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The Shadow Economy and Corruption in ECO Countries

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EİT Ülkelerinde Kayıt Dışı Ekonomi ve Yolsuzluk

Abstract

This study examines the shadow economy and corruption relationship throughout seven Economic Cooperation Organization (ECO) countries. Utilising shadow economy data provided by Medina and Schneider (2017; 2019) and Transparency International's corruption perception indicator between 2000-2017, regression analysis suggests that there is a statistically significant relationship between corruption and shadow economy, and additionally, that Soviet heritage plays a role in the determination of this relationship. Results show that for post-Soviet ECO nations, the relationship is complimentary, while for 'Other' ECO nations, the relationship is substitutive.

Keywords : Shadow Economy, Corruption, ECO Countries, Post-Soviet Countries, Turkic Countries.

JEL Classification Codes : C1, H26, O17, O57, P2, P3.

Öz

Bu çalışma Ekonomik İşbirliği Teşkilatı (EİT-ECO) üyesi ülkelerde kayıt dışı ekonomi ve yolsuzluk arasındaki ilişkiyi incelemektedir. 2000-2017 yılları için Medina ve Schneider (2017; 2019) tarafından sağlanan kayıt dışı ekonomi verilerini ve Uluslararası Şeffaflık Örgütü'nün yolsuzluk algılama göstergelerini kullanan regresyon analizi ile yolsuzluk ve kayıt dışı ekonomi arasında istatistiksel olarak anlamlı bir ilişki olduğu ve ayrıca bu ilişkinin belirlenmesinde Sovyet mirasının bir rol oynadığı ortaya konulmaktadır. Sonuçlar, bu ilişkinin Eski Sovyet EİT ülkeleri için tamamlayıcı, 'Diğer' EİT ülkeleri için ise ikame yönünde olduğunu göstermektedir.

Anahtar Sözcükler : Kayıt Dışı Ekonomi, Yolsuzluk, ECO Ülkeleri, Eski Sovyet Ülkeleri, Türk Ülkeleri.

1. Introduction

Corruption can be defined as the misuse of public or private office for individual gain and consists of bribery, embezzlement, nepotism or confiscation (Rose-Ackerman & Palifka, 2016). As one may expect, research has shown that the presence of corruption within a society has social, economic and political implications. Such implications include the inefficient allocation and waste of public resources, the elevation of the cost of business, increases in inequality and poverty, the deterioration of institutions and legal structures within society, and weakening the effectiveness of national tax systems (Bayar et al., 2018). Corruption acts as a destabilising factor within the development of economic relations, leading to unfair competitive economic conditions conducive to the establishment of equity throughout a population (Bozhenko & Kuzmenko, 2021).

The shadow economy, also referred to as the informal economy, consists of economic activities that occur outside of detection by private officials and provide goods and/or services that consumers cannot afford or find in the formal economy (Wiseman, 2013; Gokcekus et al., 2022). Higher unemployment rates, complex regulatory systems, and larger central governments and bureaucratic structures are associated with larger shadow economies (Zhanabekov, 2022). The presence of the shadow economy contributes to decreases in tax revenues and distortions of economic statistical indicators such as unemployment. Furthermore, an increase in the size of the shadow economy can compound upon itself, as the transition to informal economic activity becomes increasingly appealing as the size and scope of the shadow economy increases (Bayar et al. 2018). This comes with numerous costs that impact the economic and social well-being of nations through the establishment of inefficiencies that restrict growth and development across numerous dimensions, including public revenue and services; innovation and productivity; labour markets; financial access; and data and surveillance (Kelmanson et al., 2019). The size of the shadow economy can be determined by utilising discrepancies between income and expenditure measurements of GDP, differences between GDP growth and electrical consumption growth, and differences between estimated money demand and actual amount in circulation.

Levels of corruption have been positively linked to the size of the formal economy, as a reduction of the formal economic sector resulting from the growth of the shadow economy subsequently leads to reduced levels of corruption within a nation (Berdiev et al., 2018). However, as highlighted by Buehn and Schneider (2011), the relationship between the shadow economy and corruption is ambiguous, as the pair either acts as substitutes or complements depending on the established societal situation and environment. Within a complementary relationship, the shadow economy acts as a substitute for the official economy. When corruption acts as an added tax within the official economy, the shadow economy grows in response. Within a substitutive relationship, the growth of activity within the shadow economy disrupts official economic activity, thereby decreasing the level of corruption. Furthermore, the relationship between corruption and the shadow economy is susceptible to change based off of surrounding environmental conditions, suggesting that

actions taken to address corruption and the shadow economy must be flexible and catered to address the dynamic and changing corruption-shadow economy relationship within a state (Gokcekus & Schneider, 2020).

Given the universality of corruption and informal economic activity amongst both developed and developing nations, it is unsurprising that the economic impact of shadow economies and corruption, as well as the relationship between the two, has been a topic of particular interest amongst scholars and policymakers alike (Schneider & Enste, 2000)[1]. The presence of shadow economies and corrupt practices can be accurately perceived as a significant hindrance to socioeconomic development and stability. Together, shadow economies and corruption impede formal economic growth, destabilise economic and social aspects of society, and exacerbate existing economic waste and institutional inadequacies (Bozhenko & Kuzmenko 2021). As a result, studying the shadow economy and corruption is imperative to developing effective strategies and techniques that may be implemented to address their expansion and impact. Furthermore, such research is especially valuable to developing nations, where shadow economies and corruption face less established and effective constraints to their expansion and socioeconomic impact. Despite innumerable attempts to better understand such phenomenon and their relationship with one another, there has neither been a universally accepted understanding of the relationship between shadow economies and corruption nor the establishment of universally effective methods and mechanisms for combating their growth or presence in society.

Methods of combating both corruption and the shadow economy are ambiguous and situationally dependent. Consequently, it is important to study the relationship, impact, and methods of addressing the shadow economy and corruption on a situational basis, country, regional, or institutional level. Studies on the relationship between corruption and the shadow economy and their impact on nations of Central Asia and the Caucasus have been limited and predominantly focused on state-level analysis. To better understand the established regional relationship between corruption and the shadow economy, this study examines and investigates member nations of the Economic Cooperation Organization (ECO; Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Türkiye, Turkmenistan, Uzbekistan). Given that scholarly research into the corruption - shadow economy (CSE) relationship on a regional economic level within Central Asia and the Caucasus has been limited, such research can aid member states of the ECO that may seek to curb corruption and the growth of the informal economic sector to promote and improve upon formal state and regional economic development. Through this research, we can analyse whether the CSE relationship in ECO nations is either complementary or substitutive.

The ECO is made up of nations of Soviet and non-Soviet heritage, allowing for an assessment of whether Soviet heritage plays a role in the established CSE relationship within

[1] *Lambsdorff and Schulze (2015) and Dimant and Tosato (2018) provide a detailed account of research on causes and effects of corruption.*

a given nation through a comparison of the data between Soviet and non-Soviet heritage states. Research into the CSE in post-Soviet states suggests that the presence of a sizeable shadow economy that compliments corruption is a well-documented feature of Soviet society that has persisted in post-Soviet nations following the collapse of the USSR (Neef & Stanculescu, 2002; Rasanayagam, 2011; Zhanabekov, 2022). This additionally falls in line with Buehn and Schneider (2011), which showcased the positive, complementary relationship between corruption and shadow economies in former Soviet nations. However, this does not mean that the complementary relationship is uniform throughout all ECO nations and requires further investigation into the non-Soviet heritage nations of the ECO to assess if these nations (Iran, Türkiye, and Pakistan) exhibit an alternative relationship between corruption and the shadow economy that could potentially be explained by a shared non-Soviet heritage.

This study aims to examine the CSE relationship in ECO nations to provide crucial information that may be utilised to understand better the role and impact of corruption and shadow economies in the region and the general trends the region has expressed in recent years. Furthermore, this study will shed light on how the Soviet heritage of nations may contribute to the nature of the CSE relationship present. By conducting a regression analysis of CSE relationships in ECO nations from 2000-2017, we can establish if there is a relationship present between corruption and the shadow economy, what the nature of that relationship is, and if Soviet heritage plays a significant role in the establishment of the relationship present.

2. Methods: Claims, Model and Data

Through this examination of the CSE relationship within ECO nations, it is hypothesised that:

1: There is a relationship between corruption and the shadow economy.
2: The relationship between corruption and the shadow economy is complementary or substitutes.
3: The complementarity/substitutability is perfect.
4: Soviet heritage makes a difference.

To investigate the validity of these claims, an *ad hoc* regression model is utilised to examine the possible relationship between the size of corruption and the shadow economy within each ECO nation between 2000 and 2017.

$$ln\,(shadow)_{it} = \beta_0 + \beta_1 ln\,(corruption)_{it} + \varepsilon_{it},$$

where

$shadow_{it}$ = size of the shadow economy in country i at time t;

$corruption_{it}$ = perceived level of corruption in country i at time t;

ε_{it} = well behaving error term; and

ln = natural logarithm operator.

Our measure for the *size of the shadow economy* is derived from data provided by Leandro Medina and Friedrich Schneider's established databases on the size of the shadow economy throughout the nations of the world (2017; 2019). In establishing this database on the changing size of the shadow economy, Medina and Schneider utilise the MIMIC approach in the generation of data and the measure of the size of the shadow economy through the utilisation of comparisons between night light intensity data and estimates from countries' statistic offices (Medina & Schneider, 2017; 2019)[2]. Unfortunately, no data is available for the three nations (Afghanistan, Turkmenistan, and Uzbekistan).

As is presented in Table 1, from 2000 to 2017, the size of the shadow economy in 7 of the ECO countries represented one-third of their GDP; it has shrunk by 18% from 2000 to 2017, and there are significant variations among these countries - with the highest in Azerbaijan, and lowest in Türkiye and Kyrgyzstan.

Table: 1
Size of Shadow Economy in 7 ECO Countries: 2000-2017

	Size of the Shadow Economy (% of GDP)		Change	
	2000	*2017*	*%*	*Percentage Points*
Azerbaijan	60.6	48.6	-20%	-12
Iran	18.9	15.9	-16%	-3
Kazakhstan	43.2	35.8	-17%	-7.4
Kyrgyzstan	41.2	29.0	-30%	-12.2
Pakistan	36.8	30.1	-18%	-6.7
Tajikistan	43.2	38.7	-10%	-4.5
Türkiye	32.1	28.6	-11%	-3.5
Mean	39.4	32.4	-18%	-7.0
Std. Deviation	12.7	10.1	-20%	-2.6

Source: Medina and Schneider (2017 and 2019).

Similar to the measurement of the shadow economy, the measurement of corruption within a nation is also challenging and is an established topic of debate within scholarly circles. Throughout this research, data on corruption is sourced from Transparency International's Corruption Perceptions Index (2000-2017). This index measures corruption by establishing a national *perceived corruption score* between 1-10. Transparency International calculates each nation's score utilising a combination of data sources from reputable institutions such as the World Bank and the World Economic Forum. Furthermore, the CPI measures multiple types of corruption within a nation or region, from bribery to government transparency, to provide a comprehensive and multifaceted assessment of overall perceived corruption levels within a nation.

[2] *The study of the shadow economy, its definition, measure of size and characteristics of the shadow economy has been a source of debate within policy and scholarly circles.*

According to TI's CPI, as is presented in Table 2, perceived levels of corruption in 7 ECO countries ranged from 7-7.5, slightly worsening from 2000 to 2017, showcasing variations among these countries.

Table: 2
Perceived Corruption Levels in 7 ECO Countries: 2000-2017

	Perceived Corruption Score (out of 10 points)		Change	
	2000	*2017*	*%*	*Percentage Points*
Azerbaijan	8.5	6.9	-19%	-1.6
Iran	7.8	8	3%	0.2
Kazakhstan	7	6.9	-1%	-0.1
Kyrgyzstan	7.9	7.2	-9%	-0.7
Pakistan	7.7	6.8	-12%	-0.9
Tajikistan	8.2	7.9	-4%	-0.3
Türkiye	6.2	6	-3%	-0.2
Mean	7.6	7.1	-7%	-0.5
Std. Deviation	0.8	0.7	-14%	-0.1

Source: Transparency International Corruption Perception Indices (2000-2017).

3. Results

Not having *a priori* expectation regarding the functional form of the relationship between shadow economy and corruption, we estimated five different functional forms and reported robust regression results in column (1) - column (5) of Table 3. These functional forms are (1) linear; (2) 2nd-degree polynomial; (3) linear-log; (4) log-linear; and (5) log-log, respectively. According to F-statistics, log-linear and log-log functional forms better fit our data. Since log-log provides a more meaningful interpretation- establishing the elasticity of shadow economy to corruption or, in other words, the percentage change in the size of the shadow economy as a result of one percentage change in corruption; we adopted this functional form for the basis of our analyses: The estimated coefficient (.935) was statistically significant ($p < .001$); and variations in corruption explained 28% of the variations in the shadow economy (Table 3, Column 5).

Table: 3
Robust Regression Results-Different Functional Forms, and Post-Soviet Republic & Others

	(1) Linear	(2) 2nd-degree polynomial	(3) linear-log	(4) log-linear	(5) log-log	(6) log-log Post-Soviet	(7) log-log Others
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Corruption	4.211	63.561	25.763	0.143	0.935	1.298	-1.149
	(0.87) **	(15.16) **	(6.23) **	(0.02) **	(0.14) **	(0.42) **	(0.26) **
Corruption^2		-4.567					
		(1.09) **					
Constant	4.987	-184.050	-15.564	2.540	1.728	1.033	5.475
	(6.51)	(52.44) **	(12.47)	(0.15) ***	(0.28) **	(0.85)	(0.51) **
Adjusted-R^2	0.16	0.12	0.12	0.30	0.28	0.12	0.27
F - statistic	23.22 **	8.86 **	17.08 **	50.27 **	44.94 **	9.53 **	19.52 **
No. of Obs.	116	116	116	116	116	66	50

*** significance levels (two-tailed) 0.01 level.*

Table 4 summarises the test results. Throughout the remainder of this section, we check the validity of our claims by conducting the appropriate hypothesis tests.

Table: 4
Summary of Hypothesis Test Results

Test #	*7 ECO Countries*	*Post-Soviet*	*Others*
1	Reject	Reject	Reject
2a	Reject	Reject	Cannot reject
2b	Cannot reject	Cannot reject	Reject
3a	Cannot reject	Cannot reject	Reject
3b	Reject	Reject	Cannot reject
4	Reject		

1: Is there a relationship between corruption and the shadow economy?

H_0:$\beta_1 = 0$

H_1:$\beta_1 \neq 0$

The estimated coefficient (0.935; p <.001) indicates a statistically significant relationship between corruption and the shadow economy, indicating the presence of the CSE relationship within 7 ECO nations.

2: If there is a relationship between corruption and the shadow economy, are they complements or substitutes of each other?

2a. Complementary

H_0: $\beta_1 \leq 0$

$H_{1.1}$: $\beta_1 > 0$

2b: Substitute

H_0: $\beta_1 \geq 0$

$H_{1.2}$: $\beta_1 < 0$

With the estimated coefficient (0.935, p <.001), there is statistical evidence that the general CSE relationship within ECO nations is complimentary. Given the general complimentary CSE relationship displayed within the 7 ECO nations, next, we investigate whether the complementary or substitutive relationship is perfect.

3: Perfect complementarity

$H_{0.}$: $\beta_1 = 1$

$H_{1.1}$: $\beta_1 \neq 1$

We cannot reject the null hypothesis in examining if the CSE relationship is a perfect complementarity. As a result, we can conclude that the CSE relationship here is a statistically significant perfect complementarity.

As is presented in Figure 1 - Figure 3, in line with our *a priori* expectations, based on the existing literature on Soviet heritage and its effect on economic activities, the relationship between corruption and shadow economy varies from post-Soviet to other ECO countries.

Figure: 1
Perceived Corruption versus Shadow Economy in 7 ECO Countries

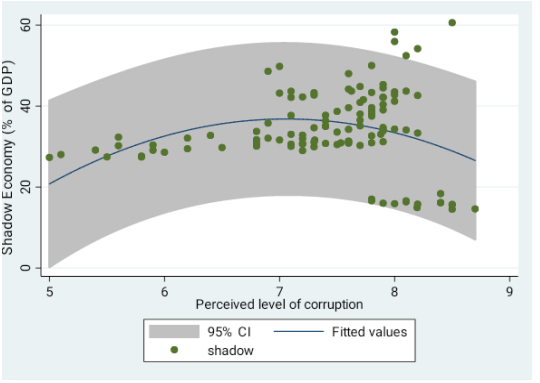


Figure: 2
Perceived Corruption versus Shadow Economy in 4 Post-Soviet Republics

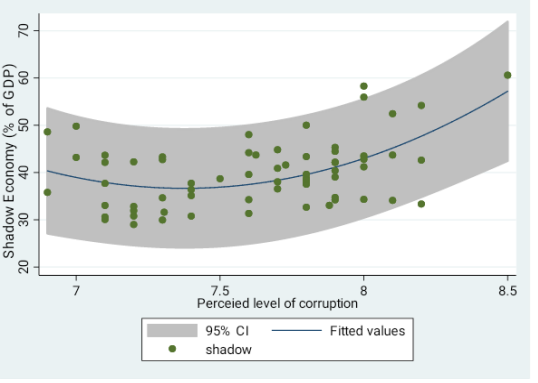
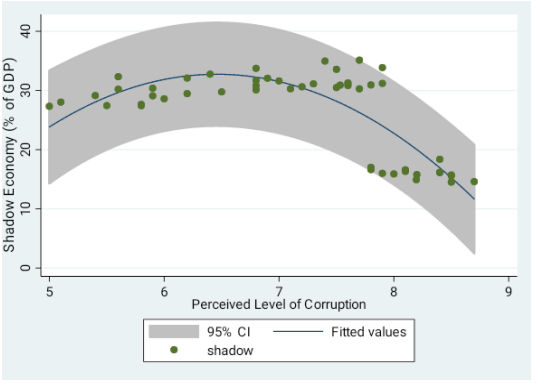


Figure: 3
Perceived Corruption versus Shadow Economy in the Other 3 ECO Countries



To statistically check the validity of this observation, we conduct the following hypothesis tests:

4: Does the Soviet heritage make a difference?

H_0: β_1 (post-Soviet) = β_1 (others)

H_1: β_1 (post-Soviet) ≠ β_1 (others)

We estimate the regression model for post-Soviet and Other ECO members: Robust regression results are presented in Column (6) and Column (7) in Table 3. The estimated coefficients for post-Soviet members (1.298, p <.01) and Others (-1.149, p<.01) indicate that there is statistical evidence that the general CSE relationship within ECO nations differs depending on a nation's history of Soviet heritage. As it has been found that Soviet heritage makes a statistically significant difference in determining the CSE relationship, we rerun hypothesis tests on post-Soviet ECO nations and 'Other' ECO nations with no Soviet heritage. According to these test results, for post-Soviet nations, which comprise most ECO states, there is a complementary CSE relationship; however, within 'Other' nations, our analysis indicates that the CSE relationship is substitutive.

4. Discussion

To summarise, three main results emerge for the ECO countries:

1) A statistically significant relationship exists between the shadow economy and corruption.
2) This relationship is generally complimentary in nature.
3) Soviet heritage plays a significant role in determining the CSE relationship: within post-Soviet nations, the relationship is complimentary. Within nations with no Soviet heritage, the relationship is substitutive.

Given the results of this analysis, it is clear that Soviet heritage plays a role in determining the established CSE relationship within ECO nations. As a result, further investigation into the specific impacts of Soviet heritage that influence this difference is necessary to understand better what specific societal variables within post-Soviet states are significant in this determination.

Due to the informal nature of the shadow economy and corruption, the growth of both corruption and the shadow economy would be compounded within more informal societal structures. As pointed out by Rasanayagam (2011), post-Soviet states experience a general reversion to the informalisation of the state on a national, socioeconomic level due to long-embedded customs of informal, decentralised societal norms. Within many, if not all, of the post-Soviet ECO member states, such nations lacked general centralisation and socioeconomic formalisation in the periods leading to Soviet rule. Although Soviet rule over such nations introduced the formalisation of domestic social and economic institutions, this formalisation did not penetrate deeply into the cultural psyche of the state and, as a result, upon the dissolution of the USSR and independence of post-Soviet republics, post-Soviet ECO nations reverted to their traditional informal societal structures conducive to the growth of both corruption and the shadow economy.

Furthermore, in line with Neef and Stanculescu (2002), we can see that a political history of socialism plays a sizable role in establishing informal economies. Given many of the ECO's members' historical relationship with socialism under USSR rule, it is clear that socialistic governmental structures within these nations, as opposed to the ECO states without Soviet heritage, have contributed to the further informalization of society and rise of the informal economy and corruption. However, it should be noted that while this is not necessarily beneficial to the state as an organ of society, the shadow economy within such states is crucial to overall societal economic well-being. Within such informal societies, the shadow economy and informal sector provide access to necessary provisions and employment opportunities within impoverished sections of the population. While the presence of the CSE relationship in more formal Western states is detrimental to economic growth and societal development, its presence in struggling, decentralised states may instead be more beneficial to the domestic population than harmful, despite its restrictions to formalised development.

As a result, it is important to note that the CSE relationship within post-Soviet ECO nations is not necessarily as taxing as it would be in other states without a Soviet heritage and a history of societal decentralisation and informality. However, this does not negate the negative externalities associated with the presence of both corruption and the shadow economy on the development and growth of the formal political and socioeconomic sectors of society. Because of this, a trade-off relationship is established in post-Soviet ECO nations in terms of addressing the CSE relationship: 1) Allow the persistence of the CSE relationship to the benefit of the population at the expense of formal institutions and governmental growth or 2) sacrifice the beneficial societal externalities of the CSE relationship in favour

of increased political and economic formalisation and the expansion of centralised power and oversight.

Turning to the non-post-Soviet ECO nations of Türkiye, Iran and Pakistan, the nature of these states' deep-rooted traditions of independence and cultural autonomy could potentially account for the prevalent substitutive CSE relationship present. Given these nations' history of independence and national pride in the face of Soviet expansion in the post-war era, one can theorise that the opportunities for companies to work within the informal sector by bribing civil servants are more limited than in the other post-Soviet nations examined. If one is to examine the limitation of corruption growth within these countries due to the continued virtuosity of the state apparatus resulting from years of staunch independence, we can begin to understand and explain the reasoning behind the substitutive CSE relationship that has taken hold. However, due to the lack of reputable, in-depth studies investigating the CSE relationship within these nations, evidence for the driving factors behind the emergence of a substitutive CSE relationship in Türkiye, Iran, and Pakistan is lacking.

We have four suggestions for conducting future research to deepen our understanding of the complex relationship between corruption, the shadow economy, and their evolution over time: Firstly, investigating the substantial variation in the size of the shadow economy between former Soviet Union (FSU) countries and non-FSU countries could be a promising avenue. Research could delve into whether the rapid expansion of the state in FSU nations provided economic actors with a longer window of opportunity to develop and grow the shadow economy compared to non-FSU countries. This exploration may involve a historical analysis of state expansion and its correlation with the shadow economy's size. Secondly, expanding the scope of analysis beyond the specific set of countries considered in this study could yield a more comprehensive understanding of the factors influencing the nature of the relationship. Comparative studies across a broader range of nations could illuminate how different historical, political, and cultural contexts contribute to variations in the nature of the relationship, whether it is complementary or substitutive. Thirdly, exploring narratives or hypotheses that elucidate the patterns of complementarity and substitutability is essential. Investigating plausible explanations linking moderate corruption levels to the growth of the informal sector, while extreme corruption suppresses it, can help clarify these dynamics. Additionally, researching exogenous variables that influence corruption and the informal sector's size could provide fresh insights into the causal factors at play. Lastly, analysing temporal changes in corruption and the shadow economy over time can offer a dynamic perspective. Understanding these variables' patterns and trends across different periods can help identify underlying drivers and mechanisms, enhancing our comprehension of their interplay.

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