects of January and have concluded that the returns are higher than the other mnths in January. Abdioğlu and Değirmenci (2013) and similarly Ergül Akel and Dumanoglu (2009) investigated the effects of days of the week and confirmed that the lowest return is on Wednesdays while the highest return is on Fridays. Also Aytekin and Sakarya (2014) using power ratio method and one-way variance analysis, in their results; in the basal period, monthly returns of the indices is different from eachother, and the occurrence of abnormalities in January was determined.

In contrast to the above studies in the literature there seems the studies defending the markets are active. One of these studies; Atakan (2008),in his work has analyzed whether the are anomalies of the dayof the week and January and found as a result that in a meaningful way there is no differentiation in returns in January in IMKB. The same year Hamarat and Tufan (2008) examined Tourism Sector Index returns using daily and monthly closing prices of IMKB. They have found that the abnormalities seen in the days of the week, while the results of the study were able to identify whether the abnormalities seen in January. Küçüksille (2012) has investigated the effect January in index of IMKB and has observed the January effect in the IMKB-100 and

XUSIN indexes while in the XUGIDA, XUMALI and XUHOLD had no January effect. In another study in the same year, Tunçel (2012) based on the IMKB-100 index. Tunçel has studied the effect of the month in his study but according to the findings of his study, he/she has determined that the effect of the month has not identified. A different study, Yılancı (2013), where the effect of the Hallaween is investigated in IMKB 100 National indexes monthly closing prices of the stocks data have been analyzed by the least squares method. His research concluded that abnormal increases as a result of the Halloween effect on stock returns in January has not been identified.

When the general of the studies in the literature is considered, one can see that indexes in BIST are not active and the presence of many anomalies that disrupt the market efficiency is evident. It is obvious that as a result of these anomalies the investors will get high returns and all anomalies that have been found care a great importance for the investors. The researches and results above will help us in our work, to observe whether there are differences in stock returns in Turkish stock price during the election period and to show the negative/positive effects of the election atmosphere. In addition, data sets and the results obtained in the model, will be able to provide information about the positions of market participants in the next election. If the election results can not be predicted, investors are pulled from the market, and the market is dominated by a recession. However, the election results can be estimated, investors will try to take advantage of anomalies that will occur in order to ensure higher profits and will do a quick access to the market. Thus, this uncertainty can be eliminated that is formed after the announcement of election results.

When the Turkish literature is viewed, a study examining the relationship between stock returns stands out as the only study. Mandacı, in his study has examined abnormal price movements in IMKB in 2003 before and after the general elections and concluded that some days during the period one can achieve abnormal returns with statistical significance. This study, in order to remedy the deficiencies in the literature, in the days around the election date between the years 2000-2014, examines the price movements of the BIST 100 Index.

When the literature is reviewed, although there are so many studies investigating the effect of economic factors such as GSMH, inflation, interest rates, exchange rates and growth rates on the market are the impact on the market, there are so few studies concerning the both national and international arena investigating the effects of the political risk on the market. It has been observed that studies on the impact of political risk on the market is done in developed countries like the United States more than in developing countries that this was the work of a small number next to nothing. In the researches made emerging political risks; it is noticeable that this effect is less in developed countries and is higher in developing countries, Perotti and Oijen (2001), Kim and Me (2001), Bilson and others (2002).

Foest and Scmitz (1997) in their work investigating the effects of Political risk which the most important risk factor in the selection process on the financial market, in US they have examined the 4-year election cycle. As a result of their study they have observed thet the returns for the first two years is lower than the third and fourth years. Herbst and Sleinkman (1984) and Huang (1985) in their general work, they have found that election periods for stock returns are uncertain and usually the stock returns are negative in election periods, but the next years the stck returns have been found positive. Also Pantzalis and others (2000) between the 1974-1995 years, they have been studying the impact on stock returns in general elections in 33 countries and has determined a positive anomaly two weeks before the election week. Based on these results, the financial markets in Turkey (BIST 100) between 2000-2014 years were considered and discussed and considered to be an important contribution to the literature in terms of providing guidance to investors.

3. DATA AND METHODOLOGY

In our study, to determine the effects of the selection periods to the stock returns and their reactions, in the Republic of Turkey after the year 2000, the General Election, Search Public Election, Local Election and Presidential Elections were evaluated in this context. The possible positive or negative impacts of the elections, which is used as the benchmark for the stock market index Located in Istanbul, has been investigated in BIST 100 Index. To provide the related analysis data needed were obtained by Datastream & Eiko program. Table 1 shows the dates and kinds of the elections that took place after 2000 in the Republic of Turkey.

Table 1: Elections in Republic of Turkey After 2000

16-May-00	*Presidential Election*
3-Nov-02	*General election*
9-Mar-03	*Search public election*
28-Mar-04	*Local selection*
22-Jul-07	*General election*
29-Aug-07	*Presidential Election*
21-Oct-07	*Referendum*
29-Mar-09	*Local selection*
12-Sep-10	*Referendum*
12-Jun-11	*General election*
30-Mar-14	*Local Elections*
10-Aug-14	*Presidential Election*

Source: *https://tr.wikipedia.org/wiki/T%C3%BCrkiye'de_se%C3%A7imler*

The Event Study that is used in the literature for measuring the measure the impactof the selection period and after, is preferred. In this context, for each election period, the range between (-5 + 15) was taken as "event window"and the range between (-15, -360) is selected as "calculation period" . In our study, mean-adjusted return method was used which assumes that the average of past returns are equal to the averag of expected returns. The reason for this is, the market adjusted return is used in to share and analyze the importance of the direction of deviation in stock returns, while in the index- based analysis the adjusted average yield method is preferred. The methodology sequence used is as follows:

- The following formula is used to calculate the deviation of the average return and the daily returns for a specified time.

$$Ln = \left({P_t}/{P_{(t-1)}} \right) \qquad (1)$$

In the formula, "P_t", refers to the BIST 100 closing price at time t, while"$P_{(t-1)}$" the "t" represents the closing price for the previous day.

- The following formula is used to calculate the abnormal returns showing deviation from the average return:

$$AR_t = R_t - R_i \qquad (2)$$

Concerning; AR_t, refers to the abnormal returns in the "t" day, the R_t refers to return on "t" day and "i" refers to each selection, R_i, refers to the average index return covering 15 and 360 days before the election date (-15, -360) period. For example; the average returns of the BIST 100 indexes for the 15 and 360 days period before May 16, 2000 elections, was calculated.

- Abnormal returns of the BIST 100 Index for any "t" day is calculated by the subtraction of the (-15, -360) days period before elections index return averages from the retuns of the "t" day. These formula is standardised as below;

$$AR_t = (R_t - R_i)/\sigma R_i \qquad (3)$$

- In our study, to see the differences that may occur in different search windows, the cumulative abnormal returns are calculated in order. For example, the following formula is used for calculating cumulative abnormal returns consisting the period from the -5th to the +5th.

$$CAR = 1/N[\sum_{t=-5}^{t=+5}(AR_t)] \qquad (4)$$

4. FINDINGS AND DISCUSSIONS

As a result of the Evenst Study concerning the effects of General Election, Search Public Election, Local Election and Presidential Elections occurred after year 2000 in the Republic of Turkey on BIST 100 indexes, it is concluded that the findings of the reactions of the market participants to the election period were meaningful around different days in a statistically perspective.

Appendix 1 and Appendix 1 (Cont.) show the abnormal returns and their significance levels subjected to the analysis around 12 days during democratic election was held. The present period has 3 General Selections, 1 Search Public Elections, 3 Local Elections, 3 Presidental Elections and 2 Referandums held in Turkey.

As can be seen from the Tables shown int appendix, although 15 days before and 15 days after the elections both positive and negative abnormal returns have occurred, only some negative abnormal retunrs showed statistically significancy. For example, the last business before the 2002 General Elections 5% level of significant abnormal returns emerged, but significant positive abnormal returns were not identified in the first business day following the same election. It was observed that concerning the 30 day period before and after the selections negative abnormal returns have been emerged as the general atmosphere of the lead. However, excess of the statistically significant positive abnormal returns formed after the 2002 elections should not be ignored.

BIST 100 Index reaction in the local election process appears to be similar. immediately before and after the local elections (-1, 1), excluding after 2009, positive abnormal returns were formed but statistically significant results could not be obtained. On the other hand, while a majority abnormal returns were negative, consisting only of positive abnormal returns in 2009 were seen in the local election process.

Considering presidential elections, excess of negative and significant abnormal returns stands out in 3 selection processes. In particular, after the the 15 day period of 2014 presidential elections 8 negative abnormal returns were found, in 6 of them have been found to be statistically significant. In addition, before each of the 3 selections, similarly, negative abnormal returns have been observed. The reactions of the markets which occurred during 2 referendum and the election processes after year 2000 also show similarities. Before both referendums significant negative abnormal returns observed while positive abnormal returns occurred before the Search Public Elections do not carry statistically meaning. In addition, following the first day of the referendums, positive perception occurred while the negative abnormal returns are outstanding after 2002 Search Public election.

Cumulative abnormal returns formed in election periods from different search windows are shown in Table 2. The CAR values occuring between [-1,1] range were positive during the 7 of the 12 elections, and negative in the other 5 of them, 3 of the negative values are statistically significant. The CAR values occuring between the range of [-15.15] were positive during 6 of the 12 elections and negative in the other 6 of them. For Example; considering the two elections in the year 2014, the positive perception has been occurred in the same range while dg the business days before and after the Presidental Election negative approach in the market has become evident. On the other hand, in the presidential elections held in 2007. [1.15] range formed a positive perception, after the presidential election held in 2014, negative approach in the market trading days has become evident.

As Table 2 examined generally, the dominance of the negative cumulative abnormal returns ' statistical significance are outstanding. In this case the selection process can not be welcomed by the market as positive (for many elections) can be interpreted.

Table 2: Cumulative Average Abnormal Returns (CAR)

	[-15,15]	[-15,-1]	[-10,1]	[-5,5]	[-1,1]	[1,3]	[1,5]	[1,10]	[1,15]
2000 Presidential Election	-5.470	-2.384	-4.339	-4.978	-1.582	-0.432	-1.653	-3.597	-4.043
	*0.000****	*0.000****	*0.000****	*0.000****	*0.062**	*0.545*	*0.000****	*0.000****	*0.000****
2002 General Election	13.169	3.797	3.601	7.762	5.677	2.107	10.222	8.325	11.960
	0.987	*0.945*	*0.998*	*0.992*	*0.986*	*0.558*	*0.987*	*0.989*	*0.994*
2003 Search Public Election	-6.728	-0.742	-3.482	-7.777	-0.446	-0.158	-1.157	-5.578	-8.140
	*0.000****	*0.041***	*0.000****	*0.000****	*0.206*	*0.945*	*0.000****	*0.000****	*0.000****
2004 Local Election	-0.657	2.109	2.089	-0.186	-1.028	0.616	-1.216	-1.337	-3.719
	*0.000****	*0.992*	*0.987*	*0.145*	*0.000****	*0.966*	*0.002****	*0.000****	*0.000****
2007 General Election	3.539	6.666	6.221	-0.793	1.697	2.435	-0.499	-1.691	-2.905
	0.987	*0.945*	*0.986*	*0.075****	*0.614*	*0.943*	*0.417*	*0.002*	*0.000****
2007 Presidential Election	2.843	-3.785	-2.352	4.832	0.138	0.159	2.496	1.855	1.529
	*0.000****	*0.000****	*0.000****	*0.992*	*0.577*	*0.155*	*0.945*	*0.986*	*0.994*
2007 Referendum	-0.876	-0.908	-1.011	-1.883	0.014	0.171	2.274	2.500	2.401
	*0.000****	*0.000****	*0.003****	*0.000****	*0.483*	*0.269*	*0.992*	*0.987*	*0.973*
2009 Local Election	11.319	5.533	3.590	5.215	0.849	-0.229	2.035	2.048	5.156
	0.994	*0.984*	*0.987*	*0.992*	*0.927*	*0.201*	*0.986*	*0.945*	*0.979*
2010 Referendum	2.471	-0.115	1.493	1.783	1.496	1.414	2.607	2.877	2.516
	0.945	*0.134*	*0.986*	*0.992*	*0.825*	*0.924*	*0.948*	*0.992*	*0.984*
2011 General Election	-0.115	-0.085	0.855	-2.424	-1.759	-0.232	-3.042	-3.238	-2.336
	*0.000****	*0.370*	*0.999*	*0.000****	*0.000****	*0.977*	*0.000****	*0.000****	*0.000****
2014 Local Election	9.416	5.583	5.859	6.928	3.271	2.325	2.083	2.883	3.999
	0.967	*0.986*	*0.992*	*0.994*	*0.979*	*0.945*	*0.987*	*0.998*	*0.999*
2014 Presidential Election	-1.521	0.901	3.095	2.410	0.973	0.004	1.382	1.377	-1.674
	*0.000****	*0.987*	*0.945*	*0.986*	*0.421*	*0.067**	*0.994*	*0.992*	*0.000****

*,** and *** refer 1%, %5 and 10% statistically significance respectively

5. CONCLUSION

The trends that are needed by the market participants generate revenue on average or the presence of predictable movements reveal the anomalies. In this perspective, the relationship between the direction of selection process and market direction is of importance. In our study, the response of the BIST 100 Index to the 3 General Elections, 1 Search Public Election, 3 Local Elections, 3 Presidential Elections and 2 Referendums in Turkey after the year 2000 were investigated. To measure the impact of before and after period of selection process on the BIST 100 index Event Study Method is preferred which is commonly used in the literature.

Under the constraints of data set and methods used, in generally speaking, negative statistically significant abnormities have been occurred around during general, local, presidential selections and referendums after the year 2000 in Turkey. These results can be interpreted as the selection atmosphere is a period that needs to be treated deliberately by the market. In result, in the context of the efficiency market hypothesis, BIST 100 index was observed to be not effective. The findings of this study can be used to gain returns above average by the participants of the market.

REFERENCES

Abdioğlu , Z., & Değirmenci, N. (2013). İstanbul Menkul Kıymetler Borsasında Mevsimsel Anomaliler. *Business and Economics Research Journal* , 55-73.

Aksoy, H., & Sağlam , İ. (2004). Sınıflayıcı (Classifier) Sistemi ile İMKB'de Yeni Bir Anomali Gözlemi.

Alrabadi, D. W., & AL-Qudah, K. A. (2012). Calendar Anomalies: The Case of Amman Stock Exchange. *International Journal of Business and Management* , 120-127.

Atakan, T. (2008). İstanbul Menkul Kıymetler Borsası'nda Haftanın Günü Etkisi ve Ocak Ayı Anomalilerinin ARCH-GARCH Modelleri ile Test Edilmesi. *İstanbul Üniversitesi İşletme Fakültesi Dergisi* , 98-110.

Aytekin , S., & Sakarya, Ş. (2014). OCAK AYI ANOMALİSİ: BORSA İSTANBUL ENDEKSLERİ ÜZERİNE BİR UYGULAMA. *Uluslararası Yönetim İktisat ve İşletme Dergisi* , 137-155.

Barak, O. (2006). *Hisse Senedi Piyasalarında Anomaliler ve Bunları Açıklamak Üzere Geliştirilen Davranışsal Finans Modelleri - İMKB'de Bir Uygulama-* . Doktora Tezi , Ankara.

Bildik, R. (2000). Hisse Senedi Piyasalarında Dönemsellikler ve İMKB Üzerinde Ampirik Bir Çalışma.

Bilson, C., Brailsford, T., & Hooper, V. (2002). The explanatory Power of Political Risk in Emerging Markets. *International Review of Financial Analysis* , 1-27.

Çinko, M. (2008). İstanbul Menkul Kıymetler Borsasında Ocak Ayı Etkisi. *Doğuş Üniversitesi Dergisi* , 47-54.

Dicle, M., & Hassan , M. (2007). Day of the Week Effect in Istanbul Stock Exchange. *Scientific Journal of Administrative Development* , 1-27.

Durukan , M., & Mandacı, P. E. (2003). The Relationship Between Stock Returns and Fundamental Variables: Evidence from Istanbul Stock Exchange. *İşletme Fakültesi Dergisi* , 64-78.

Ege, İ., Topaloğlu, E. E., & Coşkun, D. (2012). Davranışsal Finans ve Anomaliler: Ocak Ayı Anomalisinin İMKB'de Test Edilmesi. *Muhasebe Finans Dergisi* , 175-190.

Erdoğan, M., & Elmas, B. (2010). Hisse Senedi Piyasalarında Görülen Anomaliler ve Bireysel Yatırımcı Üzerine Bir Araştırma. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* , 1-22.

Ergül, N., Akel, V., & Dumanoğlu, S. (2009). Sektör Endekslerinde Haftanın Günü Etkisinin Araştırılması. *World of Accounting Science* , 129-152.

Fama, E. (1970). Efficient Capital Markets: A Review Theory and Empirical Work. *Journal of Finance*, 338-417.

Foesrter, S., & Schmitz, J. (1997). The Transmission of U.S. Election Cycles to International Stock Returns. *Journal of International Business Studies* , 1-27.

Hamarat, B., & Ekrem, T. (2008). Is The Turkish Tourism Sector Index Efficient? *Anadolu Üniversitesi Sosyal Bilimler Dergisi* , 169-184.

Herbst, A., & Slinkman, C. (1984). Political-Economic Cycles in the in the US Stock Market. *Financial Analysts Journal* , 38-44.

Horasan, M. (2008). Firma Büyüklüğünün Hisse Senedi Getirilerine Etkisi. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* , 327-339.

Huang, R. (1985). Common Stock Returns and Presidental Elections. *Financial Analysts Journal* , 58-61.

Karan, M. B., & Uygur, A. (2001). İstanbul Menkul Kıymetler Borsası'nda Haftanın Günleri ve Ocak Ayı Etkilerinin Firma Büyüklüğü Açısından Değerlendirilmesi. *Ankara Üniversitesi Siyasal Bilgiler Fakültesi Dergisi* , 103-116.

Kim, H., & Mei, J. (2001). What Makes the Stock Market Jump? An Analysis of Political Risk on Hong Kong Stock Retuns. *Journal of International Money and Finance* , 1003-1016.

Küçüksille, E. (2012). İMKB Endekslerinde Ocak Ayı Etkisinin Test Edilmesi. *Muhasebe ve Finansman Dergisi* , 129-138.

Lucey, B., & Whelan, S. (2004). Monthly and semi-annual seasonality in the Irish equity market 1934–2000. *Applied Financial Economics* , 203-208.

Mandacı, P. E. (2003). İMKB'de Genel Seçimler Öncesi ve Sonrasında Anormal Fiyat Hareketleri. *İMKB Dergisi* , 1301-1650.

Mutan, O. C., & Topcu, A. (2009). *Türkiye Hisse Senedi Piyasasının 1990-2009 Tarihleri Arasında Yaşanan Beklenmedik Olaylara Tepkisi.* Sermaye Piyasası Kurulu.

Özer, G., & Özcan , M. (2002). İMKB'da Ocak Etkisi, Etkinin Sürekliliği, Firma Büyüklüğü Ve Portföy Denkleştirmesi Üzerine Deneysel Bir Araştırma. *Süleyman Demirel Üniversitesi İİBF Dergisi* , 133-158.

Pantzalis, C., Stangeland, D., & Turtle, H. (2000). Political Elections and Resolution of Uncertainity: The International Evidence. *Journal od Banking and Finance* , 1575-1604.

Perotti, E., & Oijen, P. (2001). Privatization, Political Risk and Stock Market Development in Emerging Economies. *Journal of International Money and Finance* , 43-69.

Tunçel, A. K. (2012). İstanbul Menkul Kıymetler Borsasında Yılın Ayı Etkisi. *Yönetim Bilimleri Dergisi* , 1-30.

Turguttopbaş, N. (2012). İMKB'de Oluşan Fiyatların Davranışsal Finans Yaklaşımı İle Değerlendirilmesi. *1.Uluslararası Muhasebe ve Finans Sempozyumu*, (s. 1-16). Gaziantep.

Yılancı, V. (2013). Halloween Etkisinin İstanbul Menkul Kıymetler Borsasında Geçerliliğinin Testi. *Siyaset, Ekonomi ve Yönetim Araştırmaları Dergisi* , 21-30.

APPENDİX

Appendix 1: Abnormal Return Days Around the Elections Held After 2000 in Republic of Turkey

	2000 Presid. E.		2002 Gen. E.		2003 Sear. Pu.E.		2004 Local E.		2007 Gen. E.		2007 Presid. E.	
Days	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***
-15	1.479	*0.980*	-1.082	*0.000****	0.918	*0.982*	0.573	*0.977*	0.772	*0.998*	1.508	*0.955*
-14	0.870	*0.950*	1.070	*0.993*	1.477	*0.985*	-0.082	*0.293*	1.136	*0.955*	-2.390	*0.000****
-13	-0.342	*0.134*	-0.376	*0.001****	-0.569	*0.117*	0.525	*0.966*	0.933	*0.987*	-0.938	*0.000****
-12	1.013	*0.967*	1.999	*0.999*	0.159	*0.898*	-0.871	*0.000****	0.429	*0.911*	1.238	*0.953*
-11	-0.390	*0.076**	0.790	*0.918*	0.229	*0.934*	-0.102	*0.235*	0.045	*0.383*	-0.472	*0.022****
-10	0.381	*0.987*	0.370	*0.417*	-1.191	*0.000****	0.245	*0.991*	1.583	*0.959*	-2.582	*0.000****
-9	-0.650	*0.001****	0.534	*0.661*	-0.428	*0.237*	-0.466	*0.000****	-0.834	*0.000****	-4.077	*0.000****
-8	-1.883	*0.000****	-0.680	*0.000****	0.025	*0.794*	-0.122	*0.185*	-0.587	*0.001****	2.644	*0.934*
-7	-0.063	*0.776*	1.612	*0.957*	0.594	*0.997*	0.543	*0.989*	2.211	*0.965*	-0.554	*0.010***
-6	-1.417	*0.000****	0.123	*0.125*	0.243	*0.940*	0.714	*0.956*	0.082	*0.445*	-1.136	*0.000****
-5	0.910	*0.956*	0.117	*0.121*	-4.966	*0.000****	0.200	*0.976*	-0.357	*0.022***	2.003	*0.912*
-4	-0.491	*0.017***	0.026	*0.064**	1.698	*0.958*	-0.034	*0.453*	-0.155	*0.124*	0.599	*0.965*
-3	0.041	*0.928*	-1.039	*0.000****	0.650	*0.998*	0.232	*0.988*	-0.609	*0.001****	-0.713	*0.002****
-2	-0.735	*0.000****	0.432	*0.512*	0.052	*0.819*	0.161	*0.948*	2.453	*0.987*	1.306	*0.998*
-1	-1.107	*0.000****	-0.099	*0.023***	0.367	*0.976*	0.593	*0.976*	-0.434	*0.009****	-0.219	*0.133*
1	0.675	*0.953*	2.206	*0.959*	-0.526	*0.148*	0.023	*0.653*	2.869	*0.954*	0.378	*0.847*
2	-1.150	*0.000****	3.570	*0.945*	-0.287	*0.406*	-1.644	*0.000****	-0.738	*0.000****	-0.021	*0.343*
3	-1.017	*0.000****	0.105	*0.112*	-0.490	*0.178*	0.231	*0.988*	-0.113	*0.165*	2.463	*0.945*
4	-0.160	*0.543*	4.341	*0.989*	0.145	*0.889*	0.175	*0.960*	-2.517	*0.000****	-0.323	*0.069**
5	-0.542	*0.007****	-0.661	*0.000****	-0.254	*0.450*	0.231	*0.988*	-1.068	*0.000****	0.089	*0.496*
6	-1.401	*0.000****	-1.236	*0.000****	-4.166	*0.000****	-0.353	*0.002****	-0.124	*0.154*	-0.730	*0.002****
7	0.291	*0.999*	-1.965	*0.000****	4.011	*0.955*	-0.176	*0.083**	1.512	*0.983*	0.188	*0.635*
8	0.792	*0.975*	0.980	*0.983*	-2.354	*0.000****	-0.504	*0.000****	-1.709	*0.000****	-0.665	*0.003****
9	-0.918	*0.000****	1.623	*0.987*	-1.147	*0.001****	-1.252	*0.000****	0.098	*0.473*	-0.614	*0.006****
10	-0.232	*0.354*	1.752	*0.983*	-0.960	*0.006****	0.096	*0.852*	-0.778	*0.000****	0.860	*0.997*
11	-0.378	*0.088**	1.245	*0.999*	-2.113	*0.000****	-0.546	*0.000****	-0.337	*0.026***	-0.095	*0.252*
12	0.661	*0.959*	-1.763	*0.000****	1.169	*0.988*	-0.373	*0.001****	0.311	*0.801*	0.500	*0.928*
13	0.867	*0.989*	-0.238	*0.006****	0.839	*0.999*	-0.918	*0.000****	1.531	*0.956*	1.060	*0.934*
14	-0.612	*0.002****	1.427	*0.937*	0.600	*0.997*	-0.050	*0.398*	-2.393	*0.000****	-0.117	*0.227*
15	0.037	*0.924*	-0.804	*0.000****	0.190	*0.916*	1.085	*0.978*	-0.931	*0.000****	-0.062	*0.291*

*,** and *** refer 1%, %5 and 10% statistically significance respectively

Appendix 1 (Con't): Abnormal Return Days Around the Elections Held After 2000 in Republic of Turkey

	2007 Ref.		2009 Local E.		2010 Ref.		2011 Gen. E.		2014 Local E.		2014 Presid. E.	
Days	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***	**AR**	***P-Val.***
-15	0.492	*0.999*	-0.189	*0.000****	0.012	*0.219*	-0.133	*0.200*	-0.319	*0.000****	-1.414	*0.000****
-14	-0.616	*0.000****	0.549	*0.920*	-0.424	*0.000****	1.447	*0.996*	0.328	*0.564*	0.420	*0.923*
-13	0.708	*0.934*	0.041	*0.007****	-0.501	*0.000****	-1.076	*0.000****	0.196	*0.236*	-0.148	*0.192*
-12	1.793	*0.956*	0.538	*0.907*	0.689	*0.998*	0.126	*0.799*	0.098	*0.084**	-0.030	*0.567*
-11	-0.542	*0.001****	0.226	*0.145*	0.167	*0.843*	-1.533	*0.000****	-0.042	*0.01****	-0.649	*0.000****
-10	1.518	*0.945*	0.106	*0.024***	-0.138	*0.006****	-1.071	*0.000****	0.858	*0.996*	0.493	*0.938*
-9	-0.512	*0.002****	-0.189	*0.000****	0.522	*0.949*	1.714	*0.994*	1.253	*0.934*	1.430	*0.953*
-8	0.557	*0.987*	0.173	*0.072***	0.604	*0.938*	0.163	*0.860*	-0.058	*0.008****	-0.292	*0.017***
-7	-0.045	*0.459*	0.896	*0.932*	0.048	*0.359*	-0.160	*0.156*	-0.182	*0.001****	0.073	*0.857*
-6	0.123	*0.822*	0.215	*0.125*	-0.001	*0.178*	-0.375	*0.008****	-0.593	*0.000****	-0.014	*0.621*
-5	-1.037	*0.000****	1.543	*0.912*	-0.033	*0.098**	0.752	*0.991*	-0.770	*0.000****	0.249	*0.995*
-4	0.664	*0.938*	0.230	*0.151*	-0.503	*0.000****	1.001	*0.994*	0.912	*0.988*	1.081	*0.945*
-3	-1.639	*0.000****	0.948	*0.976*	-0.282	*0.000****	-0.467	*0.001****	2.686	*0.954*	-0.199	*0.095**
-2	-0.810	*0.000****	-0.102	*0.000****	-0.138	*0.006****	-0.471	*0.001****	-0.571	*0.000****	0.271	*0.997*
-1	-1.561	*0.000****	0.549	*0.920*	-0.138	*0.006****	-0.002	*0.505*	1.787	*0.967*	-0.369	*0.003****
1	1.732	*0.912*	-0.778	*0.000****	1.552	*0.912*	-0.230	*0.071**	0.537	*0.941*	0.372	*0.998*
2	-0.156	*0.217*	1.078	*0.967*	0.082	*0.512*	-1.527	*0.000****	0.947	*0.945*	-0.075	*0.409*
3	0.043	*0.668*	0.375	*0.530*	0.779	*0.949*	-1.454	*0.000****	-0.154	*0.001****	0.421	*0.984*
4	0.655	*0.987*	1.359	*0.999*	0.193	*0.903*	0.169	*0.868*	0.753	*0.999*	0.665	*0.945*
5	-0.045	*0.459*	-0.114	*0.000****	-0.011	*0.150*	0.649	*0.954*	0.857	*0.934*	-0.017	*0.612*
6	0.271	*0.966*	0.127	*0.034***	0.281	*0.990*	-0.845	*0.000****	-0.057	*0.008****	0.011	*0.700*
7	0.760	*0.923*	-0.317	*0.000****	-0.299	*0.000****	1.133	*0.923*	1.177	*0.967*	-1.499	*0.000****
8	-0.278	*0.064**	1.996	*0.956*	0.208	*0.930*	-0.962	*0.000****	-1.189	*0.000****	-0.376	*0.002****
9	-0.540	*0.001****	1.375	*0.938*	-0.418	*0.000****	0.389	*0.995*	0.596	*0.975*	-0.418	*0.001****
10	-0.811	*0.000****	0.506	*0.859*	-0.090	*0.026***	0.512	*0.945*	-0.312	*0.000****	-0.836	*0.000****
11	0.770	*0.912*	-0.452	*0.000****	0.238	*0.965*	-0.170	*0.141*	0.844	*0.954*	0.078	*0.868*
12	-0.848	*0.000****	-0.309	*0.000****	0.791	*0.965*	0.937	*0.934*	-1.046	*0.000****	0.534	*0.992*
13	-0.946	*0.000****	0.330	*0.394*	-0.175	*0.002****	0.170	*0.869*	-0.013	*0.017***	0.250	*0.996*
14	-1.524	*0.000****	1.763	*0.956*	0.075	*0.479*	0.261	*0.957*	0.946	*0.987*	-1.078	*0.000****
15	0.356	*0.990*	-0.008	*0.002****	-0.996	*0.000****	-0.041	*0.406*	-0.049	*0.009****	-0.422	*0.001****

*,** and *** refer 1%, %5 and 10% statistically significance respectively

Journal of Business, Economics and Finance
Year: 2016 Volume: 5 Issue: 1

THE IMPACT OF ORGANIZATIONAL STRUCTURE ON MANAGEMENT INNOVATION: AN EMPIRICAL RESEARCH IN TURKEY

DOI: 10.17261/Pressacademia.2016116656

Faruk Kalay[1], Gary S. Lynn[2]
[1]Yuzuncu Yil University. kalayfaruk@hotmail.com
[2]Stevens Institute of Technology. glynn@stevens.edu

ABSTRACT

The purpose of this paper is to investigate the effect of the two core components of organizational structure, centralization and formalization, on management innovation. In order to do this, the data received from 198 managers working in a public organization in Turkey has been analyzed. The results of this analysis have demonstrated that centralization has a significant negative impact on management innovation. However, the impact of formalization on management innovation has not been determined.

Keywords : Management innovation, innovation, organizational structure, centralization, formalization.
JEL Classification : D21, M21, O30

1. INTRODUCTION

The formation of organizational structures, which make cross-functional knowledge and resource sharing possible, is a critical element for companies; ensuring strategic decision-making, the resolution of disagreements, and the active and effective coordination of the process of innovation (Olson et al., 1995). Researchers of innovation and organizational theorists have consistently asserted that the structure of an organization is an essential factor in the function of innovation, serving to benefit or impede it accordingly (Aiken and Hage 1971; Kim, 1980; Damanpour, 1991; Subramanian and Nilakanta 1996). Innovation is considered a key factor in the establishment of new business and industry, economic development, firm performance and competitive edge, and in the efficient management of public departments and businesses (Drucker, 1985; Gopalakrishnan and Damanpour, 1997). Therefore, maintaining an environment in which innovation can occur is an essential component of a business, and thus a worthy area of academic study (Damanpour and Wischnevsky, 2006).

Miller (1987) defines organizational structure as the permanent distribution of work roles and administrative mechanisms to enable an organization to perform, coordinate and control its business activities and resource flow. Organizational structure can be thought of in terms of two core factors: centralization and formalization (Damanpour, 1991; Russell and Russell 1992; Caruana et al., 1998; Raub, 2007; Bolin and Harenstam, 2008; Mumford et al., 2008; Hirst et al., 2011). Centralized decision making and formal rules and procedures are ways of regulating and controlling employee behavior and are also linked to the degree of discretion found in employees. Both factors of organizational structure are expected to have an impact on innovative outputs (Ettlie et al., 1984; Damanpour, 1991).

Though there are a small amount of studies that have shown a beneficial effect of a highly centralized and formalized structure upon innovation (Zmud, 1982; Ruekert et al., 1985; Rogers, 1995; Gosselin, 1997; Schultz

et al., 2013), most studies conclude that decentralized and non-formalized organizational structures are more conducive to innovative performance (Hage and Aiken, 1967; West, 2000; Cardinal, 2001; Jansen et al., 2006; Kalay and Lynn, 2015). Thus, it is commonly held that centralization and formalization impede innovation; whereas non-formal, 'horizontal' arrangements are thought beneficial to the cultivation of innovative ventures (Russell and Russell 1992; Mumford et al., 2008). Yet, this statement must not be accepted without question, as the case may be that a structure initially thought of as negative in the production of innovation may assist a different form of innovation; as was shown by Damanpour (1991) when he completed a meta-analysis exploring the effects of organization on innovation.

In the majority of studies, the links between technological, product, and process innovation types and organizational arrangements have been focused upon (e.g., Subramanian and Nilakanta, 1996; Cardinal, 2001; Daugherty et al., 2011; Hirst et al., 2011; Prajogo and McDermott, 2014). Less of a focus has been given to the link between management innovation and organizational arrangements. Scholars of both innovation and management have proposed that the foundations and workings of management innovation may differ largely from other kinds of innovation, for example, from those of process, product and technological innovation (Daft, 1978; Kimberly and Evanisko, 1981; Damanpour, 2014). As a result, conclusions formed about various other types of innovation may not be immediately applicable to innovation in management (Swanson, 1994; Damanpour, 2014).

In business organizations, innovation in management is as prevalent as other types of innovation. Additionally, Damanpour and Evan (1984) conclude that managerial and non-managerial innovation complement each other in high-performance organizations. Given that this is the case, it is interesting that there remains limited research on the subject of management innovation, and there is a great need to rectify this omission. This study aims to begin bridging that gap in research. In this context, the purpose of this study is to explore the effect of the two core components of organizational structure, centralization and formalization, on management innovation. It is important to determine this relationship for scholarly purposes, ascertaining the processes and conditions of business organization that best facilitate management innovation; and for management in practicality, as it is the task of management to form organizations that are innovative and to manage the process of innovation within them.

2. LITERATURE REVIEW and HYPOTHESES

2.1. Organizational Structure

Organizational decision makers have the power to influence innovation within their company through their direct control of the structure of an organization. The dispersion of control and responsibility within an organization are determined by its organizational structure, as are the grouping, coordination, and division of tasks amongst departments and employees in an organization (Daft, 1978). Scholarly knowledge on the subject of organizational structure proposes that it has several sub-dimensions. A conclusive list of these sub-dimensions is given by Damanpour (1991) and includes such variables in organizational structure as formalization, centralization, professionalism, specialization, functional differentiation, vertical differentiation, and more, including resource-related variables, process, and culture. Further suggestions for these sub-dimensions are presented by Aiken and Hage (1971) and include decentralization, formalization, professionalism, complexity and scheduled and unscheduled communication. In an investigation into the role played by organizational structure in innovation in logistics, Germain (1996) too includes specialization and decentralization; and makes the addition of 'integration' to the list of subcategories. An investigation on the topic of organizational structure and its link to product customization by Vickery et al. (1999) utilized the sub-dimensions of operations decentralization, focus on formal control, spans of control and layers. Another study by Nahm et al. (2003) focused on the manner in which plant performance and time-based manufacturing were affected by organizational structure, and the following dimensions were included: the manner in which formalization occurred, the number of hierarchical levels in the organization, the point where the power to make decisions lay, the degree of horizontal integration and the communication levels within the organization.

Two contrasting ideas of organizational structure are given by some scholars, namely 'organic' organizational structure and 'mechanic' organizational structure (Cosh et al., 2012). In mechanic organizational structure,

authority and control are often centralized, and task standardization and specialization occur frequently. In contrast, in an organic organizational structure, a 'flatter' structure occurs. That is, the hierarchy consists of fewer levels, decision making is more frequently decentralized, and employees who are multifunctional, who work in systems where greater degrees of horizontal integration occur, are more widely found (Aiken and Hage 1971; Cosh et al., 2012).

Evidently, academic articles discussing the sub-dimensions of organizational structure are, thus far, diverse in both topic and in conclusions formed on the subject. A comprehensive list of the sub-dimensions of organizational structure that is universally agreed upon is yet to be found, and there are instances in which theorists have referred to dimensions that correspond conceptually by different names. This study does not attempt to formalize these sub-dimensions; however, in its use of centralization and formalization, it considers two of the sub-dimensions that are included throughout a number of studies.

2.2. Innovation Types and Management Innovation

Innovation can be thought of as new structures and management processes, new policies, new plans and programs, new processes of production and new products and services produced in an enterprise (Vaccaro et al., 2012). In the OECD Oslo Manuel (2005), innovation has been categorized into four dimensions: product, process, marketing, and management (or organizational) innovation. In most studies, however, innovations are considered in the broader terms of technological and management innovations (Kimberly and Evanisko 1981; Damanpour, 2014). Another method of classifying innovation is based on the factor of innovation radicalness, which makes the distinction between radical innovation and incremental innovation (Germain, 1996; Cardinal, 2001). In more recent times, these distinctions have sometimes been named as exploitative innovation and exploratory innovation (Jansen et al., 2006; Bierly et al., 2009).

The term management innovation, as it is used here, corresponds to the terms administrative innovation, organizational innovation, and managerial innovation from previous research (Birkinshaw et al., 2008; Damanpour, 2014). Damanpour and Aravind (2012) reviewed these terms and found that they overlap significantly in both definition and use. Regardless of the term used to describe this type of innovation, management innovation is most frequently explored in comparison with technical innovation or technological innovation. Technological innovation is explicitly linked with the central function of an organization, and the results produced mainly occur in the operating systems; whereas innovation in management is inexplicitly linked with the central work of the organization, and occur more frequently within the social systems of an organization (Damanpour et al., 2009). The distinction between technological and management innovation is an important one, as research suggests: "facilitation factors vary among them and further, that adoption sequence and timing may also vary systematically" (Swanson, 1994: 1071).

The OECD (2005) Oslo Manual and the Community Innovation Survey has provided a comprehensive description of management innovation, which has been grouped into three categories: (1) new practices in business, such as: the management of knowledge, the management of quality, supply-chain management, the re-engineering of business, and lean production; (2) new modes to organize decision-making and work responsibilities, such as: decentralization, teamwork, a new structure of employee responsibilities used first, department de-integration or integration, and training and education programs; and finally, (3) new modes to organize relations with external organizations, such as the first use of partnerships and alliances, and subcontracting or outsourcing. In other words, management innovation denotes the forming of and utilization of new practices in management, structures, processes and techniques with the intention of advancing the goals of an organization (Vaccaro et al., 2012; Birkinshaw et al., 2008).

The tasks that managers perform as part of their everyday role are referred to as 'management practices'. Such tasks include the setting of goals and the procedures associated with doing so; the arrangement of functions and tasks; the development of talented employees, and achieving the various demands of stakeholders (Birkinshaw et al., 2008). The routines facilitating the work of managers are referred to as 'management processes', which denotes the conversion of abstract ideas into workable implements. Common examples of these include performance assessment, strategic planning, and project management (Birkinshaw et al., 2008).

The manner in which organizations systemize their communication and unify and utilize effort in their members is referred to as 'structure' (Birkinshaw et al., 2008).

2.3. Structural Theories of Innovation

Owing to the great disparity in results of much of the research on the subject of connections between innovation and structure, the research covering this has been questioned (Miller and Friesen, 1982). Researchers have proposed several ideas to account for this disparity. All such ideas propose the notion that the structure of an organization will affect the various innovation types differently, as ultimately all resultant innovations are themselves dissimilar.

There are two groups of theories about the structure of innovation that have been put forward (Damanpour and Gopalakrishnan, 1998). In the group of theories most commonly cited as uni-dimensional theories, links found between innovation and a structural variable are explicated. These uni-dimensional theories revealed that the associations between formalization, centralization and innovation are negative (Damanpour and Gopalakrishnan, 1998). Due to discrepancies found in the results of the research of uni-dimensional theories, they were disparaged by researchers.

In a bid to account for such discrepancies, the second group of theories regarding structure and innovation were developed by researchers. These were termed the middle range theories of organizational innovation (Damanpour and Gopalakrishnan, 1998). The focus in this grouping tends to be the variance of innovation types. The middle range theories are the dual-core theory of innovation (Daft, 1978; Kimberly and Evanisko, 1981; Zmud, 1982), innovation radicalness (the theory of innovation radicalness) (Nord and Tucker, 1987), and the stages in the process of innovation (the ambidextrous theory of innovation) (Duncan, 1976; Zmud, 1982). A brief description of each theory follows.

The dual-core theory of innovation: This theory categorizes innovation into two dimensions: technical innovation and management innovation (Daft, 1978). The division of innovation in this way is significant, as it is linked to the distinction at large between an organization's technical and social systems (Swanson, 1994; Damanpour and Evan, 1984). According to this theory, an organization possesses both an administrative and technical core. The primary concern of the technical core is the conversion of resources into the services and products that the organization provides. The concern of the administrative core is the structure of the organization, the mechanisms of coordination, and the systems of control (Daft, 1978). It is possible for innovation to happen in either core, however, the innovations of the variant cores develop in different ways. It is typical for innovations of the technical kind to occur within the technical core in a 'bottom-up' form. Conversely, innovations of the administrative kind tend to occur within the administrative core in a 'top-down' motion (Daft, 1978). Therefore, in decision-making, greater behavior formalization and centralization cultivate top-down administrative innovation, whereas low levels of centralization and formalization allow for bottom-up technical innovation.

The theory of innovation radicalness: This notion once again considers innovation in the form of dual components, as is the case in the dual-core theory. The two terms used by the theory are often named as 'incremental' and 'radical' innovation when examined in empirical research (Damanpour and Gopalakrishnan, 1998). Radical innovations bring about extreme modifications in an organization's activity and demonstrate an obvious move from what was done before, whereas incremental innovation brings about a more moderate level of change from initial practices. Radical type innovation has a greater chance of occurrence when an organization has an informal, centralized structure; while those of the incremental kind are likely to happen in organizations that have structures which are decentralized and complex (Kalay and Lynn, 2015).

The ambidextrous theory of innovation: In the ambidextrous theory, it is the manner in which innovation is implemented that is the focus. Here, implementation refers to both the work involved in deciding to take up the new innovation, and that of bringing about and maintaining the innovation. Accordingly, the theory holds that there are two phases involved in innovation, and it refers to these respectively as the 'initiation' and the 'implementation' (Duncan, 1976). The first of these, initiation, includes all tasks involved in the research of the innovation, the generation of and evaluation of attitudes towards the innovation, and the identification of possible problems and the development of resources prior to taking up the innovation. The second phase,

implementation, includes all activity undertaken to adapt both organization and the innovation itself, and the innovation's inceptive period of use and its ongoing use until the innovation becomes a standard component of the organization. This theory indicates that the initiation phase is stimulated by a combination of lower levels of centralization and formalization and greater levels of complexity, while conversely, the implementation phase is facilitated by low levels of complexity and higher levels of centralization and formalization (Duncan, 1976).

2.4. The Impact of Centralization on Management Innovation

The manner in which an organization arranges its authority and carries out the process of making decisions is what is referred to in the term 'centralization' (Gosselin, 1997; Caruana et al., 1998; Jansen et al., 2006). In other words, centralization relates to how power is distributed in an organizational hierarchy, and whether employees are encouraged to participate in the process of decision making or not (Hage and Aiken, 1967; Rogers, 1995: 379). This includes the partaking in decisions regarding policy, strategy and resource allocation (Hage and Aiken, 1967; Hendricks et al., 1993). Structures in which authority has been centralized are formed 'vertically', with a select group at the top of the hierarchy in charge of directing the organization.

Previous investigations have differed on the subject of centralization's impact upon innovation. A few studies have come to find that centralization has a positive impact on innovative output (Kimberly and Evanisko, 1981; Zmud, 1982; Rogers, 1995; Gosselin, 1997), but others appear to have discovered a negative impact (Damanpour, 1991). In other studies, no notable link of any kind between the two factors has been found (Lai and Guynes, 1997). The results from existing studies regarding centralization's effect on various innovation types are summarized in Table 1. The results reflect the significant direction of regression coefficients. The significance and direction of correlation coefficients have been given in the case where the results of previous studies were not provided. For instance, in a study by Cardinal (2001), the regression coefficients are significant and positive in the case of centralization as it was compared with both radical (in the form of new drug inno¬vations) and incremental (in the form of drug enhancements) innovation. Hence in Table 1, these relationships are indicated as "Radical: Positive" and "Incremental: Positive".

When a positive effect occurs through centralization, upper-level managers have increased control, and those making decisions have more freedom when doing so. The discretion to manage and the scope of management in these roles is thus increased (Miller, 1987). When an organization is centralized, upper-level management are better able to integrate and organize knowledge and resources more effectively in order to lower the costs of this internally, and to foster competence and innovation (Olson et al., 1995; Sheremata, 2000; Cardinal, 2001). Additionally, this greater level of authority and responsibility in management can make them more receptive to opportunities of the technological, market, and organizational variety (Mom et al., 2009). Moreover, a centralized structure can facilitate better commitment and cooperation in job roles, aid in the resolution of conflict, aid in effective distribution of knowledge within the company, and result in a greater innovative output (Olson et al., 1995; Sheremata, 2000; Zhou & Li, 2012).

Conversely, the adverse effects of centralization include: narrower channels of communication, increased layers in the transfer of information and the further filtering of information (Hage and Aiken, 1967; Cardinal, 2001; Jansen et al., 2006). So, in a centralized structure, sources of knowledge formation and information the progress of information from lower levels to upper management are impeded; and thus, the quality and frequency of ideas, employee initiative and problem-solving are reduced (Jansen et al., 2006). Such a reduction will result in decreased levels of innovative performance, the consequences of which are the substandard development of products, processes, and management (Pierce and Delbecq, 1977). Additionally, through centralization, the perception employees hold of their autonomy and participation may well decrease, subsequently reducing their levels of ego-involvement and their commitment (Pierce and Delbecq, 1977). Employees working within an organization that employs centralization make less frequent attempts to pursue the finding of new and innovative solutions to problems proactively (Jansen et al., 2006). Centralization, through its limitation of employee discretion, can be expected to impede the propensity to seek out opportunities on an inter-member basis, and thus on an intra-organizational basis at large (Sheremata, 2000; Bunderson and Boumgarden, 2010). It is due to this restricted flow of information within an organization, and to the reduced level of motivation in employees, that many studies have formed the conclusion that

centralization has a negative effect on innovation (Damanpour, 1991). Owing to this, the hypothesis below is proposed:

Hypothesis 1: The impact of centralization on management innovation is negative and significant.

2.5. The Impact of Formalization on Management Innovation

Formalization refers to an organization's degree of role specificity, job codification and the presence of clearly defined rules for employees to adhere to (Hage and Dewar, 1973). In other words, it refers to the extent that instructions, communications, procedures, and rules are officially clarified (Hage and Aiken, 1967; Gosselin, 1997). In organizations with a high degree of formality, comprehensive rules exist outlining the purpose and responsibilities of each member of management. It is expected that these rules will be strictly adhered to, and it is difficult for such individuals to break away from routine practices and current organizational behaviors. In contrast to formalized organizations, in organizations that are not formalized managers have greater levels of autonomy and are able to diversify their purpose and responsibilities as necessary.

Table 1, also shows the results of existing studies concerned with the impact of formalization on various innovation types. According to some scholars, an organizational structure based on formal control may increase innovative performance by enabling coordination among different functional units, increasing the level of cost effectiveness, decreasing uncertainty and minimizing mistakes (Schultz et al., 2013). On the other hand, various authors (Hage and Aiken, 1967; West, 2000; Kalay and Lynn, 2015) have shown that a negative relationship exists between formalization and innovation. Increasing formalization reduces the extent of freedom of employees by prescribing procedures and potentially sanctioning some courses of action, providing specific directions as to appropriate actions, directing and enforcing these actions, and constraining employees' ability to engage in discretionary behaviors (Raub, 2007). Lewis et al. (2002) found that formalization discourages the generation of ideas due to the inflexibility of this mode, which constrains creativity. Formalization prevents divergence from standard knowledge and from the tendency to seek variation. Shepard (1967) posits that flexibility within a system is facilitated by a low level of formalization, and this flexibility is key for the generation of ideas. The dominant opinion regarding the impact of formalization on performance in innovation endorses a low degree of formalization (West, 2000; Kalay and Lynn, 2015; Raub, 2007). Thus, the following hypothesis is formulated:

Hypothesis 2: The impact of formalization on management innovation is negative and significant.

Table 1: Summary of Studies on the Relationship between Centralization, Formalization and Innovation.

Study	Sample Size[b]	Innovation Type	Results[a]	
			Formalization	Centralization
Cardinal (2001)	57	Technological (radical and incremental)	Radical: Positive*, Incremental: Negative	Radical: Positive*, Incremental: Positive*
Ekvall (1996)	49	Mixed	Negative**	n.a.
Grover et al. (2007)	154	Technological (radical and incremental)	Incremental: Negative***	Incremental: Negative***
Hashem and Tann (2007)	255	Administrative	Positive**	Positive**
Herrmann and Gordillo (2001)	55	Technological	Negative*	NS
Jansen et al. (2006)	283	Products/Services (radical and incremental)	Exploratory: NS, Exploitative: Positive**	Exploratory: Negative**, Exploitative: NS
Liao (2007)	203	Technological (product)	Positive*	NS
Nohria and Gulati (1996)	256	Mixed	NS	NS
Souitaris (2001)	105	Technological (Process, product-radical and product-incremental)	Process: Negative*, Product radical: NS, Product incremental: NS	Process: NS, Product radical: NS, Product incremental: NS
Delaney et al. (1996)	45	Mixed	n.a.	NS

Germain (1996)	183	Technological (process radical and process incremental)	n.a.	Incremental: Negative*
Hirst et al. (2011)	95	Mixed	NS	NS
Prajogo and McDermott (2014)	196	Service innovation (exploratory and exploitative)	Exploratory: NS, Exploitative: Positive**	Exploratory: Negative**, Exploitative: NS
Subramanian and Nilakanta (1996)	143	Administrative and technical innovation	Administrative: positive**, Technical: NS	Administrative: NS, Technical: Negative**
Daugherty et al. (2011)		Mixed	Positive	n.a.

[a]The statistical significance is the significance level of regression coefficients or the significance levels of the correlation coefficients from the original studies.
[b]The analytical method of all studies is cross-sectional.
n.a.: Not available.
NS: Not significant.
*p < .05; **p < .01; ***p < .001.

3. RESEARCH METHODOLOGY

3.1. Data Description

The individuals composing the sample of this study are managers working in a public organization in Turkey. The organization that the data was collected from is regarded as the biggest organization in Turkey. The organization has a centralized and formalized organizational structure in summation. Data was collected through a prepared questionnaire. The data was gathered through a series of one-on-one interviews with participants using a convenience sampling method. At the end of the data collection process, the data received from 198 managers was analyzed.

Table 2 outlines some of the socio-demographic characteristics of the respondent managers, illustrating their diversity in terms of organizational job tenure, education level, age, and managerial position. 'Organizational job tenure' has been divided into five categories such as 1-5 years, 6-10 years, 11-15 years, 16-20 years, and 21 years or more. 'Age' has been divided into four categories such as 20-29 years, 30-39 years, 40-49 years, and 50 years or more. As shown in Table 2, 41.4% of participants have senior high school degree, 17.2% of participants have high school degree, 34.3% of participants have university degree, 6.6% participants have master degree and 0.5% of participants have doctorate degree. The majority of respondents' ages are ranged between 30-40 years. Their organizational job tenure is ranged between 11-15 years mostly. 63.6% of participants are lower level managers, 31.8 of participants are middle level managers and 4.5 of participants are senior managers.

Table 2: Sample Profile

Organizational job tenure		Education		Age		Position	
Category	%	Category	%	Category	%	Category	%
1-5 years	3.0	Senior high school	41.4	20-29 years	5.1	Lower level managers	63.6
6-10 years	10.6	High school	17.2	30-39 years	64.1	Middle level managers	31.8
11-15 years	47.0	University	34.3	40-49 years	28.8	Senior managers	4.5
16-20 years	26.3	Master	6.6	50 or more	2.0		
21 or more	13.1	Doctorate	0.5				

3.2. Measures

In this study, multiple items were used to measure the constructs of interest. The questionnaire items are in the Appendix 1. Respondents communicated their agreement or disagreement with each item with a five-point Likert scale, wherein the most extreme descriptions of such comprised of: ''strongly disagree'' (1) and ''strongly agree'' (5). The items measuring the constructs of centralization and formalization were developed from existing spectrums in prior research (Caruana et al., 1998). The centralization construct was measured with six

items, and the formalization construct was measured with four items. Centralization was measured by whether the participants had immediate control of operating decisions and strategic decisions. Formalization was measured by determining the extent of the presence of structured control and communication reinforced by official written direction in the organization. The items of management construct was adapted from Vaccaro et al. (2012) and Nieves and Segarra-Cipres (2015) and was measured with six items. The bivariate correlations and descriptive statistics of the constructs are shown in Table 3.

3.3. Psychometric Properties

Confirmatory factor analysis (CFA) was used to assess the psychometric properties of the measures. A model was developed which included all three first-order constructs (centralization, formalization, and management innovation) and this was trialed with the whole sample from the study (N = 198). The model was shown to suit the data by the item loadings and the fit statistics ($\chi2$ = 160.61, df = 96, $\chi2$/df = 1.67, IFI = 0.96, NFI = 0.90, CFI = 0.96, RMSEA = 0.06) (Bollen, 1989). For all constructs, the standardized item loadings on their respective constructs ranged from 0.36 to 0.90, and were highly significant (P < 0.01). Item reliabilities were calculated as the square of the path (i.e., factor) loadings (Bagozzi, 1981). The reliability score for each item was near to or larger than the 0.40 limit, demonstrating a sound level of reliability (Froehle and Roth 2004). (see Appendix 1).

The internal consistency's reliability was examined by means of composite scale reliability (CR). For all constructs, the CR ranged from 0.85 to 0.92, and this exceeded the suggested cutoff value of 0.70 or above (Fornell and Larcker, 1981). Convergent validity was assessed through the inspection of average variance extracted (AVE). Each construct's AVE ranged from 0.50 to 0.85, and this was above the suggested 0.50 cutoff value and consistent with the recommendation of Fornell and Larcker (1981) (see Appendix 1). Therefore, both CR and AVE show sound reliability and validity levels for all constructs in the measurement model (Fornell and Larcker 1981).

Following this, the unidimensionality of the scale was tested. According to O'Leary-Kelly and Vokurka (1998), to confirm unidimensionality two conditions exist. Firstly, there should be a significant association between the item and the underlying latent variable, and secondly, the item should be linked with just one single variable. By using CFA, the assessment of both at the same time is possible through the assessment of item loadings and general model fit. Notable item loadings confirm an item and latent variable share an association, and indices showing a good overall fit indicate that the model and data correspond, as well as indicating that an item does not share an association with a different latent variable (O'Leary-Kelly and Vokurka, 1998; Menor and Roth, 2007). The unidimensionality of the scales used in this study is thus demonstrated by the correspondence of the items and latent variables (with significant positive loadings) combined with a satisfactory overall model fit (Hair et al. 1998).

Lastly, by examining Fornell and Larcker's criteria (Fornell & Larcker, 1981), the discriminant validity of the measures was assessed. In order to confirm acceptable discriminant validity, it is necessary for the square root of the AVE to be above the values of both horizontal and vertical correlations between constructs. As Fornell and Larcker (1981) advised, the square root of the AVE was bigger than the latent factor correlations between pairs of constructs for each. The highest correlation was between formalization and centralization (r = 0.57), as shown in Table 3, which is less than the square root of the AVE for centralization (0.75) and formalization (0.87). According to these findings, all constructs show satisfactory discriminant validity.

Table 3: Descriptive Statistics and Correlation Matrix (N = 198)

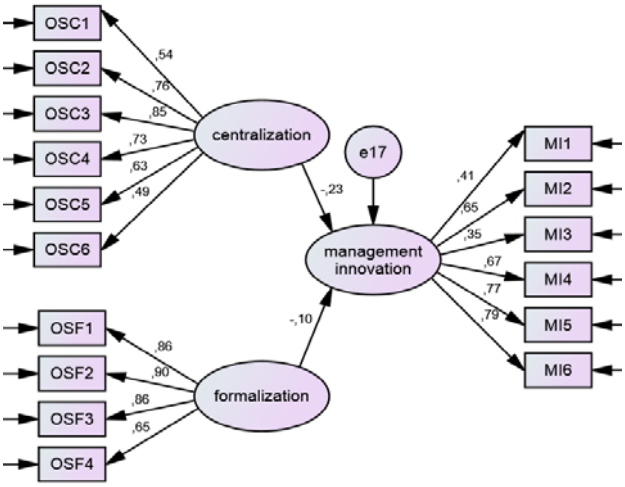
Constructs	Mean	Standard deviation	Management innovation	Centralization	Formalization
Management innovation	2.33	0.70	**0.71**		
Centralization	3.92	0.71	-0.21**	**0.75**	
Formalization	4.32	0.66	-0.13	0.57	**0.87**

** p < .01; the square root of AVE was shown as bold numbers on the diagonals.

3.4. Hypotheses Testing

The hypotheses of the study were assessed through structural equation modeling (SEM). The SEM results can be seen in Figure 1. The good fit of data and model is demonstrated by the fit indices for this model ($\chi 2$ = 246.58, df = 97, $\chi 2/df$ = 2.54, IFI = 0.90, NFI = 0.85, CFI = 0.90, RMSEA = 0.08). Hypothesis 1, which proposed that a negative relationship between centralization and management innovation exists, is supported by the model's results. The relationship between centralization and management innovation has a path coefficient of -0.23, and this has statistical significance ($P < 0.05$). However, the results of the model do not support Hypothesis 2, meaning that the relationship between formalization and management innovation, which has a path coefficient of -0.10, is statistically insignificant ($P > 0.05$).

Figure 1: The SEM Results



Notes: $\chi 2$ = 246.58, df (degree of freedom) = 97, $\chi 2/df$ = 2.54, IFI (the incremental fit index) = 0.90, NFI (the normed fit index) = 0.85, CFI (the comparative fit index) = 0.90, RMSEA (the root mean square error of approximation) = 0.08

4. CONCLUSION

This study has been conducted to reveal the impact of two core components of organizational structure, centralization and formalization, on management innovation. In accordance with this purpose, the data derived from 198 managers working in a public organization in Turkey was analyzed. The results of analysis have revealed that centralization affects management innovation significantly and negatively. This finding provides evidence that a centralized organizational structure impedes management innovation. It has also been found that formalization does not have a significant impact on management innovation.

This study's results are consistent with those of the meta-analysis study conducted by Damanpour (1991). A meta-analytical procedure was used in Damanpour's (1991) study, including seven moderators of the antecedent–innovation relationship and 13 antecedents of innovation, were integrated. His analysis resulted in: (1) a negative link between centralization and innovation, and (2) a non-significant link between formalization and innovation.

However, the findings of this study do not coincide with the argument of the dual-core theory of innovation. According to the dual-core theory of innovation, because management innovation requires top-down processes, it is likely that centralization and formalization can effect management innovation positively.

REFERENCES

Aiken, M., & Hage, J. (1971). The organic organization and innovation. Sociology, 5, 63-82.

Bagozzi, R. P. (1981). An examination of the validity of two models of attitude. Multivariate Behavioral Research, 16(3), 323-359.

Bierly, P., Damanpour, F., & Santoro, M. (2009). The application of external knowledge: Organizational conditions for exploration and exploitation. Journal of Management Studies, 46, 481–509.

Birkinshaw, J., Hamel, G., & Mol, M. (2008). Management innovation. Academy of Management Review, 33, 825–845.

Bolin, M., & Harenstam, A. (2008). An empirical study of bureaucratic and post-bureaucratic characteristics in 90 workplaces. Economic and Industrial Democracy, 29, 541-564.

Bollen, K. A. (1989). Structural Equations with Latent Variables. New York: John Wiley & Sons.

Bunderson, J. S., & Boumgarden, P. (2010). Structure and learning in self-managed teams: Why "bureaucratic" teams can be better learners. Organization Science, 21(3), 609-624.

Cardinal, L. B. (2001). Technological innovation in the pharmaceutical industry: The use of organizational control in managing research and development. Organization Science, 12(1), 19-36.

Caruana, A., Morris, M., & Vella, A. (1998). The effect of centralization and formalization on entrepreneurship in export firms. Journal of Small Business Management, 36(1), 16-29.

Cosh, A., Fu, X., & Hughes, A. (2012). Organisation structure and innovation performance in different environments. Small Business Economics, 39, 301–317.

Daft, R.L. (1978). A dual-core model of organizational innovation. Academy of Management Journal, 21(2), 193-210.

Damanpour, F. (1991). Organisational innovation: A metaanalysis of effects of determinants and moderators. Academy of Management Journal, 34, 555-590.

Damanpour, F. (2014). Footnotes to research on management innovation. Organization Studies, 35(9), 1265-1285.

Damanpour, F., & Aravind, D. (2012). Managerial innovation: Conceptions, processes, and antecedents. Management and Organization Review, 8, 423–454.

Damanpour, F., & Evan, W. M. (1984). Organizational innovation and performance: The problem of "Organizational Lag". Administrative Science Quarterly, 29(3), 392-409.

Damanpour, F., & Gopalakrishnan, S. (1998). Theories of organizational structure and innovation adoption: The role of environmental change. Journal of Engineering and Technology Management, 15, 1-24.

Damanpour, F., & Wischnevsky, J. D. (2006). Research on innovation in organizations: Distinguishing innovation-generating from innovation-adopting organizations. Journal of Engineering and Technology Management, 23, 269-291.

Damanpour, F., Walker, R. M., & Avellaneda, C. N. (2009). Combinative effects of innovation types on organizational performance: A longitudinal study of public services. Journal of Management Studies, 46, 650–675.

Daugherty, P.J., Chen, H., & Ferrin, B.G. (2011). Organizational structure and logistics service innovation. The International Journal of Logistics Management, 22(1), 26-51.

Delaney, J. T., Jarley, P., & Fiorito, J. (1996). Planning for change: Determinants of innovation in US national unions. Industrial and Labor Relations Review, 49(4), 597–614.

Drucker, P. F. (1985). The discipline of innovation. Harvard Business Review, May-June, 72-76.

Duncan, R.B. (1976). The ambidextrous organization: Designing dual structures for innovation. In Kilmann, R.H., Pondy and L.R., Slevin, D.P. (Eds.), The management of organizational Design: Strategy implementation (Vol. 1., pp. 167-188). New York: North-Holland.

Ekvall, G. (1996). Organizational climate for creativity and innovation. European Journal of Work and Organizational Psychology, 5(1), 105–123.

Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. (1984). Organization strategy and structural differences for radical versus incremental innovation. Management Science, 30, 682-695.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.

Froehle, C. M., & Roth, A. V. (2004). New measurement scales for evaluating perceptions of the technology-mediated customer service experience. Journal of Operations Management, 22(1), 1–21.

Germain, R. (1996). The role of context and structure in radical and incremental logistics innovation adoption. Journal of Business Research, 35(2), 117–127.

Gopalakrishnan, S., & Damanpour, F. (1997). Innovation research in economics, sociology, and technology management. Omega, 25, 15-28.

Gosselin, M. (1997). The effect of strategy and organizational structure on the adoption and implementation of activity-based costing. Accounting, Organizations and Society, 22(2), 105-122.

Grover, V., Purvis, R. L., & Segars, A. H. (2007). Exploring ambidextrous innovation tendencies in the adoption of telecommunications technologies. IEEE Transactions on Engineering Management, 54(2), 268–285.

Hage, J., & Aiken, M. (1967). Relationship of centralization to other structural properties. Administrative Science Quarterly, 12(2), 72-92.

Hage, R., & Dewar, R. (1973). Elite versus organizational structure inpreticting innovation. Administrative Science Quarterly, 18, 279-290.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). Multivariate Data Analysis. Upper Saddle River, NJ: Prentice Hall.

Hashem, G., & Tann, J. (2007). The adoption of ISO standards within the Egyptian context: A diffusion of innovation approach. Total Quality Management, 18(6), 631–652.

Hendricks, W. E., Gramm, C. L., & Fiorito, J. (1993). Centralization of bargaining decisions in American Unions. Industrial Relations, 32(3), 67-90.

Herrmann, P., & Gordillo, M. (2001). Organizational innovation in developing countries: An empirical approach. International Journal of Organizational Theory and Behavior, 4(1-2), 33-55.

Hirst, G., Van Knippenberg, D., Chen, C. H., & Sacramento, C. A. (2011). How does bureaucracy impact individual creativity? A cross-level investigation of team contextual influences on goal orientation creativity relationships. Academy of Management Journal, 54(3), 624–641.

Jansen, J. J. P., Van Den Bosch, F. A. J. and Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. Management Science, 52(11), 1661-1674.

Kalay, F., & Lynn, G.S. (2015). The Impact of Strategic Innovation Management Practices on Firm Innovation Performance. Research Journal of Business and Management, 2(3), 412-429.

Kim, L. (1980). Organizational innovation and structure. Journal of Business Research, 8(2), 225-245.

Kimberly, J. R., & Evanisko, M. J. (1981). Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. Academy of Management Journal, 24(4), 679-713.

Lai, V. S., & Guynes, J. L. (1997). An assessment of the influence of organizational characteristics on information technology adoption decision: A discriminative approach. IEEE Transactions on Engineering Management, 44(2), 146–157.

Lewis, M. W., Welsh, M. A., Dehler, G. E., & Green, S. G. (2002). Product development tensions: Exploring contrasting styles of project management. Academy of Management Journal, 45(3), 546-64.

Liao, Y. (2007). The effects of knowledge management strategy and organization structure on innovation. International Journal of Management, 24(1), 53–60.

Menor, L. J., & Roth, A. V. (2007). New service development competence in retail banking: Construct development and measurement validation. Journal of Operations Management, 25(4), 825-846.

Miller, D. (1987). Strategy making and structure: Analysis and implications for performance. Academy of Management Journal, 30(1), 7-32.

Miller, D. and Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. Strategic Management Journal, 3, 1-25.

Mom, T. J. M., Van den Bosch, F. A. J., & Volberda, H. W. (2009). Understanding variation in managers' ambidexterity: Investigating direct and interaction effects of formal structural and personal coordination mechanisms. Organization Science, 20(4), 812–828.

Mumford, M. D., Bedell, K. E., & Hunter, S. T. (2008). Planning for innovation: A multi-level perspective. In M. D. Mumford, S. T. Hunter and K. E. Bedell Research (Eds.), Multi-Level Issues, (Vol. 7, pp. 107–154). Oxford: Elsevier.

Nahm, A., Vonderembse, M., & Koufteros, X. (2003). The impact of organizational structure on time-based manufacturing and plant performance. Journal of Operations Management, 21(3), 281-306.

Nieves, J., & Segarra-Cipres, M. (2015). Management innovation in the hotel industry. Tourism Management, 46, 51-58.

Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? Academy of Management Journal, 39(5), 1245–1264.

Nord, W.R., & Tucker, S. (1987). Implementing routine and radical innovations. Lexington, MA: Lexington Books.

O'Leary-Kelly, S. W., & Vokurka, R. J. (1998). The empirical assessment of construct validity. Journal of Operations Management, 16(4), 387–405.

OECD. (2005). Oslo manual. Paris: OCED.

Olson, E. M., Walker, O. C., & Ruekert, R. W. 1995. Organizing for effective new product development: The moderating role of product innovativeness. Journal of Marketing, 59(1), 48-62.

Pierce, J. L. and Delbecq, A. L. (1977). Organization structure, individual attitudes and innovation. Academy of Management Review, 2(1), 27–37.

Prajogo, D., & McDermott, C.M. (2014). Antecedents of service innovation in SMEs: Comparing the effects of external and internal factors. Journal of Small Business Management, 52(3), 521-540.

Raub, S. (2007). Does bureaucracy kill individual initiative? The impact of structure on organizational citizenship behavior in the hospitality industry. International Journal of Hospitality Management, 27, 179-186.

Rogers, E. M. (1995). Diffusion of innovations (4th ed.). New York: The Free Press.

Ruekert, R. W., Walker, O. C., & Roering, K. J. (1985). The organization of marketing activities: A contingency theory of structure and performance. Journal of Marketing, 49(1), 13-25.

Russell, C. J., & Russell, R. D. (1992). An examination of the effects of organization norms, organization structure, and environmental uncertainty on entrepreneurial strategy. Journal of Management, 18(4), 639-657.

Schultz, C., Salomo, S., de Brentani, U., & Kleinschmidt, E. J. (2013). How formal control influences decision-making clarity and innovation performance. Journa of Product Innovation Management, 30(3), 430-447.

Shepard, H. A. (1967). Innovation-resisting and innovation-producing organizations. The journal of Business, 40, 470-477.

Sheremata, W. A. (2000). Centrifugal and centripetal forces in radical new product development under time pressure. Academy of Management Review, 25(2), 389–408.

Souitaris, V. (2001). Strategic influences of technological innovations in Greece. British Journal of Management, 12(2), 131–147.

Subramanian, A., & Nilakanta, S. (1996). Organizational innovativeness: Exploring the relationship between organizational determinants of innovation, types of innovations, and measures of organizational performance. Omega, 24(6), 631-647.

Swanson, E.B. (1994). Information systems innovation among organizations. Management Science, 40(9), 1069-1092.

Vaccaro, I. G., Jansen, J. J. P., Van Den Bosch, F. A.J., & Volberda, H. W. (2012). Management innovation and leadership: The moderating role of organizational size. Journal of Management Studies, 49(1), 28-51.

Vickery, S., Droge, C., & Germain, R. (1999). The relationship between product customization and organizational structure. Journal of Operations Management, 17(4), 377-391.

West, M. A. (2000). Creativity and innovation at work. In M. Vartiainen, F. Avallone and N. Anderson (Eds.), Innovative theories, tools and practices in work and organizational psychology. Canada: Hogrefe and Huber Publishers.

Zhou, K. Z., & Li, C. B. (2012). How knowledge affects radical innovation: Knowledge base, market knowledge acquisition, and internal knowledge sharing. Strategic Management Journal, 33(9), 1090–1102.

Zmud, R. W. (1982). Diffusion of modern software practices: Influence of centralization and formalization. Management Science, 28, 1421-1431.

Appendix 1: CFA Results for the Measurement Model (N = 198)

Fit statistics: $\chi 2$ = 160.61, df = 96, $\chi 2$/df = 1.67, IFI = 0.96, NFI = 0.90, CFI = 0.96, RMSEA = 0.06

Measurement item	Standardized path loadings	Standard error*	Item reliability
Centralization (AVE = 0.57; CR = 0.89)			
OSC1) Any major decision that I make has to have this company's approval	0.57	0.17	0.32
OSC2) Employees have to report small things to their supervisors	0.79	0.19	0.62
OSC3) Even within one's responsibility, an employee has to acquire permission before taking action.	0.83	0.23	0.69
OSC4) I can take very little action on my own until this company or its reps approve it	0.72	0.20	0.52
OSC5) I have to ask company reps before I do almost anything in my business	0.59	0.18	0.35
OSC6) When encountering a special circumstance, an employee cannot determine on his/her own how to handle the event.	0.50	-	0.25
Formalization (AVE = 0.75; CR = 0.92)			
OSF1) The firm has standard procedures for most routine practices, and these standards are written.	0.86	0.11	0.74
OSF2) There is a complete and refined set of rules and systems.	0.90	0.13	0.81
OSF3) It is required that everyone in the firm complies with the rules and codes.	0.86	0.12	0.74
OSF4) Contact with my company and its representatives are on a formal preplanned basis	0.65	-	0.42
Management innovation (AVE = 0.50; CR = 0.85)			
MI1) Our organization regularly renews rules and procedures.	0.42	-	0.18
MI2) New management systems are regularly implemented in our organization.	0.66	0.24	0.44
MI3) Our organization has changed the policy with regard to compensation in the last three years.	0.36	0.22	0.13
MI4) Our organization regularly restructures the intra- and inter-departmental communication structure within organization.	0.68	0.27	0.46
MI5) Certain elements of the organizational structure are continuously altered by we.	0.77	0.28	0.59
MI6) New methods for managing external relationships with other firms or public institutions (e.g., new forms of cooperation, new alliances, etc.) are frequently introduced by we.	0.80	0.31	0.64

*All of the path loadings are significant at the 0.01 level.

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

THE EFFECT OF THE IFRS 16: CONSTRUCTIVE CAPITALIZATION OF OPERATING LEASES IN THE TURKISH RETAILING SECTOR

DOI: 10.17261/Pressacademia.2016116657

Emre Selcuk Sari[1], Taylan Altintas[2], Nihat Tas[3]

[1] Istanbul University. emresari@istanbul.edu.tr

[2] Istanbul University. ataylana@istanbul.edu.tr

[3] Istanbul University. nihattas@istanbul.edu.tr

ABSTRACT

The new International Financial Reporting Standard (IFRS) 16 issued by the International Accounting Standards Board will significantly change accounting for leases. The most important issue is that operating leases beyond one year will be capitalized, which means Off-The-Balance Sheet (OBS) financing via operating lease is effectively eliminated. "IFRS 16: Leases" will fundamentally change the way that leases are accounted for and reported in financial statements. This paper tries to illustrate the impact of IFRS 16 on financial statements and financial ratios. The study is an ex ante research, simulating a predicted outcome of the new lease standard, which will be in effect after 1 January 2019. For this purpose, this research is applied to the Turkish retailing companies whose shares are publicly traded in the Istanbul Stock Exchange. The study uses the constructive capitalization method for these companies. The results indicate that new standard will have a statistically significant effect on some of the financial ratios tested (debt/asset, debt/equity, return on assets (ROA) and return on equity (ROE)) for 2010 – 2013.

Keywords : IFRS 16, Operating Leases, Accounting for Leases, Lease Capitalization, Turkish Listed Retailing Companies

JEL Classification : C1; G1; M1

1. INTRODUCTION

Accounting for leases has been discussed since 1970's among academics, standard setters, corporate management, and financial statements users. The leasing standard issued by the Financial Accounting Standards Board's Statement No. 13, *Accounting for Leases*, issued in 1976, set the rules for accounting for leases; non-cancellable leases that meet one or more of the following four criteria must be capitalized by the lessees: (1) there is a transfer of ownership of the lease asset from the lessor to the lessee at the end of the lease term, (2) there is a "bargain purchase option," (3) the length of the lease term is 75% or more of the asset's expected economic life, or (4) the present value of minimum future lease payments is 90% or more of the asset's fair value at the inception of the lease agreement. Internationally, the International Accounting Standards Board issued IAS 17, *Leases*, which requires the lessees to recognize both an asset and a liability for a lease that transfers substantially all risks and rewards incidental to the ownership of the asset. Even though the two standard-setting bodies differ in their specific requirements, they both adopt the "ownership" approach in deciding whether a lease contract should be capitalized. Over the years, companies have strived to structure most lease contracts to bypass the capitalization criteria so that capitalization of assets and liabilities on the balance sheets are not required. (FASB, IASB, Tai (2013)). As a result, a change in the IAS 17 deemed necessary and the new standard was issued by IASB.

IAS 17 Leases, which was adopted by the International Accounting Standards Board (IASB) in April 2001, had originally been issued by the International Accounting Standards Committee in December 1997. IAS 17 Leases replaced IAS 17 Accounting for Leases that was issued in September 1982. In December 2003 the IASB issued a revised IAS 17 as part of its initial agenda of technical projects. Finally, IASB announced IFRS 16 in January 2016, which will be applied for leases starting from 1 January 2019.

With the adoption of IFRS 16, capitalization of almost all lease contracts will become mandatory. The distinction between operating leases and finance leases does no longer exist for long term lease contracts. Under the new standard, lessees are required to capitalize all lease contracts as assets and liabilities. The long-standing off-balance sheet treatment of operating leases is now prohibited. After the adoption of this standard, companies with significant operating leases are likely to experience an increase in assets, increase in liabilities, and decrease in equity, which may affect their financial ratios significantly. This study tries to demonstrate the expected changes in some of the financial ratios such as debt-to-assets, debt-to-equity, return-on-assets, return-on-equity ratios. This research examines Turkish retailing sector companies whose shares are traded in the Istanbul Stock Exchange, and demonstrates how the companies' key financial ratios are affected as if the new standard was implemented.

2. LITERATURE REVIEW

There are several studies examining the expected change of the new leasing standard which effectively eliminated the distinction between operating and finance lease.

The first study about lease capitalization of operating leases is the paper of Imhoff, Lipe and Wright (1991). This paper not only proposes capitalization of operating leases, but it also provides detailed guidance how to demonstrate the effect of operating leases on assets, liabilities and net income. Their guidance is also used in this paper as explained below.

Fülbier, Silva and Pferdehirt (2008) simulate general lease capitalization and its consequences on the financial statements of a set of listed German companies. They conducted ex ante research, indicating the consequences of a possible future accounting reform. Their sample comprised 90 companies belonging to the three major German indices DAX 30, MDAX, and SDAX. They collected Datastream/Worldscope data from consolidated financial statements for the years 2003 and 2004 and investigate the capitalization impact on key financial ratios. Their simulation model is based on a modified constructive capitalization approach originally developed by Imhoff, Lipe, and Wright (1991; 1993, 1997). Their results show a material capitalization impact for a considerable number of companies, especially for the fashion and retail industry groups. Changes in financial ratios occur primarily in assets and liability relations, but they observe minor effects for the profitability ratios and market multiples often used for valuation purposes.

Kostolansky and Stanko (2011) analyzed the leasing arrangements of the Standard and Poor's 100 (S&P 100) companies by extracting Form 10-K information from the Management Discussion and Analysis note, the financial statements, and the leasing footnotes and they found a material impact on specific firms and on specific industries. Double digit increases and decreases in firm specific financial ratios will occur. Their findings also support the IASB initiative to capitalize operating leases, ultimately creating a more representative balance sheet. They agree with the Board that these leasing arrangements should be represented on the balance sheet if that statement is to reflect the firm's full set of obligations. The results of their study indicate that those firms and industries that heavily utilize operating leases will be heavily affected by the change in lease accounting.

Tai (2013) selected two Hong Kong-based fast food restaurant chains, Fairwood Holdings Limited (Fairwood) and Café de Coral Holdings Limited (CDC) for analysis. His research results indicate that the two major fast-food restaurant chains in Hong Kong will experience significant adverse effect resulting from deteriorating return-on-assets and debt-to-equity ratios when their long-term leases are capitalized. This potentially devastating consequence could reflect negatively on the companies' stock prices, cost of capital, executive compensation, and even their ability to carry on as a going concern.

Lee, Paik and Yoon (2014) use publicly available data ranging from 1990 to 2011 to explore the effects of capitalizing operating leases on the immediacy to debt covenant violations of U.S. companies. To investigate

this research questions, they use eight financial ratios that are included in debt covenants, such as solvency, liquidity, and interest coverage ratios. They investigate the effect of operating lease capitalization on these ratios for two consecutive years. Their results provide evidence that the capitalization of leases will not always cause deterioration of financial ratios. As expected, for some firms, capitalization significantly deteriorates firms' financial ratios. Furthermore, some firms cross the initial covenant threshold and violate their debt covenants because of the negative effect of capitalization of operating leases on their financial ratios. However, they also find evidence that, for other firms, capitalization improves financial ratios and helps reduce the risk of debt covenant violation. This significantly different effect on financial ratios is determined by the characteristics of each financial ratio and where firms are positioned in terms of their ratios at a starting point (before the capitalization of leases).

Paik, Smith, Lee, and Yoon (2015) suggest that the proposed capitalization of Off Balance Sheet leases (operating leases) may not result in firms violating loan covenants but will make the balance sheet a more complete source of information for debt contracting by removing the need for constructive capitalization of OBS leases. They used logistic regression models to investigate the relation between OBS leases and the use of income-statement- or balance-sheet-based ratios in covenants. The potential for these changes to negatively affect the accounting ratios included in debt covenants leading to covenant violations is an area of concern. They argue that lenders constructively incorporate OBS leases when determining the financial constraints of the borrowing firm and this influences the type of accounting ratios to use in debt covenants: income-statement- or balance-sheet-based ratios.

Joakim Ericson and Robin Skarphagen (2015) examined how capitalization of operating leasing would affect financial ratios of Swedish publicly traded companies, for this purpose 55 large cap companies on Stockholm NASDAQ OMX between 2010–2013 were studied. The constructive capitalization model, which was first introduced by Imhoff et al. (1991) and later modified by Fülbier et al. (2008), have been used. They found that a new lease standard without operating leasing would have a significant effect on the tested financial ratios (D/A, E/A, PM, ROA, ROE).

Wong and Joshi (2015) examined the lease capitalization effect on financial statements and financial ratios of Australian companies listed on the Australian Stock Exchange (ASX) in the year of 2010. The top 170 companies are chosen because they represent different sectors such as energy and utilities, health care and biotechnology, IT and telecommunications, consumers, financial, industrial and materials, metal and mining, and clean technology, and they have a market capitalization value greater than $1000 million. In their study, the results have shown a significant effect of lease capitalization on financial statements for the selected Australian companies. However, the changes in the financial statements (total assets, total liabilities, and total equity) are not as significant as the changes found in prior studies. The financial ratios such as D/E ratio, D/A ratio and ROA will change significantly under lease capitalization. However, the change in ROE is insignificant.

3. DATA AND METHODOLOGY

This part of the study explains sample selection and measurement of the research.

3.1. SAMPLE SELECTION

The study examines the effect of the lease capitalization on financial statements and financial ratios of retailing sector companies listed on the Istanbul Stock Exchange (Borsa Istanbul-BIST). The retailing sector comprises 13 companies as of December 31, 2014. During our sample selection process, we collected companies' lease and financial statement data for the "2010-2014 period". 6 companies of 13 retailer companies excluded from the sample because of lack of operating lease information.

3.2. MEASUREMENT METHOD

3.2.1. Lease Capitalization Method

The research in this study applies the constructive lease capitalization method developed by Imhoff et al (1991). This method is widely accepted and used in prior studies that examined the effect of lease

capitalization on financial statements and financial ratios such as Beattie et al (1998), Bennet and Bradbury (2003), Duke et al. (2009), Singh (2010 and 2011), Branswijck et al. (2011) and Wong and Joshi (2015). For the purpose of lease capitalization there is another method called heuristic method, but applying of heuristic method causes significantly higher unrecorded lease asset and liability amounts than constructive capitalization method. Prior studies such as Bennet and Bradbury (2003) evidenced that the heuristic method overstates the unrecorded lease assets or liabilities.

3.2.2. Estimating Unrecorded Lease Assets/Liabilities

While applying the constructive capitalization method, we first used audited annual financial statements and relevant footnotes. We extracted actual operating lease expenses from selected companies' financial statements for the period of 2010 – 2014 and non-cancelable future operating lease payments for the next 10 years. In the second step we calculated the present value of the operating lease expenses as of January 1, 2010. In order to estimate present value of operating lease expenses (also present value of operating lease expenses is equal to the amounts of the unrecorded lease assets and liabilities as of January 1, 2010) it is inevitable to use assumptions. We used following assumptions because of two reasons; first, due to lack of specific data for the remaining lease lives, second, due to lack of implicit interest rates (implicit interest rates are necessary for the present value calculation). We used following assumptions that are consistent with the Imhoff et al. (1991) and these assumptions have also been used by prior researchers working on the estimation of lease capitalization.

- At the inception of the lease, the book value of the leased asset is equal to the book value of the lease liability.
- At the end of the lease, the book value of the asset and liability are zero.
- All cash flows occurred at the end of the year.
- Compound interest (9%) rate of government bonds issued on December 14, 2009 used as discount rate.
- The asset is depreciated using straight-line method of depreciation and expected useful life is 15 years.
- Lease payments are constant over the lease term.

Using the lease expenses and discount rate, results of the estimated unrecorded assets and liabilities are shown in Table 1.

Table 1: Present Value of Lease Expenses as of January 1, 2010

Years	Yearly Lease Expenses (TL)	9% Present Value Factor	Present Value of Lease Expenses (TL)
2010	359,575,583	0.9174	329,885,856
2011	442,807,120	0.8417	372,701,894
2012	557,316,657	0.7722	430,350,716
2013	650,516,090	0.7084	460,841,998
2014	788,713,553	0.6499	512,609,693
2015 to 2024	155,683,658*	4.1710**	649,362,324
Total Estimated Unrecorded Lease Assets and Liabilities			**2,775,752,481**

* Total future lease expenses (1,556,836,580 TL) / 10 years

** This factor is the present value of a 15-year annuity at 9% less the present value of a 5-year annuity at 9%, based on assumed 155,683,658 TL at the end of each year from 2015-2024.

The result of Table 1 suggests that the PV of retailing sector company's total unrecorded lease assets and liabilities are equal to 2,775,752,481 as of January 1, 2010. If the lease capitalization be implemented by the retailing sector companies, impact on the presentation on balance sheet is shown below;

RETAILING SECTOR COMPANIES BALANCE SHEET
AS OF JANUARY 1,2010 (TL)

ASSETS		LIABILITIES	
Unrecorded Lease Assets	2,775,752,481	Unrecorded Lease Liabilities	5,128,133,605
		Deferred Interest Expense	- 2,372,381,124
		Unrecorded Lease Liabilities (Net Amount)	2,775,752,481

3.2.3. Estimating Depreciation Expenses and Interest Expenses

The capitalized lease assets should be depreciated during its useful life. In order to estimate the depreciation expense of the capitalized lease assets we used the assumptions of Imhoff et al.(1991), the useful life of capitalized lease assets are 15 years and straight-line method of depreciation will be applied. According to these assumptions, yearly depreciation rate is estimated as 7% (1/15 years) and yearly depreciation expense is estimated as 183,716,832 TL (2,775,752,481 TL*7%).

After the capitalization process, lease liabilities should be reported on the liabilities part of the balance sheet and reported net lease liability should be equal to the amount of the capitalized lease assets on the assets part of the balance sheet. As mentioned before, the amounts of lease assets and liabilities should be equal at the capitalization date and both should be equal to zero at the end of the lease. But between capitalization date and end of the lease, reported amounts of both lease assets and lease liabilities will not be equal to each other. Imhoff et al. (1991) showed that, the share of interest expense in the early payments is much larger than the principal, whereas the depreciation expense reduces the carrying amount of the leased asset at a much higher rate than the decrease of the principal of the lease liability. As a result of this, amount of the net lease liability will be higher than the amount of the net book value of the lease assets till the end of the lease. For example, at the end of 2010, depreciation expense of 2010 is 183,716,832 TL and net book value of the lease assets on the balance sheet should be 2,572,035,649 TL (2,775,752,481 – 183,716,832). On the other hand, the lease payment in 2010 should be 341,875,574 TL, lease expense should be 248,017,723 TL (2,755,752,481 TL * 9%), principal payment (also decrease in net lease liabilities) should be 93,857,850 TL (342,875,574 TL – 248,017,723 TL). This situation causes a higher decrease in lease assets that lease liabilities during the useful life.

3.2.4. Estimating Net Income

The lease capitalization has a significant effect on the net income figures. In this study, the operating lease expenses are removed from the income statement and replaced by depreciation and interest expenses which mentioned above. In order to adjust the tax effect, we used Turkish corporate income tax rate (20%) to achieve the adjusted net income after tax and calculate the adjusted total equity.

3.3. ANALYSIS

Research hypotheses to be tested for each year of the term 2010-2014 are given below as

H_1 : Lease capitalization has a significant impact on total assets
H_2 : Lease capitalization has a significant impact on total liabilities
H_3 : Lease capitalization has a significant impact on total equity
H_4 : Lease capitalization leads to a significant increase in the D/A ratio
H_5 : Lease capitalization leads to a significant increase in the D/E ratio
H_6 : Lease capitalization leads to a significant increase in the ROE ratio
H_7 : Lease capitalization leads to a significant increase in the ROA ratio

Collected and calculated data were analyzed by using software IBM SPSS version 20 and Microsoft Excel 2016. Univariate statistical tests were performed because of small sample size (n=7).

4. FINDINGS AND DISCUSSIONS

Both histogram and descriptive statistics of research variables were examined (but not displayed here) and it was determined that distribution of each variable is right-skewed. Kolmogorov-Smirnov and Shapiro-Wilk normality tests were performed and null hypothesis of normality was rejected at 1% significance level for all but one variable.

Nonparametric Wilcoxon matched-pairs signed-ranks test was used to test the null of research hypotheses because of nonnormality evidence for the population, for each year of the term 2010-2014.

For each of the first two research hypotheses, the null hypothesis of no difference was rejected for 2010 (p-values are 4.7% and 1.6% respectively) and 2011 (p-values are 7.8% and 1.6%). Null hypothesis of H_1 and H_2 couldn't be rejected for the term 2012-2014. Null hypothesis of no difference between medians of total equity under the new and existing lease accounting standards couldn't be rejected at any year of the term 2010-2014.

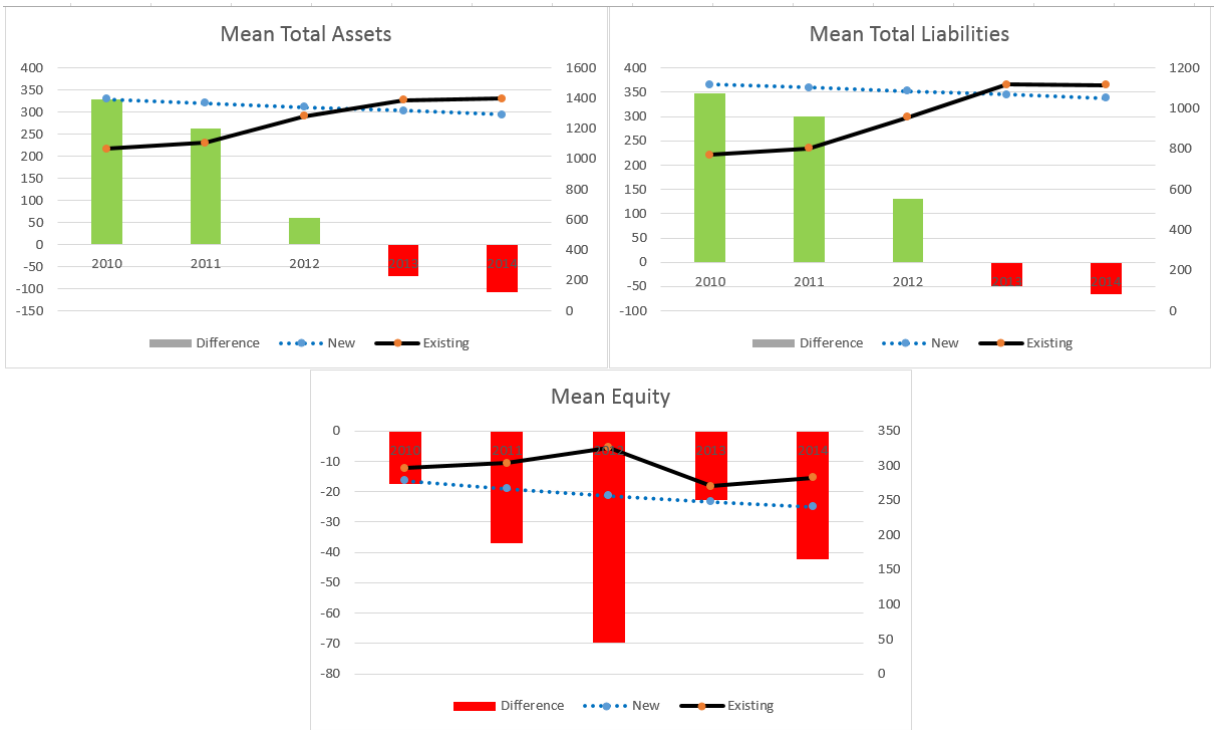
Mean financial statements and the p-values (significance) of Wilcoxon matched-pairs signed-ranks tests are given in the Table 2. Figure 1 shows the line graphs of mean total assets, mean total liabilities and mean equity under the new and existing accounting standards and the difference between them.

Table 2: Comparison of mean financial statements under the new and existing lease accounting standards

Year	Mean	New	Existing	Difference	% Change	Significance (2-tailed)
	Total Assets	1396.30	1066.72	329.58	30.90	0.047**
2010	Total Liabilities	1117.63	770.52	347.11	45.05	0.016**
	Total Equity	278.66	296.21	-17.55	-5.92	0.219
	Total Assets	1370.05	1107.58	262.47	23.70	0.078*
2011	Total Liabilities	1103.02	803.56	299.46	37.27	0.016**
	Total Equity	267.03	304.02	-36.99	-12.17	0.297
	Total Assets	1343.81	1282.71	61.1	4.76	0.375
2012	Total Liabilities	1087.09	956.36	130.73	13.67	0.297
	Total Equity	256.72	326.35	-69.63	-21.34	0.219
	Total Assets	1317.56	1389.64	-72.08	-5.19	0.297
2013	Total Liabilities	1069.73	1118.95	-49.22	-4.40	0.688
	Total Equity	247.84	270.69	-22.85	-8.44	0.297
	Total Assets	1291.32	1399.61	-108.29	-7.74	0.297
2014	Total Liabilities	1050.80	1116.96	-66.16	-5.92	0.688
	Total Equity	240.52	282.65	-42.13	-14.91	0.297

Results summarized in Table 2 show that lease capitalization will not have a significant impact on mean total equity. Also, while there is a significant difference between medians of the new and existing lease accounting standards for the years 2010 and 2011, there is no significant difference between them for the years through 2012-2014. Both the direction of changes in the financial statements are positive, increase in total assets (30.90% at 2010 and 23.70% at 2011) and total liabilities (45.05% at 2010 and 37.27% at 2011).

Figure 1: Mean of the Financial Statements for the Term 2010-2014 and the Difference between the New and Existing Lease Accounting Standards



Mean financial ratios and one-tailed p-values (significance) of Wilcoxon matched-pairs signed-ranks tests are given in the Table 3. Figure 2 shows the line graphs of mean financial ratios (D/A, D/E, ROE and ROA) under the new and existing accounting standards and the differences between them.

The null hypothesis of H_4 couldn't be rejected at any year. There is no evidence pointing lease capitalization has an impact on median D/A.

The null hypothesis of H_5 was rejected for each year through 2010-2013 but not for 2014. As earlier studies pointed, the median D/E ratio will increase after capitalizing the leases. Minimum and maximum observed percentage of the changes are 213.21% and 615.24% respectively.

The null hypothesis of H_6 was rejected only for the years of 2010 (p-value is 6.3%) and 2013 (p-value is 3.9%). While the increase in the ROE at 2013 is similar to earlier studies, sample of 2010 has an evidence that lease capitalization will have decreasing unexpected effect on ROE.

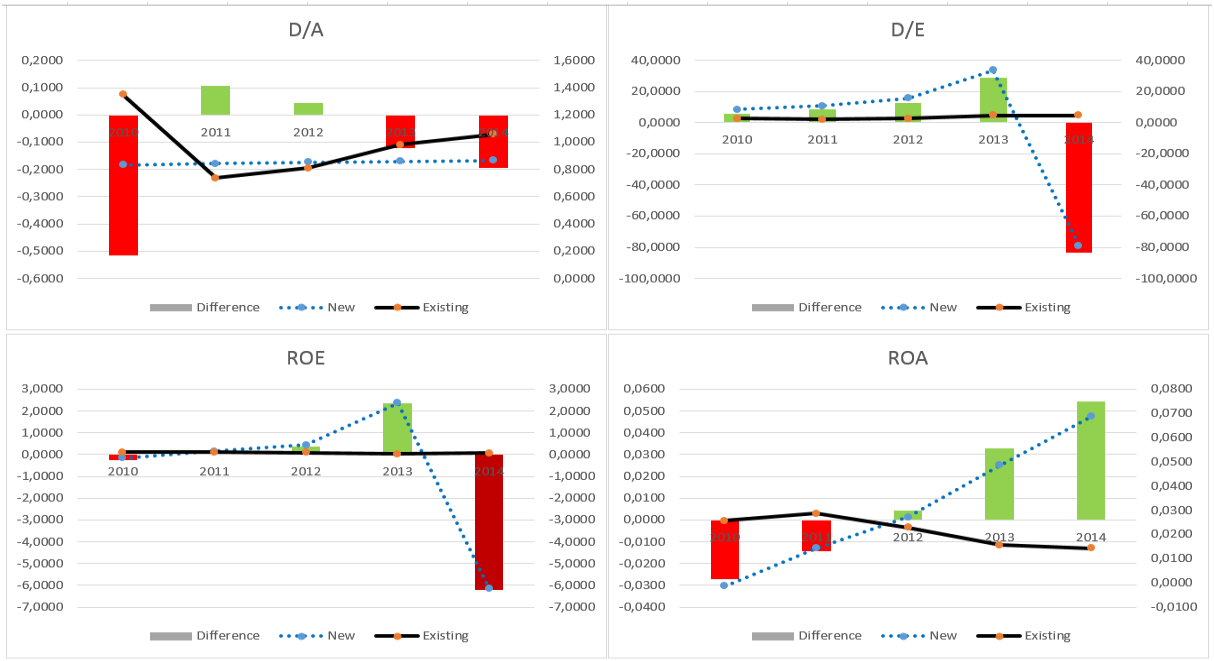
The null hypothesis of H_7 was rejected for the years of 2013 (p-value is 3.1%) and 2014 (p-value is 1.6%). Lease capitalization has an increasing impact on ROA at years 2013 and 2014. There is no evidence for the years 2010-2012.

It should be noted that the sample size is quite small (n=7). Findings of this study could be examined by taking the sample size into account. Another research can be done in a different sector of Turkey by using more observations (larger sample) to determine more generalizable findings.

Table 3: Impact of Lease Capitalization on Financial Ratios

Year		New	Existing	Difference	% Change	Significance (1-tailed)
2010	D/A	0.8329	1.3500	-0.5171	-38.30	0.133
	D/E	8.3671	2.6714	5.6957	213.21	0.008***
	ROE	-0.1543	0.1029	-0.2572	-249.95	0.063*
	ROA	-0.0014	0.0257	-0.0271	-105.45	0.969
2011	D/A	0.8429	0.7371	0.1058	14.35	0.203
	D/E	10.7386	1.9929	8.7457	438.84	0.008***
	ROE	0.1486	0.1086	0.0400	36.83	0.422
	ROA	0.0143	0.0286	-0.0143	-50.00	0.125
2012	D/A	0.8514	0.8086	0.0428	5.29	0.148
	D/E	15.5700	2.6300	12.9400	492.02	0.008***
	ROE	0.4386	0.0900	0.3486	387.33	0.156
	ROA	0.0271	0.0229	0.0042	18.34	0.328
2013	D/A	0.8586	0.9814	-0.1228	-12.51	0.234
	D/E	33.7900	4.7243	29.0657	615.24	0.023**
	ROE	2.3700	0.0214	2.3486	10974.77	0.039**
	ROA	0.0486	0.0157	0.0329	209.55	0.031**
2014	D/A	0.8657	1.0586	-0.1929	-18.22	0.188
	D/E	-78.8643	4.7143	-83.5786	-1772.87	0.469
	ROE	-6.1471	0.0557	-6.2028	-11136.09	0.500
	ROA	0.0686	0.0143	0.0543	379.72	0.016**

Figure 2: Mean Financial Ratios for the Term 2010-2014 and the Difference between the New and Existing Lease Accounting Standards



5. CONCLUSION

The introduction of the new lease standard brings dramatic changes for accounting for leases. The new standard, IFRS 16, effectively eliminates the distinction between operating and finance lease, which will result in capitalization of lease contracts and end off-the-balance sheet financing for long term leases. The purpose of this study is to demonstrate the effect of the new accounting standard about leases, namely IFRS 16. For this purpose, we tested the effect of the new standard on the Turkish retailing companies. The constructive capitalization model, which was first introduced by Imhoff et al. (1991) and later modified by Fülbier et al. (2008) was used in this study.

We found that the new lease standard would have a significant effect on the total assets and total liabilities in the years 2010 and 2011. This result is expected because of the capitalization of operating leases. After 2011, the effect of lease capitalization appears to be insignificant. This is a result of our assumptions of the calculations, since it is assumed that there are no additional operating leases after 2010.

Debt-To-Asset ratio is not significantly affected by lease capitalization. This is expected for 2010 because in 2010 the amount of leasehold and lease obligation is the same. But it is interesting to see that this ratio is not affected, because the decrease in the lease asset and lease obligation is not equal to each other. On the other hand, debt-to-equity ratio is significantly affected by lease capitalization between 2010-2013. This is expected because there is a significant increase in the liabilities. The effect of lease capitalization on ROA and ROA is insignificant for the most of the years analyzed, it is not possible to derive a conclusion from these results.

This research examines Turkish retail sector companies; and through constructive capitalization, demonstrates how the companies' key financial ratios are affected if the new standard is implemented. However, it should be taken into consideration that the sample was small and there was limited explanation in the footnotes related to operating leases.

As a matter of fact, this study can be expanded for different sectors in İstanbul Stock Exchange. Further research can be applied to a larger sample. Another research can be conducted after the application of IFRS 16 to compare the results of capitalization of the operating leases.

REFERENCES

Tai, B.Y., 2013, "Constructive Capitalization of Operating Leases in the Hong Kong Fast-Food Industry", *International Journal of Accounting and Financial Reporting*, vol. 3, no. 1, pp. 128-142.

Imhoff, E., Lipe, R., and Wright, D., 1991, "Operating Leases: Impact of Constructive Capitalization", *Accounting Horizons*, vol.5, no.1, pp. 51-63

Fülbier, R.U., Silva, J.L., and Pferdehirt, M.H., 2008, "Impact of Lease Capitalization on Financial Ratios of Listed German Companies", *Schmalenbach Business Review*, vol. 60, pp. 122-144.

Imhoff, E., Lipe, R., and Wright, D., 1993, "The Effects of Recognition Versus Disclosure on Shareholder Risk and Executive Compensation", *Journal of Accounting, Auditing and Finance*, vol.8, no.4, pp. 51-63.

Imhoff, E., Lipe, R., and Wright, D., 1997, "Operating Leases: Income Effects of Constructive Capitalization", *Accounting Horizons*, vol.11, no.2, pp. 12-32.

Kostolansky, J., and Stanko, B., 2011, "The Joint FASB/IASB Lease Projects: Discussion and Industry Implications", *Journal of Business & Economics*, vol.9, no.9, pp. 29-35.

Paik, D.G.H., Smith, J.A.L, Lee, B.B., and Yoon, S.W., 2015, "The Relation Between Accounting Information in Debt Covenants and Operating Leases", *Accounting Horizons*, vol.29, no.4, pp. 969-996.

Lee, B., Paik, D.G., and Yoon, S.W., 2014, "The Effect of Capitalizing Operating Leases On the Immediacy to Debt Covenant Violations", *Journal of Accounting and Finance*, vol.14, no.6, pp. 44-70.

Ericson, J., and Skarphagen, R., 2015, Capitalization of Operating Lease and Its Impacts on Financial Ratios, Master Thesis, Jörköping University Jörköping International Business School.

Wong, K., and Joshi, M., 2015, "The Impact of Lease Capitalization on Financial Statements and Key Ration: Evidence From Australia", *Australasian Accounting, Business and Finance Journal*, vol.9, no.3, pp. 27-44.

Bennett, B.K., and Bradbury, M.E., 2003, "Capitalizing Non-Cancelable Operating Leases", *Journal of International Finance Management and Accounting*, vol.14, no.2, pp. 101-114.

Beattie, V., Edwards, K., and Goodacre, A., 1998, "The Impact of Constructive Operating Lease Capitalization on Key Accounting Ratios", Accounting and Business Research, vol.28, no.4, pp. 233-254.

Duke, J.C., Hsieh, S.J., and Su, Y., 2009, "Operating and Synthetic Leases: Exploiting Financial Benefits in the Post-Enron Era", Advances in Accounting, Incorporating Advances in International Accounting, vol.25, no.1, pp. 28-39.

Singh, A., 2011, "A Restaurant Case Study of Lease Accounting Impacts of Proposed Changes in Lease Accounting Rules", *International Journal of Contemporary Hospitality Management*, vol.23, no.6, pp. 820-839.

Singh, A., 2010, "Proposed Lease Accounting Changes: Implications for the Restaurant and Retail Industries", Journal of Hospitality & Tourism Research, vol.36, no.3, pp. 335-365.

http://www.ifrs.org/Current-Projects/IASB-Projects/Leases/Documents/IFRS_16_effects_analysis.pdf (online 5 November 2015)

Journal of Business, Economics and Finance (JBEF), ISSN: 2146 - 7943

Journal of Business, Economics and Finance

Year: 2016 Volume: 5 Issue: 1

A STUDY ON ECO-INNOVATION AND ITS DETERMINANTS

DOI: 10.17261/Pressacademia.2016116658

Billur Engin Balin[1] ,H. Dilara Mumcu Akan[2]

[1] Istanbul University. b.engin@istanbul.edu.tr

[2] Istanbul University. dimumcu@istanbul.edu.tr

ABSTRACT

Environmental problems and the solutions investigated within the economic theory has been high on the global agenda since 70s. Variables that encourage firms to innovate and/or use environment-friendly technologies is an important subtitle in this issue. According to the common definition in the environmental economics literature, eco-innovation consists of new or modified processes, techniques, systems and products to avoid or reduce environmental damage. Although there are a lot of variables that determine the eco-innovation level of a firm, national and international environmental policy –as one of them- worths significantly noting. Under some conditions, the stringency of environmental regulations induces firms to reduce their costs by innovating new environment-friendly technologies. Therefore, environmental regulations may lead a so-called "win-win" situation characterized by both cost reducing/profit maximizing behaviour of the firm and environmental benefits. On the other hand, international harmonization of environmental regulations may create a comperative advantage for the eco-innovationg firms in the newly innovated technologies and strengthen this "win-win" situation. Market structure, technological capabilities, awareness and pressures of the demanders for cleaner technology are the other variables which determine the eco-innovation level of a firm. This study has concentrated on the variables that determine eco-innovation level of a firm. Both endogenous and exogenous variables are analysed in detail. As a consequence, it has been found that (1) the effect of environmental regulations on eco-innovation should be emphasized diligently, (2) international harmonization of environmental regulations supports eco-innovation, and finally (3) increasing awareness of society about environmental issues may be influent on eco-innovation.

Keywords : Environmental Innovation, Eco-innovation, Environmental Policy, Porter Hypothesis, European Union.

JEL Classification : Q55, Q58, R11

1. INTRODUCTION

Environmental problems and their solutions being taken into consideration in the framework of economic theory from the 1970's onward has been in the upper echelons of the global agenda. The inducement of firms developing and utilizing eco-friendly technologies are one of the important captions within this scope. When literature is being surveyed, it is seen that eco-innovation most specially has been examined by evolutionary economists. Evolutionary economics can be evaluated as a complement of neo-classical environmental economics and ecological economics putting emphasis on eco-innovation (Faber and Frenken, 2009).

According to the prevalent definition "*eco-innovations are all measures of relevant actors which; (i) develop new ideas, behaviour, products and processes, apply or introduce them and ii) which contribute to a reduction of environmental burdens or to ecologically specified sustainability targets.*" (Rennings, 2000:322) A great deal of eco-innovation combines the environmental and firms utilities. In this sense innovations other than different domains are different in terms that eco-innovation, (i) as it is in all kinds of innovations with the spillover effect creates a positive externality, and (ii) reduces environmental externality costs which is a negative externality.

Depending on the double externality problem, the firms doing eco-innovation are face to face with the problem of creating public goods at a certain extent and this reduces their desire to make eco-innovation. Thereby as long as eco harmful effects are not being punished or environmental contributions are not being remunareted it can be foreseen to lack behind an eco-innovation level which can be considered socially optimum. Eventually likewise it is mentioned about many variables influential in a firm realizing eco-innovation levels among them national and international environmental policies have a special place. It is put forward, under certain assumptions, tightening environmental regulations will encourage the firms to take cost minimizing measures and for this reason urge them to eco innovation. From this point of view environmental policy on one hand would reduce the environmental devastation on the other hand would induce firms to make innovation and create a "win-win" situation by causing them to produce at lower costs and more profitable levels. Conversely the international harmonization of environmental policies would provide a comparative advantage to firms for the new eco-friendly technologies they have developed thus aforementioned "win-win" situation would be stiffened in international markets. Apart from that market structure, the capital stock and technological structure of the firm for the firms to make eco-friendly production the pressures of non-governmental organizations or the demanders of the products pressures can be sighted among the variables determining the eco-innovation level.

2. THE DETERMINANTS OF ECO-INNOVATION

In a general sense the determinants of innovation and its subtitle eco-innovation do not submit significant differences. When literature concerning the subject is looked upon it is seen that two factors that influence innovation activity are: on the supply side (technology) and on the demand side (fully informed customer). The supply side factors that are backed up with technological innovations in the primary phase of developing a product and demand factors in the spillover phase of the product will be more effective. (Horbach, 2008) When we look through specific to eco-innovation the costs caused by environmental problems (not being private costs) being external costs means without environmental regulations existing there is no other way to induce firms produce eco-friendly products. Thereby to state economic innovation is the extended form of innovation theory with environmental policy and institutional factors will not be incorrect. In this section the factors determining eco-innovation will be examined adhering to the general innovation theory.

2.1. Determinants Concerning Supply and Demand Side

When a firm makes a decision on innovation investment certainly takes two aspects into consideration: the cost and yield of investment to be made. Though detection of the cost of the investment to be made is relatively easy the calculation of the return provided by innovation is more difficult. Likewise, we can mention the innovation made can supply cost saving for the firm and in social sense it will create a positive externality. Particularly the positive externality mentioned for eco-innovation investments are more dominant. (Jaffe et al., 2002). As long as there is no incentive/penalty mechanism the firms will produce without taking into consideration the external benefits they have made, it can be expected that the eco-innovation level socially would be below optimum level. Hence the government coming into sight can fix the market distortions via taking measures for inducing innovation.

When viewed from the supply side, another factor influencing innovation investments is the firm's stock capacity. The holdings of capital stock of a firm both physically and in terms of information capital are the most important factors determining a firm's innovative capacity; for the firms to develop the new goods and production processes. Both research and development and human capital investments (in other words the investment firm makes for his employees) promote such kind of capital stock to be formed. Each product or production process found will increase the firm's capital stock hereafter will induce more innovation to be made. Baumol summarizes this situation with just one sentence: "innovation breeds innovation". (Baumol, 2002:284)

The market structure of the operating firm is also influential on innovation. Nevertheless, we should state that there is no consensus about the direction of the effect. Schumpeterian economists assert a firm having monopoly power, by reason of having the excess profit has the required to reserve for innovation investments, the ability to combine risks, no fear of being forged because of having no rival and can benefit more from

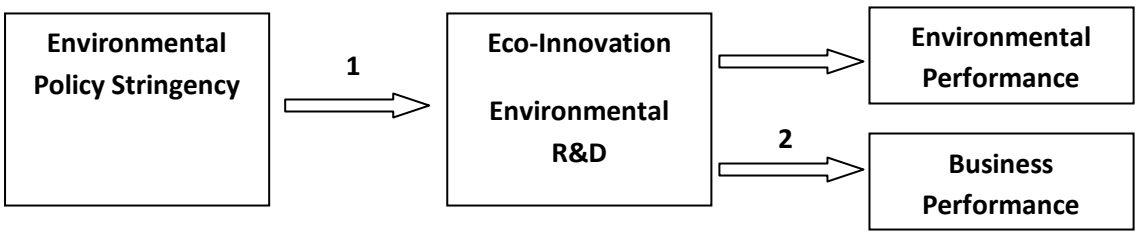
economies of scale created by innovation; are more inclined to make innovation. (Scherer, 1967; Biglaiser and Horowitz, 1995). In other respects the firm having monopoly power can be seen as a factor causing the firm making innovation an "unnecessary" aspect yet the firm having no other rival might not carry the fear of "being better off". On the contrary a firm operating in a competitive market to increase its market share should always be "better off". This can be seen as a factor inducing innovation. (Geroski, 1990; Oates et al., 1993; Jaffe and Palmer, 1997). When examined from demand side a firm's willingness to make eco-innovation will be associated in a positive way with the demand for the goods produced via this innovation. At this point the public awareness concerning eco-friendly products, the environmental consciousness of consumers and firms, their preferences and intimacy with the subject becomes crucial. In interdisciplinary studies concerning consumption behaviour, the reasons consumers preferring to use eco-friendly or "green"products recently has progressively being examined. (See Mainieri et. al, 1997; Gatersleben et al., 2002; Young et al., 2010).

2.1. The Environmental Policy's Effect on Eco-Innovation

2.2.1 Porter Hypothesis

Whether the change being done in environmental policies would encourage the firms to make innovations are studied in environmental economics literature generally on the basis of Porter hypothesis. Porter and Van der Linde (1995) in their studies have put forward that tightening of environmental policies would on one side reduce pollution and induce innovation on the other would increase profitability of the firm and create a win-win situation. Figure 1 represents this situation.

Figure 1- The win-win situation environmental policy would create



Source: Lanoie, Paul, et al. (2011), "*Environmental policy, innovation and performance: new insights on the Porter hypothesis*", p. 809

Hereby the point that has to be urged upon is the necessity of inducing eco-innovation with environmental policy. For a firm that operates under perfect competition rules, although cost minimizing measures are taken automatically without having need of any incentive, firms under imperfect competition rules due to imperfect data and coordination problems may not calculate how much saving would environmental innovation investments generate. However, for instance, for a firm that is producing by air polluting; a tax being levied on the unit CO2 emitted, would be a monetary indicator of reducing emission therefore cost-saving. Eventually the tightening of environmental policy by endogenizing external costs makes the firms to realize cost saving effects binding from eco-innovation.

A secondary component of Porter Hypothesis is the firms operating under the application of environmental policy's have the advantage of acting early and the comparative advantage would enhance the firm's acquired national competitiveness both in national and international markets hereafter cause an increase in profitability. Definitely an eco-innovation made by a firm to register an international effect is only possible if similar environmental policies are practiced in other countries. In this regard, we should notice that as well as the harmonization of environmental policies having effects to both international competitiveness and eco-innovation. (Beise and Rennings, 2004).

In fact, in the 'optimist' remark of Porter and Van der Linde (1995) it is stated that the tight environmental policies would induce firms to use their substantial resources more efficiently and this would increase the domestic firm's potential to make innovation. Therefore, although other countries do not apply similar arrangements with the comparative advantage based on resource efficiency (increase in competitiveness) it is

asserted that firms will turn out to be profitable. Here the logic is the efficient use of natural resources are because of them being a partially private good. Since firms have to pay for the water they use in planning and wastes. For this reason natural resource efficiency has been evaluated as a part of total efficiency and the firm's competitiveness.

2.2.2 Empirical Studies

Porter hypothesis which explained the relationship between eco-innovation and environmental policy simply and clearly has been subject to many empirical studies. These studies are classified as "weak version" and "strong version" of Porter hypothesis. (Lanoie and others, 2007). The weak version of the hypothesis, examines whether to tighten environmental policy increases innovation or not. This kind of studies test in Figure 1 - flow 1. The strong version of the hypothesis questions whether the tightened environmental policy (via eco-innovation) provides cost saving to firms. We can think this kind of studies where in Figure 1 - flow 1 together with flow 2 can be tested.

The first study trying to test Porter hypothesis belongs to Jaffe and Palmer (1997). In the study manufacturing industry panel data variables of USA between the years of 1973-1991 were used. Jaffe and Palmer, as an indicator of eco-innovation show research and development investments and successful patent applications. As an indicator of tightening the environmental policy they have used the government's control of pollution spending. According to the conclusion of the studies, though there is no connection among pollution control spendings and successful patent applications, but there is a weak and positive relationship with research and development investments (Elasticity: +0,15). Accordingly, we can say this study validates the weak version of Porter Hypothesis. Solely a criticism can be made to the study concerning research and development investments which are used as a dependent variable and all of the patent applications (whether related to the environment or not) have been taken into consideration.

Brunnermeir and Cohen (2003), in their study between the years (1983-1992) have used panel data concerning the manufacturing sector in the USA. In this study as an indicator for eco-innovation they have indicated the successful number of "environmental" patent applications and as an indicator of tightening environmental policy they have used the government's pollution control expenditures with public auditing activities. By the results of the studies it is stated that the change in the government's control expenditures over environmental innovation is positive but has a very low level of influence. (Other conditions being constant when pollution control expenditures are increased by 1 million$ there will be a 0,04 % increase in environmental patents). Brunnermeir and Cohen attributes the reason of the relationship to be so weak to the restriction on the environmental patterns for manufacturing sector only. No empirical relation has been found among public auditing and patents.

De Vries and Withagen (2005), in their studies, depending on the variables for 14 countries (USA, Germany, United Kingdom, France, Finland, Austria, Denmark, Sweden, Canada, Holland, Poland, Italy, Luxemburg, Switzerland) between the years 1970-2000 have used patents related with environment as an indicator of eco-innovation. The tightening of the environmental policy has been measured by three indicators: some international environmental treaties to be signed, for different polluters environmental consciousness performance indices and the tightening environment policy taken as a dummy variable. In the conclusion part of the study there is a positive relationship just between dummy variable thirdly stated and eco-innovation level.

Lanoine and others (2007) according to their studies based on variables of OECD study made in 2003 for seven countries (USA, Canada, France, Germany, Hungary, Japan and Norway) have found outcomes validating both the weak and strong versions of Porter Hypothesis. This study's conclusion supporting strong side of Porter Hypothesis is important in terms of determining environmental policy.

Horbach (2007) with the extensive study he did on German panel data variables for the years, 2001 and 2004 has concluded; (i) technological capacity to be improved with research and development has significant effects on eco-innovation, (ii) in the past generally and in environmental sense innovative firms currently still are so. Hence this result confirms Baumol's "innovation breeds innovation" (iii) the increase in expected demand in the future will trigger eco-innovation (iv) environmental administrative tools, general organizational changes

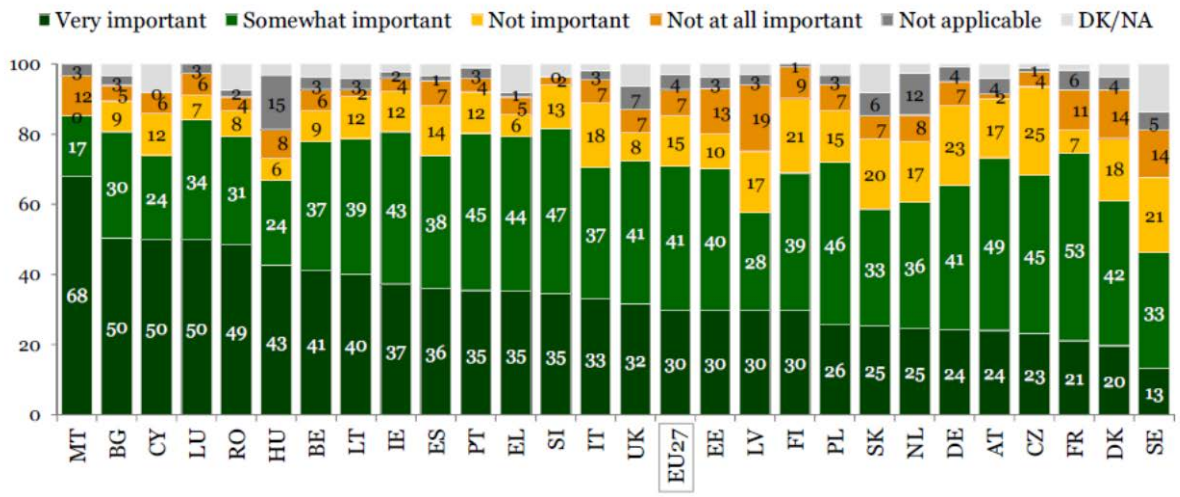
and developments have importance in inducing eco-innovation. This conclusion is confirming the weak version of Porter Hypothesis.

In another group of studies testing Porter hypothesis, it has been emphasized whichtype of environmental policies will match with the hypothesis. In the aforesaid studies there is a presupposition that the hypothesis is not suitable for all market types and environmental policies. Downing and White (1986) with Millman and Prince (1989) have asserted that market based environmental policy tools have higher augmentative power of research and development investments in respect of product process to control tools, Montenero (2002) states the aforementioned study is valid under perfect competition rules, in imperfect competition markets the arrangements done in terms of environmental standards compared to other instruments are more efficient inducing research and development expenses. Firms under imperfect conditions behave strategically and as a natural consequence of this market based instruments loose their importance.

3. ECO-INNOVATION IN EUROPEAN UNION

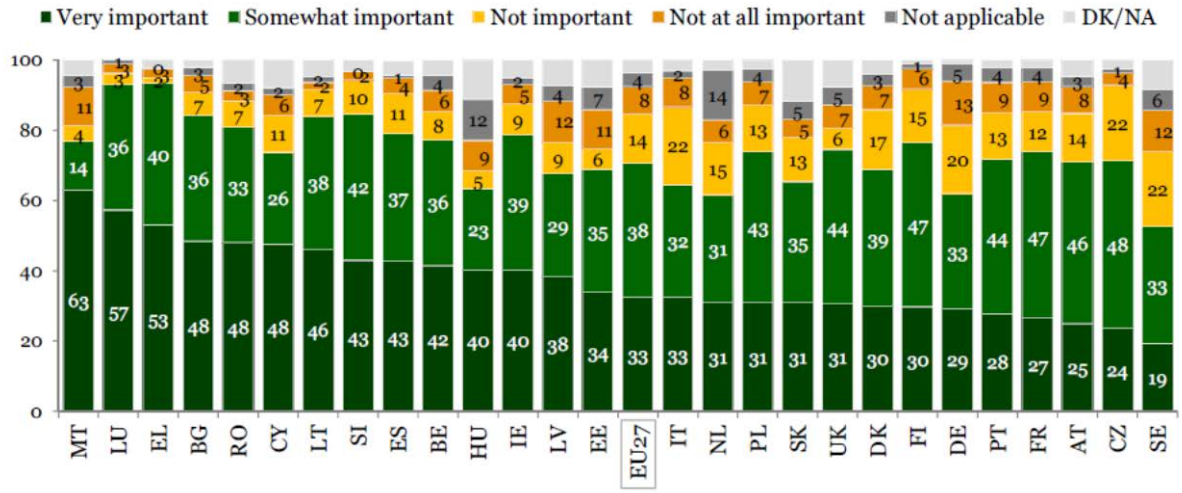
Within this section we try to examine the weak version of the Porter hypothesis by comparing environmental policy measures with the eco-innovation level on the country and time basis. Firstly it is crucial to touch upon the report of the European Comission on "Attitudes of European entrepreneurs towards eco-innovation" (2011). The report based on the Flash Eurobarometer survey to investigate the behaviour, attitudes and expectations of entrepreneurs towards the development and uptake of eco-innovation as a response to rising prices of resources and resource scarcity. Within the context of the survey a total of 5,222 managers of small and mediumsized companies were interviewed. Among four main topics of the report, drivers for an accelerated uptake of eco-innovation was related our point of view here. The report states that existing regulations and standards with expected future regulations and imposing new standards are highly effective on the eco-innovation investments.

Figure 2: Drivers that could Accelerate Eco-innovation Uptake and Development: Existing Regulations, Including Standards



Source: European Commission, "Attitudes of European entrepreneurs towards eco-innovation: Analytical Report", p.47

Figure 3: Drivers that could Accelerate Eco-innovation Uptake and Development: Expected Future Regulations Imposing New Standards

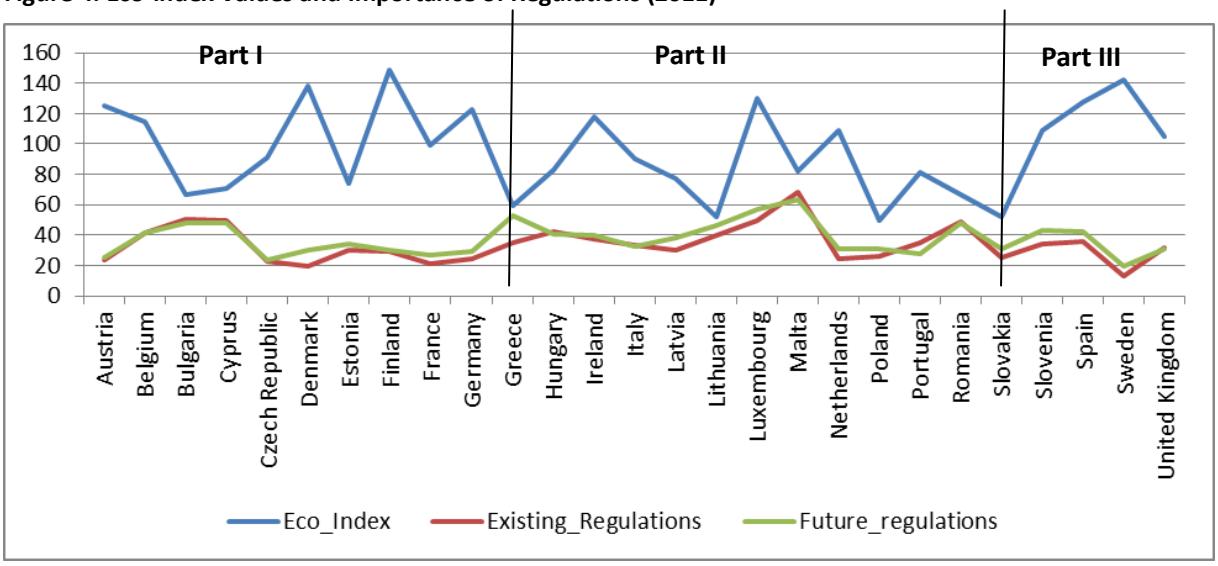


Source: European Commission, "Attitudes of European entrepreneurs towards eco-innovation: Analytical Report", p.48

As it can be seen from the figures 70% of the European entrepreneurs found important the environmental regulations for the eco-innovation. However, when we compare these results with eco-innovation index scores of the countries in the same year the expected correlation is not valid for all countries.

Eco-index is calculated by the eco-innovation observatory of the European Commission and it is the first tool to assess and illustrate eco-innovation performance across the EU Member States. The index aims at capturing the different aspects of eco-innovation by applying 16 indicators grouped into five thematic areas: eco-innovation inputs, eco-innovation activities, eco-innovation outputs, resource efficiency and socio-economic outcomes. Figure 4 represents the eco-index values and survey results about regulations together.

Figure 4: Eco-index Values and Importance of Regulations (2011)

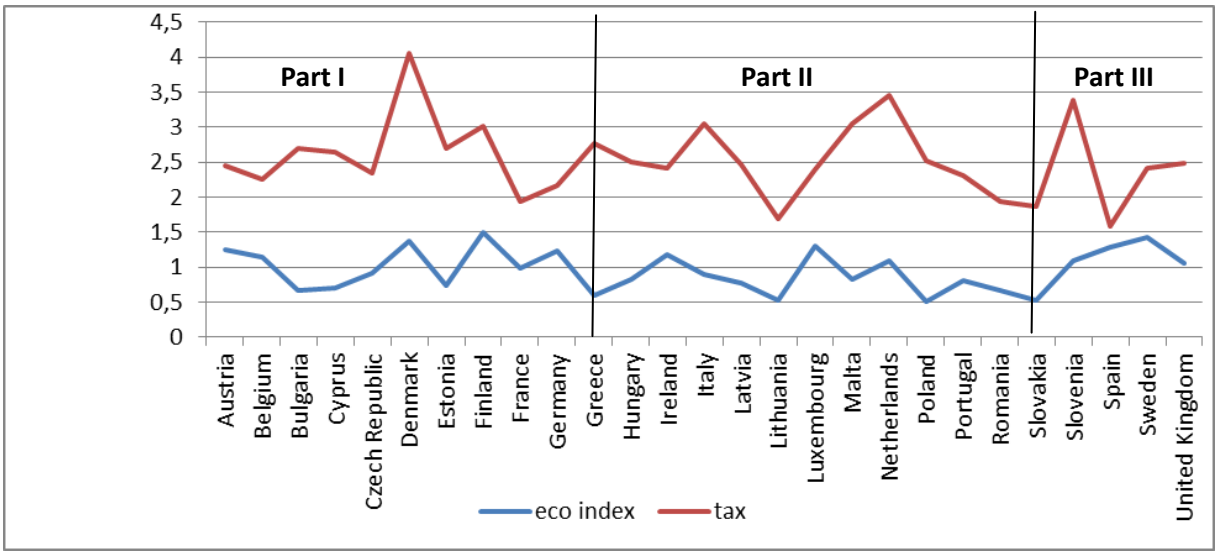


Data Source: Eco-Innovation Observatory Database (http://www.eco-innovation.eu/)

In Figure 4 it can be seen the heterogeneous structure of the countries. For part I and part III we see the negative relationship between the eco-index score and the importance of the regulations stated by the entrepreneurs. However, in part II the expected positive relationship is observed. The reason behind this heterogeneity may be sourced from the difference in current environmental regulation levels of the countries.

When we analyse the total environmental taxes (as percentage of GDP) and eco-index score, in Figure 5, we see the similar result which supports our point of view.

Figure 5: Eco-index Values and Total Environmental Taxes as % of GDP (2011)



Data Source: Eco-Innovation Observatory Database (http://www.eco-innovation.eu/) and Eurostat (http://ec.europa.eu/eurostat)

4. CONCLUDING REMARKS

As a result of increasing industrialization and consumption society how to clean the planet we have polluted or at least how to "optimize" pollution is a topic dealt by various disciplines. The environmental engineers deal with the technical aspects of the topic, the economists by having the consciousness that the source of the question is economics itself, tries to look from the window of economic theory and try to find solution proposals. These proposals can annihilate the results of the question or by focusing on the source of the question aimed at intervention.

In this study by observing what the factors inducing firms to produce eco-friendly products are we have tried to focus on how to intervene for the source of the problem. Among the observed variables we have realized that the environmental policy's effect is in the foreground. Environmental policies applied to minimize or abolish environmental problems creates a two way effect: The pollutant firms are face to face with a new maximization problem taking into consideration environmental policy and they determine their production levels. This situation is the internalization of external cost of polluting the environment. The indirect effect of environmental policy which is also subject to our study, for the firms to get rid of environmental policy liabilities or reduce its effects they have to promote to make eco-innovation.

Likewise as it is held within the scope of our study, the literature survey and empirical studies demonstrate that tightening environmental policy supports eco-innovation partially. In this context, we can say that there is a consensus among firms to avoid increasing compliance costs of environmental policies to tend towards eco-friendly technologies. Conversely the efforts in the subject, whether would increase the firm's performance more clearly. The influence eco-innovation has on the profitability of a firm has to be examined further.

REFERENCES

Baumol, W. J., (2002); The Free Market Innovation Machine – Analyzing the Growth Miracle of Capitalism, Princeton University Press, New Jersey.

Beise, M. and Rennings, K., (2004); "Lead Markets and Regulation: A Framework for Analyzing the International Diffusion of Environmental Innovations", Ecological Economics, Volume 52 (1), pp. 5-17.

Biglaiser, G. and Horowitz, J. K., (1995); "Pollution Regulation and Incentives for Pollution-Control Research", Journal of Economics and Management Strategy, Volume 3 (4), pp. 663-684.

Brunnrmeier, S. B. and Cohen M. A. (2003); "Determinants of Environmental Innovation in US Manufacturing Industries", Journal of Environmental Economics and Management, Volume 45, pp. 278-293.

De Vries, F. P. and Withagen, C., (2005); "Innovation and Environmental Stringency: The Case of Sulphur Dioxide Abatement", University of Tilburg Discussion Paper, No: 18, pp. 1- 33.

Downing, P. B. and White, L. J., (1986); "Innovation in Pollution Control", Journal of Environmental Economics and Management, Volume 8, pp. 225-271.

European Commission, (2011) "Attitudes of European entrepreneurs towards eco-innovation: Analytical Report" (online at http://ec.europa.eu/public_opinion/flash/fl_315_en.pdf 07/03/2016)

Faber, A. and Frenken, K., (2009); "Models in Evolutionary Economics and Environmental Policy: Towards an Evolutionary Environmental Economics", Technological Forecasting and Social Change, Volume 76(4), pp. 462-470.

Gatersleben,B. – Steg, L. and Vlek, C., (2002); "Measurement and Determinants of Environmentally Significant Consumer Behavior", Environment and Behavior, Volume 34 (3), pp. 335-362.

Geroski, P.A., (1990); "Innovation, Technological Opportunity, and Market Structure", Oxford Economic Papers, Volume 42 (3), pp. 586-602.

Horbach, J., (2008); "Determinants of Environmental Innovation – New Evidence from German Panel Data Sources", Research Policy, Volume 37, pp. 163-173.

Jaffe, A. and Palmer, K., (1997); "Environmental Regulation and Innovation: A Panel Study", The Review of Economics and Statistics, Volume 10, pp. 610-619.

Jaffe, A. – Newell, R. G. and Stavins, R. N., (2002); "Environmental Policy and Technological Change", Environmental and Resource Economics, Volume 22 (1-2), pp. 41-69.

Lanoie, P., Laurent-Lucchetti, J., Johnstone, N. and Ambec, S. (2011); "Environmental Policy, Innovation and Performance: New Insights on the Porter Hypothesis", Journal of Economics & Management Strategy, Volume 20(3), pp. 803-842

Mainieri, T. – Barnett, E. G. – Valdero, T. R. – Unipan, J. B. and Oskamp, S., (1997); "Green Buying: The Influence of Environmental Concern on Consumer Behavior", The Journal of Social Psychology, Volume 137 (2), pp. 189-204.

Milliman, S. R. and Prince, R., (1989); "Firm Incentives to Promote Technological Change in Pollution Control", Journal of Environmental Economics and Management, Volume 17, pp. 247-265.

Montenero, J. P., (2002); "Permits, Standards, and Technology Innovation", Journal of Environmental Economics and Management, Volume 44, pp. 23-44.

Oates, W. E. – Palmer, K. and Portney, P. R., (1993); "Environmental Regulation and International Competitiveness: Thinking about the Porter Hypothesis", RFF Discussion Paper, 94-02.

Porter, M. E. and van der Linde, C., (1995); "Toward a New Conception of the Environment-Competitiveness Relationship", Journal of Economic Perspectives, Volume 9 (4), pp. 97-118.

Rennings, K., (2000); "Redefining Innovation - Eco-innovation Research and the Contribution from Ecological Economics", Ecological Economics, Volume 32 (2), pp. 319-332.

Scherer, F. M., (1967); "Market Structure and the Employment of Scientists and Engineers", American Economic Review, Volume 57, pp. 524-531.

Young, W. – Hwang, K. – McDonald, S. ve Oates C. J., (2010); "Sustainable Consumption: Green Consumer Behaviour When Purchasing Products", Sustainable Development, Volume 18, pp. 20-31.