Does Shadow Economy Matter for FDI: Long-run Evidence from OECD Countries

Cuneyt Koyuncu[1] **Eda Ozen**[2]

[1]Prof.Dr., Bilecik Seyh Edebali University , Economic and Administrative Sciences, Economy, cuneyt.koyuncu@bilecik.edu.tr, ORCID: 0000-0002-8638-2761

[2] Asst.Prof., Bilecik Seyh Edebali University , Economic and Administrative Sciences, Economy, eda.ozen@bilecik.edu.tr, ORCID: 0000-0002-0818-1040

Abstract: This study investigates the long-run impact of shadow economy on FDI. Our hypothesis claims that shadow economy has a negative effect on incoming FDI. In order to test this hypothesis we used PDOLS estimation method for the sample of 36 OECD countries and for the period of 1999 to 2013. By implementing panel unit root test and panel cointegration test, two series are checked for stationarity and cointegration. A cointegrating relationship between shadow economy and FDI is detected. As to the estimation results, shadow economy has a statistically significant negative long-run effect on FDI. This statistically significant negative association remains valid for both the entire panel in terms of group averages and sixteen individual countries. On the other hand we got statistically insignificant coefficients for fourteen countries and statistically significant coefficients with opposite signs for six countries out of 36 OECD countries.

Key Words: Shadow Economy, FDI, Cointegration, OECD Countries.

1.INTRODUCTION

The aim of economics to meet endless demands from scarce resources emphasizes the efficient use of resources. For this reason, with the increasing population, it is even more important to use resources effectively in the economy. For this reason, the shadow economy, which makes public resources inefficient, is a problem that needs to be tackled, even if it is difficult to measure. Even if it is difficult to measure, it is necessary to develop a policy by determining estimated values with various methods.

Even though shadow economy seems to be a subjective problem because its boundaries cannot be drawn, it has concrete effects on macroeconomic factors. The shadow economy creates a crack in the economy and affects the economy in all aspects. For this reason, it can be defined in many different ways and can be seen in all areas of the economy by constantly changing.

Many studies in the literature address the shadow economy and macroeconomic factors. Some selected studies from the literature are summarized below.

The shadow economy's relationship with the formal and informal economy has drawn attention to the relationship between the shadow economy and economic growth. Luong et al. (2020) discussed the relationship between the rule of law, economic growth and shadow economy in their study. Analyzes on transition economies display that the shadow economy has an increasingly negative impact on economic growth in economies with high corruption. In another empirical study on growth and the informal economy, it is stated that the informal economy has an increasing effect on the growth rate and positively affects growth in its formal and informal aspects (Ozen & Yalcinkaya Koyuncu, 2018). In another empirical study examining economic growth, estimation results indicate that increased corruption and a larger shadow economy lead to a decline in economic growth. It also displays that the shadow economy magnifies the impact of corruption on economic growth (Baklouti & Boujelbene, 2020).

One of the features of shadow economy is the inability to use documents. This feature makes it easier to avoid taxes on trading transactions and also from public scrutiny. In fact, avoiding tax payments is an important resource for the shadow economy. For this reason, there are empirical studies dealing with the tax burden and shadow economy in the literature (Unver & Yalcinkaya Koyuncu, (2019); Kutbay, (2020)).

In another study linking the size of the shadow economy with payment methods, the estimation results suggest that bank, credit card, and account ownership have a strong negative impact on the size of the shadow economy (Koyuncu & Ünal, (2019)).

Another empirical study in the literature studied the relationship between economic freedom and the size of the underground economy with data from 153 countries for the period 1999 and 2013. According to the results of the analysis, the

employment and economic freedom indicators are in a negative relationship with the size of the underground economy. It has also been concluded that general economic freedom and freedom to do business are the most effective freedom indicators on the underground economy (Yalcinkaya Koyuncu & Unal, (2019)). Berdiev et al. (2018) also examined the relationship between economic freedom and shadow economy. According to the results of the analysis conducted with more than 100 countries between 2000 and 2015, economic freedom reduces the spread of the shadow economy. Thus, they suggest that policies that support economic freedom should be implemented.

Some of the studies on shadow economy have been summarized above. Some of studies give detailed information about the development of the shadow economies while some of them provide its positive and negative aspects. Studies on FDI and the other variables in this study are summarized below.

Herzer and Nunnenkamp (2011) examines the relationship between FDI and income inequality for a sample of ten European countries for the 1980-2000 period. Their empirical analysis indicates that FDI has a positive short-term effect on income inequality in Europe, while the long-term effect of FDI on inequality is negative on average. In another study on FDI and wages, Panel VAR analysis was conducted on two separate samples, OECD and transition economies, to examine the relationship between FDI stocks entering host economies and average wage levels. The data used in the analysis covers the period between 1990 and 2017. The study reveals a positive relationship between FDI stocks entering the host economies and average wage levels (Koyuncu & Unal, 2020 (a)).

The relationship of freedoms with the FDI is also among the topics studied in the literature. Koyuncu and Unal (2020 (b)) examined the relationship between FDI and institutional structure with the panel analysis method. They investigate whether the host country's legal system and intellectual property rights have any effect on the behavior of FDI coming to Turkey for the 2001-2012 period. The result of the empirical analysis reveals that foreign direct investment coming to Turkey prefer countries with advanced legal structure and property rights. In another study, it is conducted a panel analysis with economies of transition to examine the impact of economic freedoms on FDI. As a result of empirical analysis, it was stated that FDI was affected by many economic freedoms, but it was not correct to generalize this result (Subasat & Bellos, 2011). In another study dealing with freedoms and FDI, it was examined whether there is a relationship between the institutional structure and FDI output for the period covering 1990-2011. For this reason, three institutional structure indicators (freedom of expression and press, freedom of religion, and the right to self-determination in elections) are included in the analysis. As a result of the analysis, it was found that there is a negative relationship between external FDI and the quality of the institutional structure (Unal & Yalcinkaya Koyuncu, 2020).

In another study examining the impact of country regulations and business environment on FDI, an empirical analysis was conducted by focusing on 189 countries. In this study, it is revealed that large companies want to invest more in countries where they can make strong contracts (Contractor & Dangol, 2020). In another study examining the hypothesis that FDI may prefer to enter countries with developed and widespread infrastructure networks, the relationship between infrastructure and FDI in transition economies is analyzed by using six different infrastructure indicators, unbalanced panel data, 25 countries, and the time period between 1990 and 2014. The obtained analysis results show that the infrastructure has a statistically significant positive effect on FDI entries and this result is valid for six different infrastructure indicators (Yalcinkaya Koyuncu and Unver, 2017).

Foreign direct investment is a multi-faceted macroeconomic variable that is not only affected economically. Apart from the economy, social and legal regulations, laws, welfare and trust levels in countries are among the factors that affect FDI. For this reason, the effects of terrorism, IQ levels, corruption, exchange rate and many other variables on FDI have been investigated in the literature (Majocchi & Presutti, 2009; Yalcinkaya Koyuncu, 2011; Nyarko et.al.2011; Koyuncu et.al., 2016; Beugelsdijk et. al., 2008; Yalcinkaya Koyuncu and Saritas, 2017).

In this study, the effect of the shadow economy on FDI is examined. The reason for this is that economies where the shadow economy is large, the rule of law is questioned, and corruption is increasing are not attractive to investors. For these reasons, FDI is expected to be adversely affected by the shadow economy. Thus, in line with this argument, we formed the research question of this study.

2.DATA AND METHODOLOGY

In this study we examine the long-run impact of shadow economy on FDI for 36 OECD countries for the period of 1999-2013. Since shadow economy flourishes and prevails in an environment where

institutions are weak and underdeveloped and corruption is widespread, investors may restrain from investing in such an economy and thus reduces FDI. As a result of this shadow economy may lead to a decrease in inward FDI. The size of shadow economy (SHADOW) is measured as percentage of GDP and covers the years between 1999 and 2013 for 36 OECD countries. The data on the size of shadow economy were gathered from the discussion paper of Hassan and Schneider (2016). FDI inflow stocks are measured as percentage of total world and were collected from UNCTADSTAT database.

In order to examine the long-run nexus between shadow economy and FDI we estimated the following panel regression model:

$$FDI_{it} = \beta_{0i} + \beta_{1i} SHADOW_{it} + \varepsilon_{it}$$

where ε_{it} represents the error term of the regression model, subscript *'i'* shows each of the OECD countries in the sample, and subscript *'t'* stands for the time period.

In this study, we firstly implement panel unit root test for SHADOW and FDI variables to find out whether they are stationary in levels or not. Given that each variable is integrated order one, we secondly conducted panel cointegration test by implementing Westerlund's (2005) test in which the test's null hypothesis claims no cointegration whereas the alternative hypothesis asserts that the series is cointegrated in all the panels. If a long-run association between SHADOW and FDI variables is identified then we proceed to estimate the long-run impact of shadow economy on FDI by utilizing Pedroni's Panel Dynamic OLS (PDOLS) estimation technique.

3. EMPIRICAL FINDINGS

Table 1 below displays panel unit root test result for SHADOW and FDI variables by estimating a model containing both individual effects and individual linear trends. The findings of panel unit root test reveals that SHADOW and FDI variables are not stationary in levels but they are stationary in first differences. In other words each of them is integrated order one (i.e., I(1)). Due to the fact that they are I(1) we are able to conduct panel cointegration analysis between two variables.

Table 1: Panel Unit Root Test

	Levels		1.st Difference	
Variable: FDI	Statistic	Prob.	Statistic	Prob.
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu Test	-2.7361	0.0031	-16.3944	0.0000
Breitung Test	1.16471	0.8779	-5.9745	0.0000
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin Test	1.21354	0.8875	-5.4857	0.0000
ADF - Fisher Test	59.9554	0.8436	152.900	0.0000
PP - Fisher Test	105.799	0.0058	304.978	0.0000
Variable: SHADOW	Statistic	Prob.	Statistic	Prob.
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu Test	-3.2379	0.0006	-5.5582	0.0000
Breitung Test	-3.4150	0.0003	-4.9644	0.0000
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin Test	-1.6648	0.0480	-2.7107	0.0034
ADF - Fisher Test	91.6560	0.0590	104.882	0.0069
PP - Fisher Test	64.7819	0.7146	225.547	0.0000

Given that SHADOW and FDI variables are I(1), we conducted Westerlund panel cointegration test to see if there is a long-run relationship between SHADOW and FDI variables. Table 2 below depicts the results of panel cointegration test and the finding discloses that SHADOW and FDI variables are cointegrated %1 significance level. Hence they move together in the long-run.

Table 2: Panel Cointegration Test

Ho: No cointegration	
Ha: All panels are cointegrated	
Test Statistic	P-value
4.9757	0.0000

Given that the two variables are cointegrated, long-run coefficients of SHADOW variable for each 36 OECD countries are estimated by using PDOLS technique. The estimation results are given in Table 3. The long-run coefficient of SHADOW variable for group mean is negative as expected and highly statistically significant at the 1 percent significance level. Regarding to estimation results for individual countries, we have fourteen statistically insignificant long-run coefficient estimations out of thirty six estimations, namely Australia, Austria, Switzerland, Estonia, Finland, Hungary, Lithuania, Luxembourg, Latvia, Mexico, Norway, Portugal, Slovak Republic, and Turkey. Meantime, in contrast to our expectation, we got opposite positive signs for six countries, namely Chile, Germany, France, Iceland, Japan, and Sweden. On the other hand we got expected negative long-run coefficient for SHADOW variable for sixteen countries (i.e., Belgium, Canada, Czech Republic, Denmark, Spain, United Kingdom, Greece, Ireland, Israel, Italy, Korea Rep., Netherlands, New Zealand, Poland, Slovenia, and United States). United States is the country possessing the highest significant negative impact of shadow economy on FDI whereas Slovenia is the country possessing the lowest significant negative impact of shadow economy on FDI.

As a result, a strongly statistically significant negative long-run effect of shadow economy on FDI was found for both the entire panel (i.e., group average coefficient) and sixteen individual countries. This finding supports the deteriorating impact of shadow economy on FDI in the long-run.

Table 3: Long-run Coefficient Estimates

Country	Coefficient	t-statistic	Country	Coefficient	t-statistic
Australia	-0.8197	-0.8969	Israel	-0.0186	-15.04***
Austria	-0.3303	-1.271	Italy	-0.0880	-3.163***
Belgium	-0.5456	-4.063****	Japan	0.0760	3.972***
Canada	-0.5306	-1.647*	Korea, Rep.	-0.0291	-2.418**
Switzerland	-1.2090	-1.609	Lithuania	-0.0005	-0.194
Chile	0.1046	5.019***	Luxembourg	-0.0563	-0.424
Czech Republic	-0.1299	-5.844***	Latvia	0.0015	0.489
Germany	0.9546	2.162**	Mexico	-0.0494	-1.220
Denmark	-0.1598	-2.822***	Netherlands	-0.6325	-5.906***
Spain	-0.0591	-5.465***	Norway	-0.1247	-0.874
Estonia	-0.0010	-0.710	New Zealand	-0.0399	-4.206 ***
Finland	-0.0244	-1.216	Poland	-0.0345	-3.153 ***
France	1.0160	8.172***	Portugal	-0.0213	-0.559
United Kingdom	-0.3395	-1.988**	Slovak Republic	0.0106	0.873
Greece	-0.0098	-1.683*	Slovenia	-0.0057	-2.206**
Hungary	0.0426	1.538	Sweden	0.4898	2.918***
Ireland	-0.2863	-6.314***	Turkey	0.0529	1.174
Iceland	0.0559	3.604 ***	United States	-12.6400	-4.745***
Group Mean:	-0.4272	-8.285***			

***, **, * indicate statistical significance at %1;%5, and %10 significance levels respectively.

CONCLUSION

This study analyzes the long-run nexus between shadow economy and FDI by using PDOLS estimation method for the sample of 36 OECD countries and for the period of 1999 to 2013. Firstly panel unit root test was conducted and after identifying the stationarity of each variable in first differences we implemented panel cointegration test to see if both variables move together in the long-run. Given the existence of cointegrating association between SHADOW and FDI variables, long-run coefficients were obtained. According to the estimation findings, there is a statistically significant negative long-run impact of shadow

economy on FDI. This statistically significant negative association keeps its validity for both the entire panel and sixteen individual countries. Based on this finding we may assert that increases in the size of shadow economy lowers FDI levels. For policy implication, it may be suggested that countries aiming at accumulating more FDI should follow policies and take measures controlling and reducing size of shadow economy. Meanwhile we got statistically insignificant coefficients for fourteen countries and statistically significant coefficients with opposite signs for six countries.

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