ANDRANIK MANUKYAN
PhD Student at the Chair of International Relations at ASUE

MEASURING THE SHADOW ECONOMY (CASE STUDY OF ARMENIA)

This paper presents an attempt to quantify the shadow economy in Armenia utilizing an indirect measurement method known in the economic literature as Currency Demand Approach. Given the peculiarities of the Armenian economy as well as the data availability, several modifications and extensions have been applied to the initial model framework. Specifically, I have relaxed some of the model assumptions, and have considered the inclusion of additional macroeconomic variables that can be significant for the formation of the cash demand in the country. The model outcomes indicate that starting from 2001 the shadow economy in Armenia has variated from 24% to above 38% of the actual Gross Domestic Product resulting in around 170 bln AMD worth of losses in tax revenues in the fourth quarter of 2017 alone. Such high levels of underground activities substantiate the need to measure the shadow economy to equip the government institutions with better data for designing select macro-level policies.

I. INTRODUCTION

The shadow economy has been drawing increasing attention from economists and public policy makers over the last couple of decades. Being a complex social and economic phenomenon, shadow economy is present to a significant extent in both developing and developed countries. This is also true

for transition countries like Armenia, where both firms and household units have resorted to shadow activities as a shield for protecting the competitiveness and vitality of their enterprises. As a result, only a few would disagree that today there are a significant number of economic transactions and activities in Armenia that are not captured by the statistical and tax authorities.

All economic theories that focus on measuring the shadow economy firstly face the problem of defining it. One commonly-used definition characterizes shadow economy as the sum of all economic activities that contribute to the actual Gross National Product but are currently unregistered - including underreported or unrecorded transactions, illegal deals as well as household activities and barter exchanges. Leandro Medina and Friedrich Schneider define the shadow economy as "market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP". F. Schneider (1986) has further argued that "in general, a precise definition seems quite difficult, if not impossible, as the shadow economy develops all the time according to the principle of running water: it adjusts to changes in taxes, to sanctions from the tax authorities and to general moral attitudes, etc."[1] For the purposes of this research, all economic activities and non-barter transactions, whether legal or illegal, that are not registered by tax or statistical authorities are considered to constitute the shadow economy.

Currently, the problems of shadow economy and the measurement of its size and scope are of major importance for Armenia's further development. At the same time, it can be argued that the mere existence of the shadow economy makes the official macroeconomic data less trustworthy as the records on national income, unemployment, balance of payment (BOP) and demand for money can all be significantly distorted by unaccounted underground activities (Tanzi,1983)[2]. A consequence of the above is the inappropriateness of the economic statistics to guide policy makers in making decisions, and hence the government policies implemented on the basis of these data may address the wrong issues. Another important consideration is the fact that tax collections constitute the major part of state incomes, and it is important to monitor the dynamics of the shadow economy to be able to tailor and employ relevant counter mechanisms, which will enable avoiding the enlargement of state budget deficit. It is especially a significant issue for countries like Armenia, where, because of underdeveloped tax systems and difficulties associated with tax collection, the governments' fiscal position is not strong (Tunyan, 2005).

Given the peculiarities of the transitional period, the social, political and economic difficulties and many external factors, the researchers and policymakers in Armenia have had difficulties in estimating the actual magnitude of the shadow activities in Armenia. Several attempts have been made in an effort to quantify and analyze the dynamics of the Armenian shadow economy as part of cross-country international studies through panel data (e.g.

[1] **Schneider F.,** Estimating the Size of the Danish Shadow Economy Using the Currency Demand Approach: an Attempt, The Scandinavian Journal of Economics, 88, 1986, pp. 643–668.

[2] **Tanzi V.,** The Underground Economy in the United States: Annual Estimates, 1930–1980, IMF Staff Papers, 30, 1983, pp. 283–305.

Schneider, 2016). However, research projects focused on measuring the shadow economy for the case of Armenia are very scarce in the academic literature.

This paper is a sporadic attempt to quantify the shadow economy specifically in Armenia considering the peculiarities of its economy. Considering the advantages and drawbacks of existing measurement methodologies as well as the international practice in the field, the Currency Demand Approach has been applied to the case of Armenia with certain modifications and extensions to the initial model framework. The calculations show that the underground activities have been an inseparable part of the Armenian economy ranging from 24% of the GDP (in 2009) to 38.3% (in 2015).

Section 2 of this paper gives a brief literature review on various methodologies and attempts used for calculating the shadow economy. Section 3 gives theoretical background of the empirical model. Section 4 introduces the data, outlines the estimation strategy and presents the results of the estimation. Finally, Section 5 summarizes and discusses the implications of the results.

II. LITERATURE REVIEW

The economic literature differentiates between two main approaches that are used for estimating the size of the shadow or underground economy - direct methods and indirect methods. Direct methods are based on the immediate observations that are carried out on the micro-level. Lamnek, Olbrich and Schäfer (2000) have predominantly used data obtained through tax audits for calculations. In this case, the financial activity of a number of economic entities is examined and then conclusions are made on macro-level using statistical random sampling methods. The disadvantage of these methods is that the data obtained through this method are not always precise and representative, primarily because in most cases only those entities, whose financial and taxation reports hint at suspicious activity, undergo audit, thereby resulting in the collection of biased data.

Other direct methods that are used to estimate the size of the underground economy are surveys and questionnaires. Here economic entities are asked to voluntarily fill in specially-designed questionnaires and, based on the collected information, conclusions are made about their shadow activities. The disadvantage of this method is that the results greatly depend on the willingness of participants to give out information. Furthermore, it is unlikely that any unreported economic activity, that may also involve some illegal elements, will be reported to surveyors. According to Tunyan (2005), this is especially true for transition countries like Armenia where a strong fear about the real confidentiality of any survey still exists, and the survey participants are afraid to reveal the truth about their economic activities.

The indirect methods are based on various macroeconomic indicators that change with the fluctuations in the size of the underground economy. Kerrick MacAfee (1980), Michael O'Higgins (1989) and James D. Smith (1985) have used the discrepancy between the national expenditure and the national income as an indicator of the shadow economy. The core idea behind this approach is that the income structure of GDP should correspond to the expenditure structure of GDP. However, the underground activities that are hidden from tax

authorities, and are thereby absent from the income structure, will appear in the expenditure structure of GDP, thus the discrepancy shall represent the shadow economy. A drawback to this method is that statistical agencies employ techniques that tend to minimize the discrepancy between these two indicators, so the officially published data may render underestimated results (Schneider, 2016).

According to Kaufmann and Kaliberda (1996), the best indicator that can be used to assess the overall economic activity is the level of electricity consumption, based on which we can assess the actual size of the GDP[3]. Overall (official and unofficial) economic activity and electricity consumption have been empirically observed throughout the world to move in lockstep with an electricity/GDP elasticity usually close to one. The reasoning behind this is as follows: there are three main factors that are not related to the changes in the real GDP but can increase the level of electricity consumption: a) during economic recession the full capacity of production is not used resulting in higher usage of electricity per production unit; b) automatization of the production results in higher electricity consumption; c) in many cases other sources of energy (gas, coal etc.) are substituted with electricity which is more effective and convenient to use in production. On the other hand, there are three main factors that are not related to changes in the real GDP but can decrease electricity consumption: a) technological advancements decrease the volume of resources needed to organize production; b) due to the structural changes of the economy, the share of electricity-intensive sectors decreases, while the share of sectors that consume less electricity in the production process increases; and c) economic entities and especially households often underreport their electricity usage, thereby artificially bringing down the level of electricity consumption.

The authors argue that the above-presented factors compensate each other, so all changes in the electricity consumption are caused by the fluctuations of the real GDP. As such, electricity consumption can serve as a proxy to measure the actual GDP, the subtraction of official GDP from which will render the shadow economy.

This method has received a fair amount of criticism for its central assumption that there is a unit electricity/GDP elasticity across time. The latter criticism is relevant for the case of Armenia as well: during the last decades, Armenia has experienced subsequent periods of economic downturn and boom causing deviations in the "steady state" where the above-mentioned factors neutralize each other. Another important consideration is that the share of losses of electricity stands at a very high level in Armenia, reaching an annual 9.7% in 2016 (for comparison, in Russia the number stands at 3.93%, in Belarus at 4.3% etc.)[4]. Mnria Lackg (1998) has delivered a comprehensive critique regarding the usability of this method.

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[3] **Kaufmann D., Kaliberda A.,** Integrating the Unofficial Economy into the Dynamics of Post-Socialist Economies: A Framework of Analysis and Evidence. World Bank Policy Research Working Paper No. 1691, December 1, 1996.

[4] Electric Networks of Armenia, Annual Report 2017.

Another method that has been widely used in the economic literature to measure the share of the shadow economy is the Currency Demand Approach proposed by Philip Cagan (1958). This method was firstly employed to calculate the correlation between the demand for currency and the tax burden with the latter being considered as the main factor for the formation of the shadow economy. Later, the method was refined by Tanzi (1983). The main postulate of the model is that the transactions in the shadow economy are conducted in cash money in an effort to hide these activities from tax authorities. Thereby the expansion/ contraction of the shadow economy should bring with it an increase/decrease in the demand for cash currency. Building on that, Cagan put forward the hypothesis that the best rationale for quantifying the shadow economy and its changes are the fluctuations in the demand for cash currency[5]. This method is considered to be one of the most effective approaches for measuring the shadow economy given the nature of its underlying assumptions that make the model framework more expedient and representative of real-world economic relationships.

Based on the above-presented advantages and drawbacks of measurement methodologies as well as the prevailing practices and the gaps identified in the existing literature, I have decided to employ the Currency Demand Approach for the case of Armenia. So far, the only Armenian author that has made an empirical measurement attempt is Tunyan (2005) using the Currency Demand Approach. This research paper has been subjected to criticism for the econometric soundness of the calculations, and provides information only for time periods of up to 2004. Of particular concern are the length of the time series included in the model, the usage of data in absolute values (without transforming to counter stationarity) as well as the high level of the determination coefficient which hints at spurious regression. However, Armenia has been included in a number of cross-country studies that mainly use DYMIMIC (dynamic multiple-indicators multiple-causes) models of structural equations (Schneider, 2016). As such, the goal of this paper is to apply the Currency Demand Approach to the case of Armenia, becoming a sporadic tailor-made attempt to quantify the shadow economy specifically in Armenia. Several model adaptions and extensions will be considered to best serve this purpose.

III. Research Methodology

Motivating the model framework

As already highlighted, for the purposes of our analysis we will be using the Currency Demand Approach. The main postulate of the model is that the transactions in the shadow economy are being conducted in cash money in an effort to hide these activities from tax authorities. Further to this, it is noted that the main motivation for economic agents to hide their transactions is to avoid paying taxes. Hence, changes in the level of taxes (that trigger changes in the underground activities) become one of the main determinants for the demand

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[5] **Cagan P.,** The Demand for Currency Relative to the Total Money Supply, Journal of Political Economy, 66, 1958, pp. 302–328. **Feige E.** Defining and Estimating Underground and Informal Economies: The New Institutional Economies Approach, World Development, vol.18, No 7, 1990, pp. 989-1002.

for cash currency acting as a proxy for the shadow economy (Schneider & Enste, 2000). Undoubtedly, there are other economic variables capable of influencing the demand for cash currency. These variables include but are not limited to the level of national income & GDP, government regulations and tax morale, interest rates, payment habits and technological advancements in e-commerce and others. To isolate the excess demand for cash currency resulting from shadow activities, an equation for currency demand is estimated over time. Tanzi (1983) proposed using the weighted average tax rate (as a proxy for changes in the size of the shadow economy), the proportion of wages and salaries in the national income (to capture changing payment and money holding patterns), the interest paid on savings deposits (to capture the opportunity cost of holding cash) and the per capita income as the main explanatory variables for cash demand[6]. Any excess demand that is not explained by the mentioned conventional economic variables is then attributed to the rising taxes and the resulting shadow activities. By estimating the amount of cash currency used in the underground layer, we will be able to quantify the shadow economy and compare it to the official numbers of GDP.

Based on the initial model framework put forward by Cagan, researchers have over time proposed differing sets of explanatory variables. However, there are some variables, derived from the economic theory, that are common in all model variations. To begin with, according to the Keynesian liquidity preference theory (Keynes, 1936) and Friedman's general money demand theory (Friedman, 1956), a standard model for narrow money demand can be presented:

$$ln\,M = \beta_0 + \beta_1\,ln\,y + \beta_2 r + \beta_3 \pi,$$

Where *M, y, r* and *π* denote real narrow money, real total income, the interest rate, and the inflation rate respectively. The relationship between real income and demand for cash currency is quite straightforward from the theoretical point of view - the changes in the level of economic activity directly affect the number of monetary units needed for servicing the conducted transactions. Both the interest rate and the rate of inflation represent opportunity costs for holding cash money, and are expected to have a reverse relationship with the latter. Depending on the payment habits, it is also possible for inflation rate to have a positive correlation with the demand for cash currency: when prices go up, consumers start to carry more cash money to be able to pay for the goods and services they receive. Herwartz et al. (2015) have established that in poorer economies, where the share of unofficial activities is higher, the omission of the shadow activities from the model results in the overestimation of the income elasticity of money demand and the underestimation of the interest rate semi-elasticity. Therefore, many authors, including Cagan (1958), have incorporated tax variables in the model as a proxy for the share of the shadow economy.

Gaps of the model and the applied extensions

Although this is the most widely used method internationally, it is only still open to criticism. The main arguments include[7]:

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[6] **Tanzi V.,** The Underground Economy in the United States: Annual Estimates, 1930–1980, IMF Staff Papers, 30, 1983, pp. 283–305.

[7] **Schneider F., Buehn A.,** Estimating the Size of the Shadow Economy: Methods, Problems and Open Questions, IZA Discussion Paper 9820, 2016.

(i) Not all shadow transactions are conducted in cash as some barter transactions also take place. It can be noted, however, that barter transactions constitute a very small portion of all transactions, and they tend to be of lesser monetary value. Thereby, the model calculations should not be significantly different from the actual numbers.

(ii) Most studies consider only one particular factor - the tax variable, as a cause of the shadow economy. Although the tax variable is expected to be the strongest element, other factors like the impact of state regulations, tax responsibility and morale, corruption etc. can also be important. However, the inclusion of these variables in the model is hindered by the lack of reliable data.

(iii) In many developing countries (including in Armenia) where the level of dollarization is very high, the model results do not include the shadow transactions that are carried out in other currencies (US Dollar, Euro etc.). Feige (1989) argues that currency substitution, dollarization, or elminting - the use of a foreign currency in parallel to or instead of the domestic currency, can all have substantial impact. The collection of trustworthy information about the amounts of cash foreign currency held by economic agents and the monitoring of its usage are arduous, and sometimes impossible tasks to accomplish. Economic theorists and researchers have not yet been able to devise an indirect calculation methodology that would allow to capture these underground activities by exploiting the data available for associated variables. A possible remedy for this problem can be direct surveys and questionnaires conducted on micro-level that will allow to gain a better insight about the volume of underground activities mediated by cash foreign currency.

(iv) Most studies assume the same velocity of money in both the official and unofficial layers of the economy, and have to resort to using the velocity observed in the official economy for calculating the shadow economy.

(v) The model assumes that there is no shadow economy during the base year of the study – a notion far too dubious and unrealistic. Within this study, we will not be adhering to this assumption. To overcome this obstacle, we will use the estimations about the level of the shadow economy as calculated by the National Statistical Service of Armenia. In 1999, the Service made a rare direct measurement effort by conducting a survey among 9,000 households. The results indicated that the shadow economy variated in the vicinity of 30% at the beginning of the millennium.[8] This is a good example where different estimation strategies can be dovetailed to yield better results.

Moreover, I will examine the significance of the USD/AMD exchange rate and the level of private remittances as explanatory variables for the cash demand in the Armenian context. As discussed, in countries where the level of dollarization is high, economic agents often use foreign currency both as a medium of exchange and a store of value. Whether agents convert their dollars and create demand for cash AMD or resort to using USD is determined by the exchange rate. We anticipate that when the exchange rate goes up, which implies depreciation of AMD (direct quote of exchange rate is used), the demand for cash AMD will decrease. The same line of reasoning applies for the

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[8] **Tunyan B.,** The Shadow Economy of Armenia: Size, Causes and Consequences, Armenian International Policy Research Group, Working paper No.05/02, 2005, p. 3.

level of remittances as well: large volumes of foreign remittances enter the Republic in USD, which then are being converted to AMD and used mainly for consumption purposes. Thereby, the variations in the volume of remittances can potentially alter the cash demand as well.

IV. Conclusions

Based on the model framework presented above, the initial regression equation for the cash demand will assume the following specification:

$$C_t = \beta_0 + \beta_1 GDP_t + \beta_2 T_t + \beta_3 CPI_t + \beta_4 R_{t_t} + \varepsilon_t,$$

where C_t is the demand for cash currency (cash money in circulation), GDP_t is the nominal *GDP*, T_t is the level of collected taxes, CPI_t (Consumer Price Index) in chosen as the indicator for inflation and R_t is the Interest Rate for deposits. Consistent with the hypothesis presented in the previous section, we expect for *β₁, β₂* and *β₃* to have a positive sign, and *β₄* to have a negative sign (as noted, *β₃* can also assume a negative sign).

Data description

For the purposes of this analysis we will be using the quarterly data for the select variables. The data set has been obtained from the statistical databases of the Central Bank of Armenia and the National Statistical Service of Armenia. The data set ranges from the beginning of 2001 to the end of 2017. The values for the variables ranging from 1992-2000 have intentionally been left out as these years have been quiet tumultuous for the country's economy - the reform of the economic system, structural changes, the introduction of AMD, political factors have all resulted in drastic variations of the recorded values (especially in the cash demand and the tax collections), which, in my opinion, may distort the outcomes of the model.

It is worth noting that as an indicator of inflation I have chosen the quarterly consumer price index compared to the preceding quarter (12-month inflation), and as an indicator of the opportunity costs of holding cash money - the interest rate for deposits extended to individuals in AMD. Further to this, the variables for GDP, tax revenue, cash in circulation and the private remittances have been subjected to seasonal adjustment. The need for seasonal adjustment becomes apparent from the analysis of the time plots of the variables. The seasonal adjustment has been achieved via the tool "U.S. Census X-12-ARIMA".

As presented in Table 1,68 observations will be included in the regression analysis. The mere visual inspection of the maximum and minimum values of the variables obviates significant variations in the macroeconomic variables over time. It can also be observed that during the period under consideration both the quarterly nominal GDP and the collected taxes have multiplied equally, by increasing nine times, which implies that the efficiency of the tax administration of the government has remained surprisingly unaltered.

Table 1

Summary statistics for the unadjusted values of the observations

Variable	Observations	Mean	Std. Dev.	Min	Max
Cash demand (mln AMD)	68	237134.8	116932.6	49037.38	409118.9
Nominal GDP (mln AMD)	68	825515.1	330966.3	281476.4	1483061
Collected taxes (mln AMD)	68	155391.8	84256.44	37506.73	302479.3
Exchange rate	68	443.5466	82.12353	302.3	586.59
Consumer price index (%)	68	0.941471	3.151516	-6.9	6.5
Interest rate for deposits (%)	68	10.15824	3.783579	4.66	22.26
Private remittances (mln AMD)	68	116.8418	42.52439	42.5881	194.9795
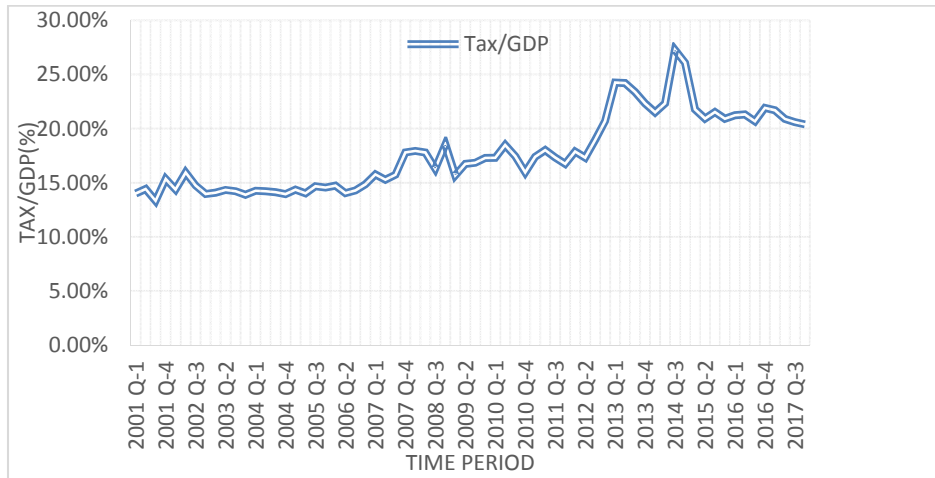
Graph 1:   *Tax burden in Armenia (% of GDP)*

According to the above-presented graph, during the time period under observation tax burden has mostly variated in the vicinity of 15-20% notwithstanding the changes in the tax environment. The highest amount of taxes has been collected during the third quarter of 2014 following a downward trend afterwards.

Table 2

Model output summary

	Model_1	Model_2	Model_3	Model_4
Main	b/se	b/se	b/se	b/se
Cash Demand (1st lag)	0.279**	0.255*		
	(0.10)	(0.11)		
GDP	0.016	0.028	0.013	0.020
	(0.03)	(0.03)	(0.04)	(0.03)
CPI	-78.399	-55.975	-203.422	-113.397
	(449.69)	(492.07)	(578.03)	(648.05)
Interest Rate	-105.252	-26.239	-403.782	-283.283
	(461.55)	(529.68)	(957.15)	(989.66)
Tax	0.503**	0.609***	0.556***	0.617***
	(0.16)	(0.17)	(0.14)	(0.13)
Remittances	378.889**		323.585*	
	(117.33)		(154.07)	
Exchange rate		-214.604		-215.365
		(120.09)		(151.94)
_cons	2307.918	1232.629	6817.749	5322.487
	(5007.13)	(5719.26)	(8695.10)	(9828.28)
ARMA				
L.ar			0.438	0.467
			(0.37)	(0.42)
L.ma			-0.190	-0.224
			(0.40)	(0.44)
Sigma				For ou
_cons			10575.816***	10998.873***
			(747.49)	(815.91)
r2	0.481	0.421		
df_r	59.000	59.000		
Aic	1421.540	1428.803	1449.900	1455.131

In order to avoid spurious results, the variables have been tested for stationarity using the Augmented Dickey Fuller test. Based on the results, the variables for the cash in circulation, GDP, tax revenue, remittances and the exchange rate have been first differenced while in case of inflation and the interest rate, the unit root hypothesis was rejected with a P-value of less than 0.05. Further to this, the application of Breusch Godfrey test has revealed the presence of autocorrelation, which disappears when the first lag of the dependent variable is incorporated into the model. The below table summarizes the information regarding four model options.

Based on Akaike Information Criterion (AIC), we will be selecting model_1 for our calculations. This model also has a higher coefficient of determination. The updated model specification will assume the following specification

$$\Delta C_t = \beta_0 + \beta_1 \Delta C_{t-1} + \beta_2 \Delta T_t + \beta_3 CPI_t + \beta_4 R_t + \beta_5 \Delta GDP_t + \beta_6 \Delta Rem_t + \varepsilon_t,$$

where Rem_t is the variable for private remittances. According to the Bresuch-Pagan test, the null hypothesis of homoskedasticity cannot be rejected, and the variance inflation factors do not indicate presence of multicollinearity.

The regression analysis allows us to obtain the values of the β parameters. We then use the values of the parameters and the included independent variables to calculate the volume of additional (excess) cash demand ΔC_t that has been generated during each quarter. It is important to note that this ΔC_t amount is determined by all of the included variables of the model, out of which ΔC_{t-1}, CPI_t, R_t, ΔGDP_t and ΔRem_t are conventional explanatory variables derived from economic literature, and ΔT_t has been included to capture the changes in the shadow economy. Therefore, the portion of this additional cash demand that is constituted by the tax variable represents the amount by which the cash demand used in the shadow economy has changed.

$$\Delta C_t = \Delta C_{t,offical} + \Delta C_{t,shadow},$$

where ΔC_t is the overall change in the cash demand, $\Delta C_{t,official}$ is the change in the cash demand in the official (registered) economy and $\Delta C_{t,shadow}$ is the change in the shadow economy. Further to this, as already discussed, the model assumes that the velocity of money in the shadow and official layers of the economy are equal meaning that we can calculate the share of the shadow economy in the overall GDP by comparing the amount of cash used in the underground economy to the volume of overall cash in circulation. Hence, knowing that in the base year the share of the shadow economy was 30%, we can easily calculate the starting values of C_1, $C_{1,official}$ and $C_{1,shadow}$. From this point, it is a matter of arithmetics to calculate the values of C_t and $C_{t,shadow}$ for all subsequent periods. The comparison of these two numbers will provide us with the share of the shadow economy for the timeframe under consideration.

The results of the calculations are presented in Graph 2. Starting at 30% during the base year, the share of the shadow economy generally exhibits a downward trend during the periods of high economic growth of early 2000s. The underground activities reached their minimum level in the first quarter of 2009 constituting 24% of all transactions. Further to this, it can be observed that after the global financial crisis of 2008, economic entities have started to move their activities into the informal layer of the economy more intensively. It can be argued that the increase of the shadow economy has also had a stabilizing

impact in the post-crisis periods as it allowed economic agents to protect their competitiveness and financial soundness. Shadow economy has reached its peak value of 38.3% during the third quarter of 2015 assuming a moderately decreasing trend afterwards.
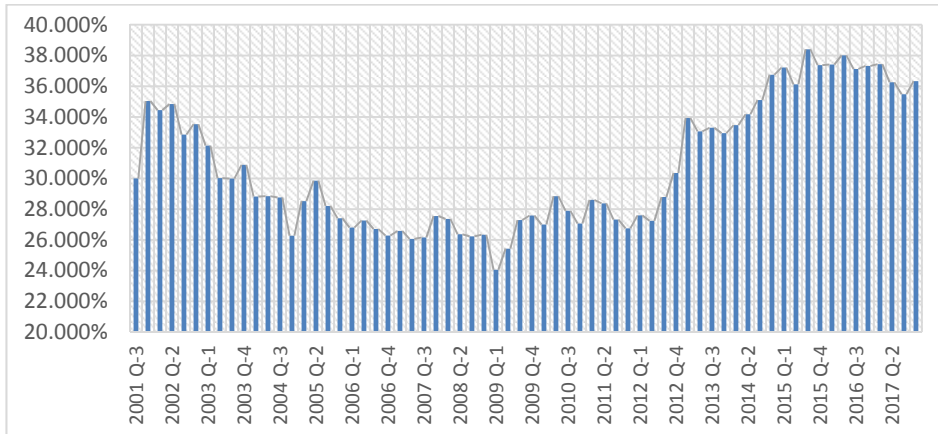
Graph 2:   *Share of the shadow economy in Armenia (% of GDP)*

Discussions

Shadow economy is a complex phenomenon present, to a significant extent, in both developing and developed economies. As discussed in the literature review, there are no perfect methodologies capable of precisely measuring the volume and the composition of all shadow activities. However, empirical outcomes derived through different estimation methodologies allow us to gain valuable insights about the approximate volume and the dynamics of the shadow economy.

The model results show that starting from 2001 the shadow economy in Armenia has varied from 24% to above 38% of the actual GDP. Such significant results come to confirm the hypothesis that in conjunction with Gross Domestic Product and income, a whole spectrum of other associated macroeconomic variables, including unemployment and the demand for cash, are distorted by underground activities. As a logical consequence, the available macroeconomic statistics become inappropriate to guide policy makers in making decisions, and policies implemented based on this data may address the wrong issues, and yield undesirable results and consequences. The above calculations extend a useful tool for controlling the impact of unrecorded activities and adjusting the data framework.

Further to this, it can be calculated that the government has lost around 170 bln AMD in tax collections in the fourth quarter of 2017 alone. This is an especially important piece of information for countries like Armenia where the fiscal position of the government is not strong. Such a high volume of underground activities can also distort the market competition among companies by giving those economic agents, that hide their transactions, an unfair competitive advantage.

The high level of the shadow economy, as presented above, provide grounds for arguing for a more proactive government policy aimed at tackling the shadow economy in the country. The existing literature is unanimous in

confirming the effectiveness of electronic payment methods in addressing the issue. The latter can be promoted by introducing a threshold for cash payments and designing tax incentives for both consumers and merchants. This can be achieved by providing payment card users with special benefits directly related to their cards, such as discounts, cash-back or reward points redeemable for prizes. As the deployment of POS terminals can be costly, it is also worth considering the provision of tax incentives to those merchants that utilize these methods thus leading to a reduction in cash payments. Further to this, modernizing the tax and customs services and devising stronger monitoring instruments and control mechanisms in respective government institutions can have a significant impact in curbing the shadow economy.

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ԱՆԴՐԱՆԻԿ ՄԱՆՈՒԿՅԱՆ
ՀՊՏՀ միջազգային տնտեսական հարաբերությունների
ամբիոնի ասպիրանտ

Ստվերային տնտեսության քանակական գնահատումը
(ՀՀ օրինակով).– Սույն հոդվածը նպատակաուղղված է Հայաստանի Հանրապետությունում ստվերային տնտեսության գնահատմանը անուղղակի չափման մի մեթոդաբանությամբ, որը տնտեսական գրականության մեջ հայտնի է որպես «արժույթի պահանջարկի մեթոդ»: Ելնելով ՀՀ տնտեսության առանձնահատկություններից, ինչպես նաև վիճակագրական տվյալներից` մի շարք փոփոխություններ և հավելումներ են կատարվել մոդելի նախնական համակարգում: Մասնավորապես, մեղմացվել են մոդելի որոշ ենթադրություններ և դիտարկվել է հաշվարկների համակարգում այնպիսի մակրոտնտեսական փոփոխականների ներառումը, որոնք կարող են նշանակալի լինել երկրում կանխիկ արժույթի նկատմամբ պահանջարկի ձևավորման հարցում: Հաշվարկների արդյունքները ցույց են տալիս, որ, սկսած 2001 թվականից, Հայաստանում ստվերային տնտեսությունը տատանվել է համախառն ներքին արդյունքի 24%-ից մինչև 38%-ի միջակայքում, ինչի հետևանքով ՀՀ-ն, միայն 2017 թ. վերջին եռամսյակում, կորցրել է 170 մլրդ դրամի հասնող հարկային եկամուտներ: Ընդհատակյա գործառնությունների այսպիսի բարձր մակարդակը հիմնավորում է ստվերային տնտեսության գնահատման անհրաժեշտությունը` պետական կառույցները մակրոտնտեսական մակարդակում իրականացվող մի շարք քաղաքականությունների արդյունավետ մշակման համար ավելի արժեքավոր տվյալներով զինելու նպատակով:

Հիմնաբառեր. Հայաստան, ստվերային տնտեսություն, անուղդակի գնահատման մեթոդներ, արժույթի պահանջարկի մեթոդ, ռեգրեսիոն անալիզ, տնտեսական քաղաքականության մշակում
JEL: C02, H83, O52

АНДРАНИК МАНУКЯН
Аспирант кафедры международных
экономических отношений АГЭУ

Количественная оценка теневого сектора эконо
мики (на примере РА).– Данная статья нацелена на оценку теневого сектора экономики в Республике Армения методом непрямой оценки величины, известным в экономической литературе как "метод спроса на валюту". Исходя из особенностей экономики Армении, а также наличия статистических данных, в первоначальную систему модели был внесен ряд изменений и дополнений. В частности, были смягчены некоторые допущения модели и было рассмотрено включение в систему расчетов таких макроэкономиче-

ских переменных, которые могут быть значимыми в вопросе формирования спроса на наличную валюту в стране. Результаты расчетов показывают, что с 2001 года теневая экономика в Армении колебалась в пределах от 24% до 38% от ВВП, в результате чего только в последнем квартале 2017 года Армения потеряла налоговые поступления на общую сумму в 170 млрд драмов. Такой высокий уровень подпольной деятельности обосновывает необходимость измерения теневой экономики с целью снабжения государственных структур более качественными данными для разработки ряда эффективных политик, проводимых на макроэкономическом уровне.

Ключевые слова: *Армения, теневая экономика, методы непрямой оценки, метод спроса на валюту, регрессионный анализ, разработка экономической политики.*
JEL: C02, H83, O52