EKONOMİK ÖZGÜRLÜĞÜN YERALTI EKONOMİSİ ÜZERİNDEKİ ETKİSİ: PANEL ANALİZ

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ÖZET

Bu çalışma, ekonomik özgürlük ve yeraltı ekonomisinin büyüklüğü arasındaki ilişkiyi 153 ülke verisini 1999 ve 2013 yılları arasındaki periyodu göz önünde bulundurarak incelemeyi amaçlamaktadır. Bu sebeple, Hausman test sonuçlarına dayanarak sabit etkiler (FEM) ve rassal etkiler modellerinden (REM) faydalanılmıştır. İstihdam ve ekonomik özgürlük göstergeleri yeraltı ekonomisinin büyüklüğü ile negatif ilişki içerisindedir. Diğer yandan, vergi yükü ve istihdam, yeraltı ekonomisinin boyutu üzerinde pozitif etkiye sahiptir. Genel ekonomik özgürlük ve iş yapma özgürlüğü, yeraltı ekonomisi üzerindeki en etkili özgürlük göstergeleridir. Ancak en az etkili olanı yatırım yapma özgürlüğü olarak tespit edilmiştir.

Anahtar Kelimeler: Yeraltı Ekonomisi, Ekonomik Özgürlük, Rassal Etkiler Modeli, Sabit Etkiler Modeli, Panel Veri

THE IMPACT OF ECONOMIC FREEDOM ON THE SHADOW ECONOMY: PANEL ANALYSIS

ABSTRACT

This study aims to find the relationship between economic freedom and the size of the shadow economy in 153 countries for the period between 1999 and 2013. Panel fixed effects (FEM) and panel random effects models (REM) are utilized based on the Hausman test results. Employment and economic freedom indicators are found to be in negative association with the size of the shadow economy. On the other hand, tax burden and employment positively affect the size of the shadow economy. The most effective freedom indicators on the shadow economy are overall economic freedom and business freedom, but the least effective is investment freedom.

Keywords: Shadow Economy, Economic Freedom, Random Effects Model, Fixed Effects Model, Panel Data

1. INTRODUCTION

Shadow economy concept has been getting attention due to its mysterious characteristics. It is hard to detect its existence and exact magnitude in an economy because most of the activities related to shadow economy are not declared voluntarily. So, this secrecy creates a

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compulsion for researchers to explore the boundaries of the shadow economy. However, different tax authorities have different methods to measure the size of the shadow economy. They have different fiscal systems and taxation policies are not alike. Owing to this reason, the reasons pushing economic actors towards the informal side of the economy may be nonidentical as well. Economic freedom, on the other hand, is supposed to be a common factor representing similar relationship in different economies. This study is an attempt to find the effect of economic freedom on the size of the shadow economy. For this aim, fixed effects and random effects models are put into use in the analyses.

Defining the shadow economy is a controversial issue. There is no consensus even on the name of the concept. However, informal sector, informal economy, gray economy, shadow economy, or underground economy can be used as synonyms with little differences. To put it simply, these names are the exact opposites of the formal economy. So, it is supposed to be penalized by the authorities in general. Or, it can be defined as the "sector that does not contribute to the national tax revenue and the economy" (Edelbacher et al., 2016, p.1) in economic terms. Some defines the concept very simply as "the difference between actual individual and corporate income and reported income levels" (Baker, 2016, p. 183).

Schneider et al. (2010) search for the size of the shadow economy in different country samples for the period between 1999 to 2006 and 2007. It differs from 37.6% of the GDP in Sub-Saharan Africa to 13.4% of the GDP in high income OECD countries (Schneider et al., 2010, p. 457). However, tax burden, regulations, and the quality of the goods and services provided by the state are the unchanging driving forces of the shadow economy in all the country groups. That is, structure of the taxation system and regulation are the most effective factors on the formation of the shadow economy.

Not only defining the concept, but also detecting is a problem as well. No researcher can force a participant of a questionnaire to honestly answer a question looking for the participation in an illegal activity in a certain time period. That is why illegal activities of organized crime or drug-trafficking, unrecorded employment or any other form of economic crime are not included in the shadow economy (Schneider & Enste, 2013, p. 15). Hence, underground/shadow economy is composed of goods and services that should be counted in the national product but are not included in the national product (Schneider & Enste, 2013, p. 9).

Although the measurement methods for the size of the shadow economy are not same in any two economies due to the difference in the measurement of the causal factors leading shadow economy, factors causing economic freedom seems to be common in different economies. Yet, the level of economic freedom or the subcomponents of the economic freedom are not necessarily similar in any two nonidentical countries. That is so because institutional quality, implementation of law, size of the government, regulations in the markets, and functioning of the open markets can be counted just a few of the many determinants of the economic freedom. Any change in the levels of these determinants can also have influence on the size of the shadow economy. Not only the shadow economy, but also tax morale is affected by the level of economic freedom. So, economic freedom may cause a structural change in the tax system by this way.

In his study seeking for the relationship between tax compliance and selected determinants of tax morale, Riahi-Belkaoui (2004) bases the research on the data from 30 countries. He finds ample evidence of a negative relationship between tax compliance and the level of economic freedom across the sample of countries. In his study searching for the effects of fiscal freedom, government effectiveness and human development on tax evasion in European Union economies, Dronca (2016) shows that increasing fiscal freedom which is thought to be the same thing as reducing the tax burden causes a decline in the tax evasion.

And, increasing government effectiveness results in reduction in the tax evasion as well. That is so because both fiscal freedom and government effectiveness support tax compliance. Tax system is regarded as the application area of the state's sovereignty by collection, allocation and redistribution of the sources. So, deterioration in the tax compliance of the taxpayers indicate ineffectiveness of the government in return. In his study deeply investigating the behavior of the Portuguese shadow economy for the period between 1977 to 2004, Dell'Anno (2007) finds that effective tax auditing and uncomplicated tax system creates loyalty to state mechanism and improves tax morale.

Likewise, Belasen and Hafer (2012) claims that any improvement in the economic freedom results in increase in the well-being of people. Carrying out their research on 50 states of the U.S., they also find that this relationship between well-being of inhabitants and the economic freedom within the state differ across regions significantly depending on the government's role in the economy. So, there remains no need to be an active participant of the informal sector for an inhabitant if the economic freedom is high and well-being is at a satisfactory level. Therefore, as an intuitive deduction based on the study conducted by Belasen and Hafer, economic freedom decreases the size of the shadow economy.

Clark and Lawson (2008) point out another aspect of the relationship. They show that private property rights, sound money, trade openness, and government size, which are the items analyzed to compute the level of economic freedom, have a strong correlation with the increasing income equality. They also assert that progressive income taxation can be a desired strategy to some degree, but economic intervention is not consistent with the goals of improvement in income equality. Considering that income inequality may be a catalyzer of having an interest in the shadow economy, economic freedom may move individuals away from the shadow economy.

In addition to economic freedom, institutional quality is an effective factor on the development of the shadow economy. Goel and Nelson's (2005) empirical findings indicate that countries with small black markets are potentially less corrupt. Moreover, economic freedom, rather than political freedom, is a dissuasive factor on the corruption. Hence, they conclude that when economic controls are loosened, corruption reduction is highly likely to be achieved. However, there is a fine line between chaos and order. For, as Graeff and Mehlkop (2003) assert economic freedom is not necessarily a service provided by the government consciously. It might emerge because of the inability of the state to enforce the law. So, ineffectiveness of the sate on the enforcement of law and rules might be the reason of the greater economic freedom (Bratton, 1989). A weak state at least in the market regulation would give signal to the taxpayers to engage in the informal sector. If the state has no authority, then there is no reason to finance it because it cannot provide any effective protection or social security to taxpayers. So, it is meaningless to declare any economic activity to the state officials. Simonović and Bošković (2015) emphasizes that weak enforcement of laws and bad functioning of institutions might be the reasons of the shadow economy in the first place. In the study they examine the relationship between politics, shadow economy, corruption and organized crime in the Western Balkans, they insist on that the shadow economy is a reaction to powerless authority. Government's and state's inability to efficiently enforce the legal legislation pushes the shadow economy and favors organized crime, such as corruption and fraud (Simonović & Bošković, 2015, p. 113-14).

Torgler and Schneider (2009) draw attention to the importance of human touch and the societal institutions on the power of the shadow economy. For them, high level of institutional quality is the key factor enhancing individuals' ability to express preferences, their engagement into political decision-making processes. This creates a collective consciousness among citizens

to stay in the formal side of the economy. Indeed, the institutional quality provides the effective functioning of the state and the legal system because it creates a pressure on the government to be accountable and to take responsibility of its actions. Hence, taxpayers comprehend that the taxes collected by the authorities are not spend recklessly. This in return creates a trust to the formal sector and decreases the tendency to be participant in the shadow economy. On the other hand, an increase in the size of the shadow economy degenerates the institutional character. To avoid from getting caught, bribery becomes the primary tool of the economic agents in the shadow economy (Buehn and Schneider, 2009). So, while corruption feeds shadow economy, shadow economy feeds the corruption as well. Then, the relationship turns into a vicious circle in which the initiator of the process cannot be detectable.

In the study investigating the effects of economic freedom with five subcomponents on the shadow economy, Berdiev et al. (2018) find that increase in economic freedom decreases the size of the shadow economy. Because the most desired feature of the shadow economy is the autonomy and freedom it provides, enhanced economic freedom in the formal part of the economy causes this attraction to lose power. However, freedom from regulation is the most effective aspect of the economic freedom on the development of the shadow economy. It is an expected finding because regulation in the official economy is one of the most important causes of the shadow economy (Schneider and Enste: 2000). Especially labor market regulations in the formal sector creates a pressure on the shadow economy to increase. Enste (2010a, 2010b) claims that decreasing intensity of the regulations creates new potentials of working, investment and innovation in the formal sector. Thus, official economy becomes more attractive than the underground economy.

Regulatory efficacy of the institutions and fully and efficiently operating open market guarantee the deep-seated establishment of economic freedom in a society. Any advancement in these means secures the advancement in economic freedom which assures the strengthened economic prosperity in return. On the other hand, any restraint on the economic freedom to engage in exchange activities, business and trade has potential results such as the enlargement of the illegal sector in an economy. Government intervention beyond tenable limits might obligate economic agents, whether individuals or institutions, to be allured by tax free paradise, shadow economy. Intervention itself could be perceived as a constraint on the economic freedom.

The rest of the study is structured as follows. The second part is reserved for the details of the data and the methodology conducted for the analyses. The third part is designed for the summary of the empirical findings while part 5 concludes the study.

2. DATA AND THE METHODOLOGY

2.1. Data

Hassan and Schneider (2016) creates a panel data set for the size of the shadow economy in 157 countries from 1999 to 2013. They use a MIMIC model strategy in which high tax burden and regulations, unemployment and self-employment are causal variables determined as the driving forces of the shadow economy. Average of the size of the shadow economies as percentage of the official GDP from 1999 to 2013 is found to be 33.8%. Yet, the largest shadow economies are in South America and Africa. OECD countries have the lowest on the other hand (Hassan & Schneider, 2016, p. 19). As the sizes differ, the effect of the causal factors on the size of the shadow economy differs based on the economies' characteristics.

Heritage foundation (2019a) produces an index of economic freedom composed of four main fields which are rule of law, government size, regulatory efficiency, and market openness.

All four aspects of the economic freedom are related to the size of the shadow economy. However, regulatory efficiency and open markets are expected to be most related two categories with the size of the shadow economy. While regulatory efficiency is composed of business freedom, labor freedom, and monetary freedom, open markets category is composed of trade freedom, investment freedom and financial freedom (The Heritage Foundation, 2019a).

The score for the business freedom is formed considering factors related to the life-cycle of a business. That is, how easy to start a business, functioning and the closing of a business are taken into account. How much procedure, time, and money cost to start, operate and close a business are counted under this title. For the labor freedom aspect, legislation on the regulation of the labor market in an economy is considered. Minimum wage policies, working hours, labor force participation rates, and laws organizing the labor market are a few of the items listed under labor freedom. Monetary freedom is found on the two related factors which are inflation rate and price controls. Inflation and price control are taken as negative factors on the free market mechanism. Simply, monetary freedom is the reverse of inflation and price control (Miller et al., 2019, s. 462-464).

The first subcomponent of the open market category is trade freedom. There are two factors listed in the trade freedom. These are tariff and non-tariff barriers affecting balance of trade. Investment restrictions, on the other hand, are assessed as barriers on the investment freedom. Whether in or outflow of the investment capital must be free for an economy to have hundred percent investment freedom. State intervention in the finance sector and government's role on the financial services, and capital are evaluated in the formation of the financial freedom index. Moreover, development level of the financial and capital markets, and the place of foreigners are taken into account as well. Minimal government intervention in the banking sector, equality between domestic and foreign agents in the financial and capital market competition are the deserved features for financial freedom (Miller et al., 2019, s. 464-468).

In this study, overall score of economic freedom, business freedom, labor freedom, monetary freedom, trade freedom, investment freedom and financial freedom are put into use as the indicators of freedom. All the freedom indicators are retrieved from 2019 Index of Economic Freedom database of the Heritage Foundation (2019b).

As control variables, employment, inflation, and tax burden are utilized. As an indicator of employment, employment to population ratio is used. It is the proportion of the population that is employed in an economy. Population at age 15 and older are considered as the working-age population (World Bank, 2019a). ILO estimates are preferred to national estimates because there are measurement differences between the statistical institutions of different countries. As an indicator of the inflation and the second control variable, GDP deflator is utilized, and the base year varies by country. Data for the employment to population ratio, and GDP deflator are retrieved from the World Development Indicators database of the World Bank (2019b). Although it is one of the subcomponents of the economic freedom index of the Heritage Foundation, tax burden is utilized as the third control variable of the study. That is so because, tax burden is supposed to push economic agents towards black side of the economy. It is a measure counting for personal and corporate marginal income tax rates, and the total tax burden as of percentage of the GDP (Miller et al., 2019, p. 459).

2.2. Methodology

Model specification is determined based on the results of the Hausman test. Yet, before starting the analyses, the series used in the models have to be stationary, no matter what the integration orders are. There are two basic model specifications utilized in the study. The first

is fixed effects model and the second is the random effects model. Following multivariate models are estimated;

$$LOGSHADOW_{it} = (\alpha + \tau_t) + \beta_1 LOGFREEDOM_{it} + \beta_2 \Delta logEMPLOYMENT_{it} + \beta_3 logTAX_{it} + \beta_4 logINFLATION_{it} + u_{it} \quad \text{(FEM)}$$

$$LOGSHADOW_{it} = \alpha + \beta_1 LOGFREEDOM_{it} + \beta_2 \Delta logEMPLOYMENT_{it} + \beta_3 logTAX_{it} + \beta_4 logINFLATION_{it} + (\tau_t + u_{it}) \quad \text{(REM)}$$

where subscript it is for the observation value of the i-th country at time t for the particular variable. α is the intercept term and τ_t is for the time-specific effects which affect all countries in the same way. That is, it is variable across time but not across the countries. u_{it} stands for the idiosyncratic error term of the model. LOGFREEDOM is for the logarithmic value of: overall economic freedom; business freedom, labor freedom, monetary freedom, trade freedom, financial freedom, and investment freedom. LOGEMPLOYMENT, LOGTAX, and LOGINFLATION are the control variables standing for log of the employment, tax burden, and inflation respectively.

The size of the shadow economy is expected to increase as the tax burden increases. A negative relationship is expected between the employment and the size of the shadow economy. The increase in inflation used in the model representing economic and political uncertainty is expected to expand the shadow economy. A negative relationship between the size of the shadow economy and the economic freedom is the main expectance of the study. All the subcomponents of the economic freedom are anticipated to have similar relationships with the shadow economy. But overall economic freedom index is multifaceted compared to subcomponents because it includes information of all the components. So, the relationship between the overall economic freedom and the shadow economy is overarching in terms of explanatory purposes.

3. EMPIRICAL FINDINGS

Unit root tests are conducted to determine if the series are stationary. To avoid spurious regression problem, stationary series have to be utilized because a spurious regression is the one in which series utilized are non-stationary and independent. For this aim, both common unit root and individual unit root processes are tested. As seen from Table 1, all series are stationary except logEMPLOYMENT. However, after taking the first difference of logEMPLOYMENT, series turns to be stationary because the null hypothesis stating that there exists unit root is rejected. Thus, all the series are I(0). But, logEMPLOYMENT is I(1).

Table 1: Panel Unit Root Tests

	Null: Unit root	**Null: Unit root**

	(Common unit root process)	(Individual unit root process)
Series	**Levin, Lin & Chu t* statistic**	**PP-Fisher Chi-square statistic**
logSHADOW	-6.156***	425.003***
logEMPLOYMENT	3.997	315.967
ΔlogEMPLOYMENT	-22.880***	1565.45***
logTAX	-16.836***	657.368***
logINFLATION	-40.75***	1560.48***
logECONFREE	-9.48***	632.724***
logBUSINESS	-3.463***	397.173*
logLABOR	-6.890***	407.812**
logMONETARY	-71.051***	3065.54***
logTRADE	-89.061***	1243.58***
logFINANCIAL	-5.282***	407.767***
logINVESTMENT	-2.765***	376.98**

***, **, * means statistical significance at 1%, %5, and 10% respectively

Table 2 summarizes the Hausman test results of the seven different models used in the study. Hausman test is conducted to decide on the specification of the models. Based on the results, fixed effects model or random effects model are chosen as the appropriate specification. If there exists no correlation between the error term and the regressors, then the model specification is random effects. That is, the null hypothesis is that the specification is random effects model where the alternative is fixed effects model. Only in model 3, the null hypothesis cannot be rejected at 5% level of significance. For the rest, null hypotheses are rejected at 5% significance level. Thus, only in model 3, random effects model is utilized. But, fixed effects is used for the rest of the regression models.

Table 2: Correlated Random Effects (Hausman Test)

Model	Chi-Sq. statistic	Method (Fixed/Random Effect)

(1)	10.07**	FEM
(2)	20.37***	FEM
(3)	2.511*	REM
(4)	18.076***	FEM
(5)	12.708**	FEM
(6)	14.657***	FEM
(7)	24.256***	FEM

***, **, * means statistical significance at 1%, 5%, and 10% respectively.

Table 3 is for the summary of the main results of all seven models used in the analyses. Even, after the control variables are included in the models, coefficients are significant at 1% level of significance. Results are consistent between the models. As expected, the relationship between employment and the size of the shadow economy is negative in all seven models. The range of the magnitude is from -1.470 in model 1 to -2.182 in model 3. That is, as the employment increases 1%, the size of the shadow economy decreases by 1.47% in model 1. And, as the employment increases 1%, the size of the shadow economy decreases by 2.182% in model 3. If the business freedom is used as the freedom indicator in model 2, an increase in the tax burden by 1%, there is a jump in the size of the shadow economy by 0.412%. If the overall economic freedom is used as a freedom indicator, 1% rise in tax burden increases shadow economy by 0.519% in model 1. Inflation increases the shadow economy by 0.107% as well. If the labor freedom is chosen as the freedom indicator in model 3, 1% increase in inflation rises the size of the shadow economy by 0.176%.

The most effective indicator of economic freedom on the size of the shadow economy is the overall economic freedom index. 1% increase in economic freedom decreases shadow economy by 1.244%. 1% increase in business freedom results in 0.699% decrease in the shadow economy in model 2. In model 7, investment freedom causes 0.083% decrease in the shadow economy. Hence, the least effective kind of freedom on the shadow economy is investment freedom. But, the association between the economic freedom and the shadow economy is still negative.

Table 3: Panel Least Squares (Dependent Variable: LogSHADOW)

Variable	(1) logSHADOW	(2) logSHADOW	(3) logSHADOW	(4) logSHADOW	(5) logSHADOW	(6) logSHADOW	(7) logSHADOW
ΔlogEMPLOYMENT	-1.470*** (0.472)	-1.910*** (0.491)	-2.182*** (0.680)	-1.671*** (0.526)	-1.737*** (0.521)	-1.791*** (0.513)	-1.775*** (0.525)
logTAX	0.519*** (0.043)	0.412*** (0.045)	0.493*** (0.069)	0.480*** (0.048)	0.459*** (0.048)	0.442*** (0.047)	0.460*** (0.049)
logINFLATION	0.107*** (0.014)	0.123*** (0.014)	0.176*** (0.019)	0.153*** (0.015)	0.147*** (0.015)	0.135*** (0.015)	0.143*** (0.015)
logECONFREE	-1.244*** (0.053)						
logBUSINESS		-0.699*** (0.038)					
logLABOR			-0.422*** (0.049)				
logMONETARY				-0.094*** (0.018)			
logTRADE					-0.190*** (0.024)		

***, **, * means statistical significance at 1%, 5%, and 10% respectively.

Standard errors are in parenthesis.

Table 3 (continued): Panel Least Squares (Dependent Variable: LogSHADOW)

Variable	(1) logSHADOW	(2) logSHADOW	(3) logSHADOW	(4) logSHADOW	(5) logSHADOW	(6) logSHADOW	(7) logSHADOW
logFINANCIAL						-0.257***	
						(0.022)	
logINVESTMENT							-0.083***
							(0.016)
Constant	5.789***	3.978***	2.178***	1.054***	1.567***	1.900***	1.102***
	(0.292)	(0.268)	(0.350)	(0.227)	(0.243)	(0.235)	(0.232)
Selected Model	FEM	FEM	REM	FEM	FEM	FEM	FEM
R-squared	0.282	0.225	0.168	0.113	0.125	0.152	0.112
Observations	2184	2184	1333	2184	2184	2184	2184
Cross-Sections	153	153	153	153	153	153	153

***, **, * means statistical significance at 1%, 5%, and 10% respectively.

Standard errors are in parenthesis.

4. CONCLUSION

To conclude, as employment increases the size of the shadow economy shrinks. Employment can be regarded as an indicator showing the performance of the economy. So, increasing production in an economy would improve the macro indicators of the economy which results in escape from the informal sector. On the other hand, increasing tax burden, with unpredictability and instability in the economy contribute to the shadow economy. Increasing inflation causes individuals and firms to forecast the economic future of the country with a wide margin of error. So, there emerges a necessity to cut down expenses by moving the business into a gray area of the economy in return.

Although all aspects of the economic freedom are effective on the shadow economy, the magnitude of the impacts are not same. They all have a negative relationship with the shadow economy. But, the most influential subcomponent of the economic freedom is business freedom aside from overall economic freedom index. So, the longer the bureaucratic procedures required to start a new business, the greater the probability of a growing shadow economy. On the other hand, the least effective is investment freedom.

Going into details of the effect of the economic freedom on the size of the shadow economy by creating different country samples would strengthen the results of this research. Because different countries have different measuring methods in their fiscal system and different social and institutional features, the causal factors affecting the formation of the shadow economy are different. Thus, the results would not be same in alternative country samples.

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