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Foreign direct investment inflows on tax revenues in the transition economies of european union

Hakki Odabas*, Department of Public Finance, Usak University, İzmir Yolu 8.Km 1.Eylül Kampüsü, 64200 Usak, Turkey.

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Abstract

There have been significant increases in the flows of foreign direct investment inflows in the world together with the globalization process as of 1980s. In this regard, this study examines the impact of foreign direct investment inflows on the tax revenues in the selected transition economies of the European Union including Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia and Slovenia during the period 1996-2012 by using Dumitrescu and Hurlin (2012) causality test. We found that there was unidirectional causality from foreign direct investment net inflows to the tax revenues, and also there was unidirectional causality from foreign direct investment net inflows to the economic growth.

Keywords: Tax revenues, foreign direct investment inflows, economic growth, panel data analysis

* ADDRESS FOR CORRESPONDENCE: **Hakki Odabas,** Department of Public Finance, Usak University, İzmir Yolu 8.Km 1.Eylül Kampüsü, 64200 Usak, Turkey. *E-mail address*: hakki.odabas@usak.edu.tr / Tel.: +90-276-221-2121

1. Introduction

Global foreign direct investment (FDI) inflows covaried with the globalization and experienced significant increases and reached to 1,911 billions of US dollars in 2007, then contracted to the 1,171 billions of US dollars in 2007 due to successive crises in the global economy such as Global financial crisis and Eurozone sovereign debt crisis (UNCTAD, 2015). However transitional economies of the European Union (EU) belatedly began to attract FDI inflows as of mid 1990s due to their centrally planned and closed economies (World Bank, 2015a).

The empirical studies on the relationship between FDI inflows and economic growth have found that FDI inflows generally have affected economic growth positively (See Anwar and Nguyen (2010), Tiwari and Mutascu (2011), Lean and Tan (2011) and Soumia and Abderrezzak (2013)). Therefore the net increase in domestic income is prosperousness for the governments by taxation of wages and profits of foreign-owned companies, and possibly other taxes on business (e.g. property tax). Also FDI inflows may positively affect domestic income via spillover effects such as the introduction of new technologies and the increasing human capital (OECD, 2008). So, FDI inflows may have potential to affect positively the tax revenue in a country.

This study examines the impact of economic growth and net FDI inflows on the tax revenue in the transition economies of the EU during the period 1996-2012 by Dumitrescu and Hurlin (2012) causality test. The rest of the study is organized as follows. The next section overviews the existing literature on the relationship between tax revenue and FDI net inflows. Section 3 introduces the data, method, empirical application and major findings of the study and the study is over with the conclusion and policy implications.

2. Literature Review

The extensive empirical studies have been conducted on the impact of FDI flows on the various economic indicators including economic growth, employment, export and import volume etc. as a consequence of growing FDI flows in the world (See. Popescu (2014),Ugurlu and Bayar (2014), Jang-Pyo (2013), El-Wassal (2012)). However, relatively few studies have been made on the impact of FDI inflows on the tax revenue. These few studies generally have found that FDI inflows had positive impact on the tax revenue (see Gropp and Kostial (2000), Sarisoy and Koc (2010), Mahmood and Chaudhary (2013), Okey (2013)).

In one of these studies, Gropp and Kostial (2000) used the panel data of nineteen OECD countries to find relationship between FDI and tax revenue. They found a weak correlation between FDI and corporate income tax and found a strong positive impact of FDI inflows on the profit tax and on the total tax revenue. On the other hand Sarisoy and Koc (2010) investigated the impact of FDI inflows on the corporate tax revenue in 21 OECD countries during the period 1981 and 2008 and found that FDI inflows had positive impact on the corporate tax revenue.

Mahmood and Chaudhary (2013) examined the effect of FDI inflows on the tax revenue in Pakistan during the period 1972-2010 by using Auto-Regressive Distributive Lag (ARDL) and found that FDI inflows FDI inflows had positive impact on the tax revenue. In another study, Okey (2013) investigated the impact of FDI on the tax revenue in 8 West African countries during the period 1989-2009 by using panel data analysis and found that FDI had positive impact on the tax revenue. On the other hand Bunescu and Comaniciu (2014) examined the bivariate correlation between tax revenues and causal factors in 27 EU member countries and found that there was a weak correlation between tax revenue and FDI inflows.

3. Data, Method and Empirical Application

We investigated the impact of FDI inflows on the tax revenues in the selected transition economies of the European Union including Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia and Slovenia during the period 1996-2012 by Dumitrescu and Hurlin (2012) causality test.

3.1. Data

We used the tax revenue as a % of GDP as proxy for tax revenue. We took net FDI inflows as % of GDP and real GDP per capita growth as independent variables. The data of tax revenue and net FDI inflows were obtained from World Bank (2015 a&b), while the data of real GDP per capita growth was obtained from IMF (2015). Our study period and sample were dictated by data availability. The variables used in the econometric analysis and their symbols were presented in Table 1.

Table 1. Variables used in the study

Variables	Symbol
Tax revenue as % of GDP	TREV
Net FDI inflows as % of GDP	FDI
Real GDP per capita growth	PRGDPGR

E-views 8.0 and STATA 14.0 software packages were used for the analysis in the study.

3.2. Econometric Methodology and Application

We firstly tested the cross-sectional dependence among the cross-sectional units by Lagrange multiplier (LM) test of Breusch and Pagan (1980) because time dimension is higher than cross-section dimension, then conducted the stationarity by Cross-Sectionally Augmented Dickey-Fuller (CADF) unit root test of by Pesaran (2007). Finally we analyzed the causal relationship among economic growth, remittances and FDI inflows by Dumitrescu and Hurlin (2012) causality test.

3.2.1. Cross-Sectional Dependence Test

The existence of the cross-sectional dependence among the series is crucial for the determination of further econometric tests in our study. If we ignore to determine whether there is the cross-sectional dependence among the series, our findings can be biased and inconsistent (Breusch and Pagan, 1980). In this study because T=17 is larger than N=7, we used the LM test of Breusch and Pagan (1980). The null hypothesis of this test is cross-sectional independence, while the alternative hypothesis is that there is cross-sectional dependence.

We applied the LM test of Breusch and Pagan (1980) and the results were presented in Table 2. The results indicated that the null hypothesis was rejected and there was cross-sectional dependence among the cross-sectional units of the panel.

Table 2. The results of Breusch and Pagan (1980) LM test

Variables	Test statistics	Prob.
LM	61.283	0.0000

Source: Authors' own elaboration based on the results of Breusch and Pagan (1980) LM test.

3.2.2. Cross-Sectional Dependence Test

The first generation panel unit root tests assume that all the cross-sections are independent, while the second generation panel unit root test consider the cross-sectional dependence among the cross-sectional units of the panel (Hurlin, 2004). Because we found that there was cross-sectional dependence among the series, we used the CADF unit root test developed by Pesaran (2007), which was a second generation panel unit root test. In this test, Augmented Dickey Fuller (ADF) regression is improved by using cross-sectional averages of lagged levels and first differences of the series in the study. The individual CADF statistics are used for the calculation of CIPS (cross-sectional IPS (Im et al., 2003)). CIPS statistics is the average of all the calculated t values for each cross-sectional unit.

We tested the stationarity of the series in our study by CADF unit root test and found that PRGDPGR was I(0) and the other variables were I(1) as seen in Table 3.

Table 3. The results of Pesaran (2007) CADF Unit Root Test

Variables	Intercept only		Intercept + Trend	
	$p=0$	$p=1$	$p=0$	$p=1$
TREV	-1.870 (0.031)**	-0.473 (0.318)	-1.917 (0.028)**	-0.222 (0.412)
dTREV	-7.766(0.000)***	-2.747(0.003)***	-6.957 (0.000)***	-1.540 (0.062)*
FDI	-2.823 (0.002)***	-1.454 (0.073)	-1.288(0.099)*	0.045 (0.518)
dFDI	-8.398 (0.000)***	-4.591 (0.000)***	-7.547 (0.000)***	-3.827 (0.000)***
PRGDPGR	-2.599 (0.005)***	-2.761 (0.003)***	2.048 (0.020)**	-1.076 (0.141)
dPRGDPGR	-7.275(0.000)***	-3.907 (0.000)***	-6.295 (0.000)***	-3.212 (0.001)***

Source: Authors' own elaboration based on the results of Pesaran (2007) CADF unit root test

Notes:.(1)***, **, * denote significant at 1%, 5% and 10% level respectively

(2) The lag order, p, is selected by the AIC or BIC with the maximum order number being set to 3.

(3)The Pesaran (2007) test is performed by "multipurt" command written by Markus Eberhardt

3.2.3. Dumitrescu-Hurlin (2012) Causality Test

Dumitrescu and Hurlin (2012) causality test the causality by considering the cross-sectional dependence among the series and can be applied in case time dimension is larger than cross-sectional dimension and it also yields efficient results in unbalanced panel data sets (Dumitrescu and Hurlin, 2012). The casual relationship between Y and X is tested by the following model ((Dumitrescu and Hurlin, 2012)):

$$Y_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_i^k Y_{i,t-k} + \sum_{k=1}^{K} \beta_i^k X_{i,t-k} + \varepsilon_{i,t} \qquad (1)$$

If K denotes optimal lag length in the Equation (1). The null hypothesis of the test is that there is no causality from X to Y in all the cross-sectional units, while alternative hypothesis is that there is causality from X to Y in some cross-sectional units. Dumitrescu and Hurlin (2012) calculates individual Wald statistics $(W_{i,T})$ for each cross-sectional unit, then calculated the Wald statistics of the panel $(W_{N,T}^{HNC})$ by taking arithmetic average of the individual Wald statistics. Dumitrescu and Hurlin (2012) suggests the use of $Z_{N,T}^{HNC}$ test statistics with asymptotic distribution when T>N, and Z_{N}^{HNC} test statistics with semi-asymptotic distribution when T<N.

$$Z_{N,T}^{HNC} = \sqrt{\frac{N}{2K}}\left(W_{N,T}^{HNC} - K\right) \qquad (2)$$

$$Z_{N,T}^{HNC} = \frac{\sqrt{N}\left[W_{N,T}^{HNC} - N^{-1}\sum_{i=1}^{N} E\left(W_{i,T}\right)\right]}{\sqrt{N^{-1}\sum_{i=1}^{N} Var\left(W_{i,T}\right)}} \qquad (3)$$

Dumitrescu and Hurlin (2012) calculates the test statistics and their probabilities by using Monte Carlo simulation. In this study, we applied Dumitrescu and Hurlin (2012) causality test for 0, 1 and 2 lags and the results were presented in Table 4. We found that there was unidirectional causality from FDI inflows to the tax revenue and economic growth when lag was selected as 1. On the other hand there was unidirectional causality from FDI net inflows to the economic growth when lag was selected as 2 and 3.

Table 4. Results of Dumitrescu and Hurlin (2012) panel causality test

	K=1		
Null Hypothesis	W-Stat.	Zbar-Stat.	Prob
DFDI does not homogeneously cause PRGDPGR	**3.65605**	**3.26542**	**0.0011**
PRGDPGR does not homogeneously cause DFDI	0.86875	-0.44040	0.6596
DTREV does not homogeneously cause PRGDPGR	1.33279	0.17655	0.8599
PRGDPGR does not homogeneously cause DTREV	0.29633	-1.20147	0.2296
DTREV does not homogeneously cause DFDI	1.01479	-0.24624	0.8055
DFDI does not homogeneously cause DTREV	**3.36601**	**2.87979**	**0.0040**
	K=2		
Null Hypothesis	W-Stat.	Zbar-Stat.	Prob
DFDI does not homogeneously cause PRGDPGR	**12.1492**	**7.34519**	**2.E-13**
PRGDPGR does not homogeneously cause DFDI	2.20565	-0.28051	0.7791
DTREV does not homogeneously cause PRGDPGR	1.78489	-0.60320	0.5464
PRGDPGR does not homogeneously cause DTREV	1.49955	-0.82202	0.4111
DTREV does not homogeneously cause DFDI	2.61577	0.03400	0.9729
DFDI does not homogeneously cause DTREV	3.43187	0.65987	0.5093
	K=3		
Null Hypothesis	W-Stat.	Zbar-Stat.	Prob
DFDI does not homogeneously cause PRGDPGR	**12.8388**	**3.20961**	**0.0013**
PRGDPGR does not homogeneously cause DFDI	3.18375	-0.50662	0.6124
DTREV does not homogeneously cause PRGDPGR	4.05446	-0.17149	0.8638
PRGDPGR does not homogeneously cause DTREV	4.60737	0.04133	0.9670
DTREV does not homogeneously cause DFDI	4.00195	-0.19170	0.8480
DFDI does not homogeneously cause DTREV	4.54061	0.01563	0.9875

***,**,* denotes significant at 1%, 5% and 10% level respectively

Source: Authors' own elaboration based on the results of Dumitrescu and Hurlin (2012) panel causality est.

4. Conclusion

We examined the causality among net FDI inflows, economic growth and the tax revenue in the transition economies of the EU including Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia and Slovenia during the period 1996-2012 by Dumitrescu and Hurlin (2012) causality test. Firstly we applied cross-sectional dependence test and found that there was cross-sectional dependence among the series. Therefore we tested the stationarity of the series with a second generation panel unit root test, CADF unit root test developed by Pesaran (2007). Finally we applied the Dumitrescu and Hurlin

(2012) causality test to determine the causality among FDI net inflows, economic growth and tax revenue.

We found that there was unidirectional causality from FDI inflows to the tax revenue and economic growth when lag was selected as 1. On the other hand there was unidirectional causality from FDI net inflows to the economic growth when lag was selected as 2 and 3. Consequently we saw that FDI inflows boost both economic growth and tax revenue in the transition economies of the EU and the measures to attract the FDI inflows also improve the welfare of the country through creating tax revenue and economic growth.

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