ANALYSIS OF THE MAIN DETERMINANTS OF THE SHADOW ECONOMY BASED ON SELECTED COUNTRIES OF CENTRAL ASIA

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Abstract

This article focuses on assessing the determinants of the shadow economy in Kazakhstan, Kyrgyzstan, and Uzbekistan from 2010 to 2020. Examining the experience of these countries reveals the full range of problems associated with the shadow economy and its impact on economic growth. One of the objectives of the article was to examine the causes of the shadow economy and highlight the highest-income but most vulnerable sectors of the economy. Three Central Asian countries were selected to determine the importance of some factors on the shadow economy in developing countries. To assess the importance of the factors, data for these countries were collected from www.data.worldbank.org and www.theglobaleconomy.com. Empirical research shows that more than 80% of the size of the shadow economy in these countries can be explained by factors such as the total number of employees, the tax rate as a percentage of commercial profits, GDP per capita and imports of goods and services as a percentage of GDP. At the same time, the correlation analysis proves that the increase and active participation of young people of working age reduces the volume of the shadow economy.

Keywords: *Causes of the shadow economy, Size of the shadow economy, GDP, Kazakhstan, Kyrgyzstan, Uzbekistan*

1 INTRODUCTION

In most developing countries, tax revenues account for the bulk of government revenues. Therefore, effective tax systems should be established in the countries of Central Asia, creating better conditions for the administration of tax collection. However, the shadow economy hinders the implementation of the above objective. There are several factors that can lead to the emergence of a shadow economy, but the most important are inadequate tax administration, as well as higher tax rates and other compulsory levies. In order to avoid paying high taxes and / or other compulsory payments, companies take risks by conducting their activities informally. Another reason is the lack of a specific mechanism for collecting taxes or imposing fines in case of tax evasion (Savina 2015).

Most developing countries are trying to formulate strategies that can help them curb the informal economy. In this article, we examine examples from three Central Asian countries such as Kazakhstan, Kyrgyzstan and Uzbekistan. These countries were part of the former Soviet Union and their economies still exhibit some of the methods inherited from that period. All three countries have been independent for over three decades. In the early days of their independence, the size of the shadow economy in these states was very high. According to www.theglobaleconomy.com, the shadow economy (% of GDP) in Kazakhstan, Kyrgyzstan and Uzbekistan was 46.08, 45.93 and 45.92% respectively in 2019.

By 2021, they could reduce that number by about 15%. At the same time, the share of the shadow economy in Kazakhstan in 2021 is 33.5%. As for the size of the shadow economy, the country ranks 12th in the global Kearney ranking. According to the analytical agency, in 2021 the shadow economy of Kazakhstan amounted to 21.8% of the country's GDP, in the previous 10 years it was 22.2%. At the same time, this indicator decreased from 34.7% to 30.1% from 2015 to 2020 and started to grow again from 2020.

The study shows that the shadow economy in Uzbekistan consists of several components. It does not take into account unpaid taxes, barter transactions, payment of wages and premiums in natural products, as well as household goods produced for personal use. In Uzbekistan, corporate taxation is very high - 18 types of taxes. A World Bank study shows that taxes eat up 87% of a company's profits. Only 13% remains for bonuses, for the expansion of production, for reconstruction, for marketing expenses and so on.

The aim of the research is:

1. Find the reasons for the expansion of the shadow economy in the selected countries of Central Asia;
2. Study the experience of some countries that faced the same problems related to the shadow economy;
3. Conduct an empirical analysis to identify significant variables for the expansion of the shadow economy;
4. Develop recommendations and suggestions to reduce the impact or extent of the informal economy in developing countries.

2 LITERATURE REVIEW AND METHODOLOGY

The causes, consequences and problems arising from the influence of the shadow economy have long been discussed. In order to eliminate or reduce the influence of the shadow economy, most developing countries have implemented several tax reforms, but they have not been able to reduce it to the level of their expectations (Elmurodov 2020). There are enough studies on the impact of shadow economy, but most of them were conducted in developed or European countries.

In this article, the size of the shadow economy in selected Central Asian countries is estimated in relation to their GDP. The size of government, share of direct taxes, total tax burden, financial freedom, entrepreneurial freedom, economic freedom, unemployment rate and GDP per capita are presented as causal variables (Buehn 2010). Schneider and Buehn define the shadow economy as follows: The shadow economy includes all legal production of goods and services in the market that is intentionally hidden from government authorities for the following reasons:

1. to avoid paying taxes such as income tax or VAT;
2. to avoid paying social security contributions;
3. to avoid certain legal labor market standards such as minimum wages, maximum working hours, safety standards, etc., and to avoid following certain administrative procedures such as filling in statistical questionnaires or other administrative forms (Schneider 2017).

Enste shows that high taxes and social security contributions as well as strict regulation are the main drivers of the shadow economy. According to him, however, the shadow economy is difficult to measure and different methods lead to different results (Enste 2018).

Understanding the essence of the shadow economy as an economically ineffective activity allows us to fully identify this sector, recognise the internal relationships and interdependence of the relevant phenomena, which makes it possible to identify the conditions, causes and mechanisms of the emergence and spread of the shadow economy as a socio-economic phenomenon inherent in any social formation (Savin 2017).

The causes, consequences and determinants of the shadow economy have been discussed in detail by experts in several empirical studies. Most of these studies consider variables such as tax burden, GDP per capita, openness to international trade, regulatory costs, government spending, unemployment and some institutional characteristics as informal economic determinants as mentioned by Johnson et al. (1998), Friedman et al. (2000), Torgler and Schneider (2007) and Andersen (2018).

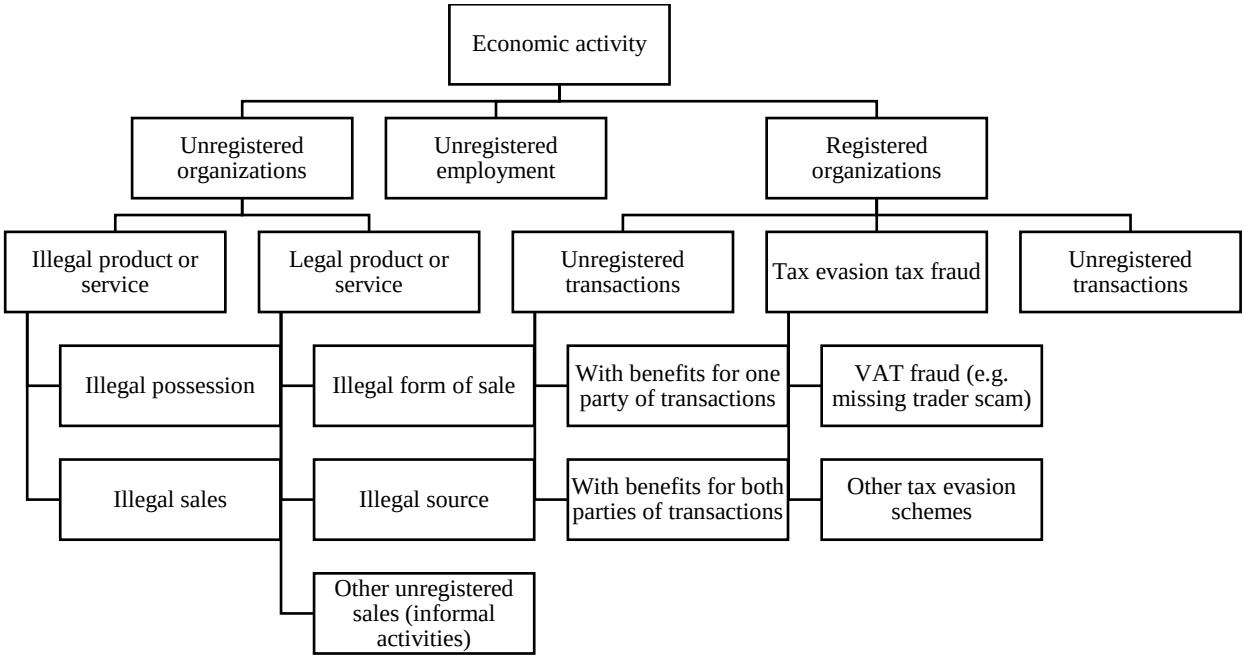

Fig. 1 Various elements of the shadow economy

Figure 1 shows that both registered and unregistered businesses represent shadow businesses via unrecorded transactions. For all forms of the shadow economy, a very significant general fact is that remittances allow the seller not to disclose information about the transaction. With some exceptions (e.g. e-commerce, bookmaking or barter), an electronic payment in lieu of cash could not be registered (Bozieva 2016). However, not only unregistered businesses, but also registered businesses have unregistered transactions, reflecting the scale of the shadow economy in the country, are also increasing.

Scholars who have attempted to estimate the size of the shadow economy are faced with the question of how to properly define it. One working definition is: "all currently unreported economic activity that would contribute to officially calculated (or observed) gross national product if observed." Table 1 shows the evidence for one definition of the shadow economy:

Table 1 The main reasons defining the concept of the shadow economy

Determinants	Theoretical reasoning	Link
Regulations	Regulation is likely to be a burden on business. For example, labor market regulations or trade barriers affect business productivity. They lead to an increase in labor costs, which may increase the likelihood of working underground. Countries with strict and stringent regulations are more likely to have higher coverage of the underground economy.	Johnson, Kaufmann, and Shleifer (1997), Johnson, Kaufmann, and Zoido-Lobatón (1998b), Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000), Kucera and Roncolato (2008), Schneider (2011)"
Public sector services	The increase in the size of the shadow economy is likely to lead to a decrease in government revenue. This will affect the quality and quantity of services and goods available to the population. This in turn will lead to higher tax rates for businesses and individuals. As a result, more and more businesses and individuals will migrate to the informal sector.	Johnson, Kaufmann, and Zoido-Lobatón (1998a,b), Feld and Schneider (2010)"

Taxpayer Morale	An implicit influence on the size of the shadow economy, as far as financial ethics are concerned, is provided by high-quality government services and products. Taxpayers tend to sincerely pay taxes to obtain useful public goods. It is also essential that tax authorities are run by taxpayers. Thus, (better) tax morality and (stricter) social standards can reduce the likelihood of people working in the shadow economy.	Feld and Frey (2006), Kirchler (2007), Torgler and Schneider (2009), Feld and Larsen (2005, 2009), Feld and Schneider (2010)
Institutional quality	The quality of state institutions is an important factor in the spread of the informal sector. Informal sectors that have developed because of a lack of political institutions to support an efficient market economy and businessmen that have closed because of inadequate public goods can be minimized by improving institutions and bringing tax policy closer to the wishes of the average voter.	Johnson et al. (1998a,b), Schneider (2010), Buehn and Schneider (2012), Teobaldelli (2011), Teobaldelli and Schneider (2012), Amendola and Dell'Anno (2010), Losby et al. (2002), Schneider and Williams (2013)
Intimidation	There is limited empirical evidence that fines and penalties do not negatively affect the economy, but that the risk of detection is subjectively perceived. But the results are often weak, and Granger's causal tests show that containment can affect the size of the shadow economy, not conviction.	Andreoni, Erard and Feinstein (1998), Pedersen (2003), Feld and Larsen (2005, 2009), Feld and Schneider (2010)
Developing an official economy	An important factor in the shadow economy is the growth of the formal economy. The higher (lower) the share of unemployment in GDP, the higher the remuneration.	Andreoni, Erard and Feinstein (1998), Pedersen (2003), Feld and Larsen (2005, 2009), Feld and Schneider (2010)
Self-employment	The higher the unemployment rate, the more measures can be taken to combat the shadow economy.	Schneider and Williams (2013), Feld and Schneider (2010)

Table 1 provides information on the main reasons that determine the extent of the shadow economy and the scholars who have used them in their research. Some of them, such as disincentives, fiscal spirit, quality of public services, are difficult to measure and therefore are not used in empirical research.

This article uses the Doing Business assessment published annually in the World Bank's Doing Business report. For each indicator and country, a time series of data is published starting with the first year in which the indicator was used or the country was included in the survey sample. The starting point is a combination of the number of procedures, the cost, the time spent and the amount of capital indicated. The total number of procedures, as well as their costs and time limits, that entrepreneurs have to go through in order to register a limited liability company (or a company of a similar type), from the submission of documents to the start of operations, is determined. These procedures can be a burden or an obstacle for the business. Thus, if they do not comply with these requirements, they will either not start a business or will operate in the informal sector. Therefore, this estimation is included as a dependent variable in this article as it affects the informal sector (Irwin 2014).

There are many factors that influence the emergence, extent and growth of the informal economy in a country. Generally, the most important /determinants can be classified into two types, namely real economic factors and non-economic factors such as social and psychological conditions of the society, governance and others.

Different approaches and models provide surveys to determine the size of the shadow economy. Medina and Schneider (2018) is a recent study of the informal sector. They use the multiple metrics approach to determine the average size in 158 states from 1991 to 2015. According to their findings, it is 31.9% of GDP. Access to finance, political stability, public service delivery, tax burden, labor market regulation, and organizational efficiency are important factors. Most work directly or indirectly assumes that the shadow sector will decline as the economy grows, modernizes, and increases the institutional quality and efficiency of financial and public service regulation. It is unclear whether this trend is permanent for the decline of the shadow economy. In the study, the GDP per capita indicator is used to assess its importance for the shadow economy as a degree of its development. Ruge (2010) studied the determinants of the informal economy in 35 countries. His research found that 93% of the informal economy is determined by factors such as government development, government effectiveness, tax and social security payments, complexity of taxation and regulation of the labor market. According to Herwartz (2015), the shadow economy determines the taxes paid, Schneider (2010) and Tafenau (2010) indicate the share of government employment, the unemployment rate and the level of self-employment. The number of unemployed and self-employed has a positive impact on the economy. They can cover their income better than employees of companies or public sector. Studies by Andwig et al. (2000) and Dreher and Schneider (2010) have shown a relationship between bribery in Canada and the underground economy. Conditions that lead to corruption cause businesses and individuals to be non-compliant. This study is also supported by Beuhn and Schneider (2012) who stated that corruption, which is the abuse of power for personal gain, occurs due to the failure of the judiciary and the rule of law as a result of violations in the political system, administration and other determinants. In general, countries with high levels of public administration efficiency, political stability and conditions for corruption have a significant impact on the growth of the unobserved economy.

Table 2 Relevant previous studies

Author	Focus	Method	Variables	Relevance
Friedrich Schneider, 2015	"Driving forces" in 31 European and 5 other non-European OECD countries in terms of the size and growth of the shadow economy between 2003 and 2014.	Multiple Indicators, Multiple Cause Model Assessment (Simulation)	Currency demand, official working hours or labor participation and official GDP	Several variables from this study will be used as explanatory variables
George Manolas, et al. 2013	The various main factors that determine the shadow economy have been explored, with a sample of OECD countries and Greek as the	Using EGLS panels with country weights and diagonally corrected standard errors (using White methodology).	Anti-corruption, public administration efficiency, tax burden and others	Several variables from this study will be used as explanatory variables

	main subject.			
Marcus Ruge, 2010	Examining the determinants of the underground economy using a set of eleven latent variables with 58 indicators in 35 countries	Structural Equation Models	Wealth and level of development, tax and social benefits, unemployment	Several variables from this study will be used as explanatory variables.
Axel Dreher, et al 2006	Analyze the impact of the shadow economy Russia on corruption and vice versa in the context of 120 countries and a group of 70 countries for the period 1994-2002.	OLS	GDP per capita, rule of law, democracy, government efficiency, corruption	Several variables from this study will be used as explanatory variables
Leandro Medina, et al. 2017	From 1991 to 2015, a detailed debate was held on the latest changes in current and new approaches to assessing the shadow economy in 158 countries around the world.	Currency Demand Approach (CDA) and Simulation	Trade openness, unemployment rate, government size, etc.	This model will be used in this work
Shokhjahon Elmurodov 2021	The main focus is on assessing the determinants of the shadow economy in Kazakhstan, the Kyrgyz Republic and Tajikistan over the period from 2005 to 2015.	Determination of the causes of the shadow economy	Total labor force, tax rate as a percentage of commercial profits, labor force participation rate, GDP per capita and imported goods and services as a percentage of GDP	This model will be used in this work

Table 2 provides information on relevant studies that have been conducted in the past. It also shows the methods used in the empirical analysis.

However, not all researchers believe that the shadow economy has only negative effects. According to Zaman and Goschin, the shadow economy, like the financial crisis, also has positive consequences. Moreover, it can be useful to solve some problems, such as high unemployment, additional income for the poor and future use of black money in the formal economy (Zaman 2015).

In the studies cited above, this article focused on the impact of the shadow economy on economic growth in Uzbekistan, Kazakhstan and Kyrgyzstan.

3 RESULT AND DISCUSSION

The reasons for the emergence of the shadow economy vary in all regions of the world. Although most developed countries have reduced the size of the shadow economy, developing countries still suffer from its consequences. The countries studied differ in the proportion of passive and loyal components in their shadow economies.

The sector supplying food, beverages and tobacco plays the most important role in the passive shadow economy. This conclusion holds for all the countries studied. On average, this sector accounts for 39.6% of the total passive shadow economy. The sector that ranks second in terms of its contribution to the size of the passive shadow economy varies across the countries studied. It is fuel for vehicles in Kazakhstan (9.4% of the total passive shadow economy); the sector of restaurants, bars and cafes in Uzbekistan (8.7%), Kazakhstan (12.5%) and Kyrgyzstan (9.7%). Other sectors that have a relatively high share in the total passive shadow economy in the countries studied are transport and clothing and footwear.

Most people may think that only unregistered businesses are the cause of the shadow economy, but some activities of registered organizations can also affect the growth of the shadow economy in the country. Tax fraud or evasion is also possible in registered businesses that are paid in cash or electronically. An example is disappearing trader fraud, where a transaction is reported, an invoice is issued and a payment is made, but the seller "disappears" without paying VAT. Therefore, the fact of registering the transaction may not be sufficient to ensure the collection of taxes. Additional measures are needed to address such issues, but they are beyond the scope of this report. This shows that not only unregistered businesses but also registered businesses contribute to the growth or existence of the black economy in the country.

In general, it is quite difficult to determine the extent of the shadow economy in the country as there are several obstacles to carrying out this task. These are as follows:

1. The enterprises engaged in the shadow economy remain unnoticed (Tulisov 2017).

2. There is a lack of data to determine the essential factor of the shadow economy (Sadyraliev 2019).

In order to determine the importance of some factors for the shadow economy in developing countries, three Central Asian countries were selected. In order to assess the importance of the factors, data for these countries were collected from www.data.worldbank.org and www.theglobaleconomy.com.. The study period is from 2010 to 2020, as there is no data for 2021.

Table 3 Independent variables and their description

Independent variables	Short description
Total labor force, thousand people (X_1)	Current Active Population (Bank Data)
General tax rate,% of commercial profit (X_2)	The total amount of taxes and other mandatory payments is paid by companies as a share of their profits (World Bank data)
Labor force participation as a percentage of the working age population (X_3)	Labor force participation rate as a percentage of the total population (World Bank data)
GDP per capita (X_4)	GDP per capita based on PPP (World Bank data)

Imports of goods and services (to GDP) (X_5)	Goods and services received from other countries (World Bank data)

Source: Author's selection

In the multiple regression analysis, the shadow of the economies of three countries (% of GDP) is the dependent variable (Y), and total labor force (in thousands), total tax rate (% of corporate profits), labor force participation (% of total population), GDP per capita, and imports of goods and services (% of GDP) are taken as independent variables. The correlation between these variables was determined before the regression analysis.

Table 4 Correlation between variables

		Y	X_1	X_2	X_3	X_4	X_5
	Y	1.00 00					
X_1		- 0.5457	1.000 0				
X_2		0.88 78	- 0.6440	1.0 000			
X_3		- 0.8204	0.746 9	- 0.8655	1.0 000		
X_4		- 0.5626	0.986 6	- 0.6494	0.7 222	1.0 000	
X_5		0.28 77	- 0.8342	0.2 970	- 0.4184	- 0.8374	1.0 000

Source: Author's calculations

Table 4 illustrates the correlation between the variables. We see that there are strong positive and negative correlations between several variables. Shadow economy (% of GDP) has a strong positive correlation with total tax rate (0.8878), while it has a strong negative correlation with labor force participation (-0.8204). The strongest positive correlation (0.9866) is between total labor force and GDP per capita, while the strongest negative correlation (-0.8655) is between total tax rate and labor force participation. There is virtually no correlation between imported goods and services and the shadow economy. Also, the correlation between total tax rate and imported goods and services can be considered non-existent.

Multiple regression analysis was used to determine the extent to which the aggregation of the selected variables explains the extent of the shadow economy in each of the Central Asian countries during the study period. In statistical theory, regression is referred to as the measurement of the relationship between variables, linear and non-linear relationships (Martišius 2014). Multiple regression is performed when there is more than one explanatory variable to be tested. As Martišius (2014) acknowledges, multiple regression is not well described and commonly used in scientific research. For this reason, multiple regression was chosen for calculations in empirical research to facilitate the practical application of this analysis and to test whether multiple regression analyzes can produce reasonable results. The following equation is used for multiple regression:

$Y = \beta_0(constant) + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$

Here Y represents the shadow economy (% of GDP), the total labor force in thousands of persons (X_1), the total tax rate, the percentage of commercial profit (X_2), the labor force participation rate as a percentage of the working-age population (X_3), GDP per capita (X_4), and imports of goods and services (percent of GDP) (X_5).

Table 5 Multiple regression analysis

Shadow economy (% of GDP)	Coefficient (β_i)	Error	Standard	t-statistics	P>|t|
All labor force (X_1)	.0015987***		.0007463	2.14**	0.041
General tax (X_2)	.1322049***		.0317688	4.16***	0.000
Labor force participation (X_3)	-.1482785**		.0596203	-2.49**	0.019
GDP per capita (X_4)	-.0003075		.0002519	-1.22	0.233
Imported goods and services (X_5)	.0536817*		.0317471	1.69*	0.102
Constant change	30.41928***		5.489597	5.54***	0.000
Number of observations	33				
R-square	0.8408				
Adjusted R-square	0.8114				
	Note: *, **, *** significant, respectively, for p<0,05, p<0,01 и p				

Source: Author's compilation using STATA

From Table 5, we can summarize that more than 80 percent of the size of the shadow economy in the selected Central Asian countries can be explained by factors included in our regression analysis. Labor force participation and an increase in GDP per capita reduce the overall size of the shadow economy, but statistically GDP per capita is not significant with a t-value of -1.22. An increase in the total labor force and tax rates leads to an increase in the size of the shadow economy in Central Asian countries. High tax rates lead to tax evasion and increase the size of the shadow economy. Due to the increase in the total number of labor force, undeclared work increases and wages are paid in envelopes.

4 CONCLUSION

Based on the results of the study and the regression analysis, the following conclusions were drawn:

1. Not only unregistered, but also registered enterprises engage in informal activities that increase the size of the shadow economy. In Uzbekistan, the tax rate on commercial profits is very high, so businesses resort to barter and other transactions to avoid higher taxes. In Kyrgyzstan, the size of the shadow economy is higher than in neighboring countries, and it continues to grow (Engvall 2013).

The peculiarity of the shadow economy in Kazakhstan is associated with the emergence of a new type of tax fraud, and tax evasion is possible even in registered transactions paid in cash or electronic form. The peculiarities of the shadow economy in Uzbekistan and Kyrgyzstan are associated with a decline in the share of the labor force in GDP per capita. This is due to the determinants of the lack of fixation of workers in an employment relationship and the impossibility of tax fixation of illegal employment.

2. Calculations have shown that the total number of labor force, total tax rate, labor force participation, GDP per capita and imports of goods and services are the main factors determining the size of the shadow economy in the Central Asian countries. The increase in the

total labor force and corporate tax rate has led to an increase in the shadow economy. However, the active participation of people of working age narrows the scope for the development of the shadow sector. Thus, the methods of overcoming the shadow economy, which are universal for the countries under consideration, are fixing the employment of citizens, as well as such specific methods, instruments for shadowing local economies, such as motivating working people to register officially in the formation of tax benefits and social guarantees.

STATEMENTS AND DECLARATIONS

The authors have no relevant financial or non-financial interests to disclose.

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