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## The Shadow Economy of Armenia: Size, Causes and Consequences

Bagrat Tunyan\*

The World Bank Armenia Country Office  
btunyan@worldbank.org

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### Abstract

Over the past decade or so the problems caused by the shadow economy have become a major concern for policy makers, researchers, as well as the donor community in Armenia. The shadow economy has had some negative consequences during the past transition period, but it also has played some positive stabilizing role. The paper discusses various factors that have contributed to the development of the shadow economy in Armenia. The main causes for the existence of the shadow economy are argued to be the tight and unfair tax administration and regulations, and the corruption. Many of the shadow activities in Armenia relate to the problem of non-reporting and/or underreporting by business entities. International experience and various methods of estimation of shadow economies are presented in the paper. Two of them, namely currency demand approaches of Tanzi and Gutman, are adopted and used for the estimation of the shadow economy in Armenia for the period of 1994-2004. The findings of the estimation by these two methods suggest that there is a significant amount of economic activities that are not captured by the official statistics. Some policy implications and recommendations are presented at the end of the paper.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the Armenian International Policy Research Group. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

**Keywords:** shadow, underground economy, corruption, tax evasion, transition economies

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## Introduction

Over the past transition period the Armenian economy has undergone a systematic transformation, and new systems of economic, social and political relationships have emerged in our society. Individuals and companies have also faced a significant challenge of adjusting to a new economic, political, legal and social environment, which in many cases required abidance to new strict rules and restrictions imposed by the government. On the other hand, during the past decade or so the government itself was transforming and creating new institutions necessary for effective management of the public sector and creation of favorable conditions for private sector development under the market economy conditions.

During these past years of transition period there has been a growing concern among economists and policymakers over the existence of the shadow economy. A few would deny in Armenia that today there are a significant number of economic transactions and activities that are not captured by the statistical authorities. All these hidden activities have contributed to the growth of the shadow economy of Armenia.

Because of its multifaceted nature there is still no overall agreement on the terms and definitions used to describe the problem of shadow economy. Various definitions and terms have been used in the international and local literature to describe the phenomenon that is widely known as shadow or underground economy. Terms such as underground, black, parallel, second, unofficial, unobserved hidden, cash, unreported, unrecorded, illegal, informal, irregular, subterranean, submerged have been used in the professional literature to refer to the economic activities that were fully or partially not observed by the statistical authorities.

Today, the problems of shadow economy and the measurement of its size and scope are a major challenge for Armenia's further development. Because of 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. The government itself realizes the need to fight the shadow economy and devoted a section about the problem in its Poverty Reduction Strategy Paper (2003). The PRSP highlights the problem of shadow economy and mentions tighter control over incomes resulting from illegal economic activities and limiting of cash transactions as the main directions for the government's strategy aimed at reducing the hidden economic activities<sup>1</sup>. The MTEF program for 2005-2007 approved by the government also highlights the need to fight against hidden economic activities to raise the tax revenues to GDP ratio by 0.4% annually<sup>2</sup>. In various public statements, the President has also underscored the widely used practice of underreporting of actual turnover and economic transactions by business entities.

Despite the importance of the problem so far there has been very limited research discussing this phenomenon in Armenia. The National Statistical Service makes some estimates of the size of the shadow economy, which, however, are not done in a comprehensive and periodic manner. The most recent figure about the official estimate of

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<sup>1</sup> Armenia-Poverty Reduction Strategy Paper. Chapter 6.3.2, para 196, Yerevan, 2003.

<sup>2</sup> Medium Term Expenditure Framework, p. 27, Yerevan, Armenia.

the size of the underground economy of Armenia was published in 1999, according to which the size of the unrecorded sector of the Armenian economy in 1999 was at a level of 28.9% of the official GDP<sup>3</sup>. This number was estimated based on the findings of a survey of 9,000 individuals. However, the year 1999 was the last year when such a survey about the underground economy was conducted and for later years the official statistics used about 30% estimate in calculation of the official GDP. While this method captures some part of the informal sector, however it is not capturing the whole size of the shadow economy. More thorough and regular study of the problem and its development trends is critical in better understanding the ongoing economic processes and making relevant adjustments and corrections in the policy measures.

### **Shadow Economy of Armenia: Causes and Consequences**

We will start with understanding the definition of shadow or underground economy. A simple definition of the shadow economy is that it is the part of the gross national product that, because of non-reporting and/or underreported is not included in the official statistics<sup>4</sup>. It can also be defined as a part of the total GDP (official and unofficial) that has been left outside the official statistics because of other reasons, not necessary only for tax evasion. The latter includes the production of and trade in illegal products and services, unrecorded economic transactions that are due to the underdeveloped system of national statistics, as well as barter transactions and economic activities carried out by n households. So, in general the shadow activities can be divided into four main categories: (i) underreported or not-reported; (ii) illegal; (iii) unrecorded; and (iv) household activities and barter transactions. In the following sections we will discuss these types of shadow activities in the Armenia.

The major part of the shadow economy is assumed to involve those activities that were not recorded by the statistical services because of non-reporting or under reporting by business entities and citizens, and the main indicator of this hidden part is the difference of the total tax revenues estimated on the real level of all economic activities (not the planned budget figures) and actually collected tax revenues by the state tax service. This part of the shadow economy is of particular interest because of the significant policy implications it can have.

Although the international experience and the academic literature suggest that the main reason for the existence of the shadow economy are high rates of taxes and other mandatory payments imposed by the government, however, in Armenia these have not been the only major factor contributing to the existence of shadow economy. On the contrary, the tax regime in Armenia is considered as lenient with relatively low tax rates. Widespread corruption and ineffective systems of accountability in the public sector have had largely contributed to the expansion of hidden economic activities in Armenia during the past decade. Corruption in the public sector has been one of the major factors that contributed to the growth of the shadow sector of the economy in Armenia. More corruption provides both incentives and reasons for the businesses to go underground. By

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<sup>3</sup> National Statistical Service of Armenia, 1999.

<sup>4</sup> First provided by Tanzi (1980)

paying the tax inspectors or other government agencies the regular “tax-bribes” the businesses consider themselves protected for the coming periods and get incentives to hide even more in order to justify the payments made. On the other hand, during the past ten years many of the government institutions were just being formed and there was no professional civil service or other special public services on place. All these provided favorable and not risky environment and conditions for public officials to look for corrupt practices that in many cases involved taking bribes or abusing the public offices for private gain. One of the few studies on shadow sector of the transition economies also suggests that one of the main reasons for the companies to go underground is to avoid the burden of administrative regulations and taxations; institutional aspects and regulatory discretion play a greater role in expansion of the shadow economy<sup>5</sup>.

For economic entities the bribes paid to the tax or other state officials have been preferable to the official taxes to be paid to the state agencies because of several reasons. First, and foremost, the bribe paid to the tax officials are usually lower than the real tax amounts that should be paid to the tax authorities. Second, non-payment of taxes saves some time for the business entities, because it limits the required paperwork and visits to various state agencies. The tax regulations and bureaucracy in the Armenian state apparatus are so much complicated that some economic agents prefer going underground not only for evading taxes, but mostly for avoiding to enter the official state registry so that to save their time and energy. Being a fair taxpayer is not rewarded in the current system, because of regular harassments that these taxpayers would experience even more. Third, payment of taxes in their full amounts puts the entities in a competitive disadvantage since their underreporting competitors pay less. Fourth, usually regular payments of bribes to tax inspectors establishes special personal relationships between them, and over some period of time and with the expansion of a particular business the underreported amount increases even more.

Of course being in an underground is supposed to limit the businesses’ access to and rights for some benefits, such as bank credits and public goods, in the form of rule of law, and other benefits. However, in the Armenian reality these benefits have not materialized, because of the underdeveloped and ineffective systems of provision of such public goods, as well as the relationship based crediting widely practiced by commercial banks. The other major factor that has contributed to the existence of the shadow sector in Armenia is the widespread politicization of many businesses. Today, many public officials have stakes in or effectively own various businesses, and by using their role and position in the public sector they create favorable conditions for those economic entities. There is also the reverse trend of getting public offices using the economic wealth accumulated by engaging mostly in shadow activities.

The second group of shadow economy involves illegal activities. It should be realized that taxes and mandatory payments are not the major reason for existence of some types of shadow activities. Even if there were no any taxes or regulations there would still be some part of economic activities, mostly illegal ones, which would have not been captured by the official statistics. Some of the economic agents and citizens are involved in production or trade of such products and services that are prohibited by laws and various

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<sup>5</sup> Kaufman, D. and Kaiberda, A. (1996).

regulations, such as drugs, prostitution, trafficking and others. So, regardless of the tax regime and rates these illegal activities will not be reported and thus will be left out of the official statistics. It is important, however, to make a distinction among those illegal activities that have nothing to do with creation of economic values through production or trade.

There are some economic activities that are not being captured because of the underdeveloped systems of national statistics, as well as low and ineffective information sharing between various state bodies, such as national statistical service, tax, customs, state pension fund and others. Better coordination and information sharing would limit the chances of leaving some economic transactions from national accounts. While this problem was very serious in the early stages of transition, however, today the national statistical service is quite developed and these unrecorded economic activities does not constitute a major part in the total shadow economy of Armenia.

The fourth group of the shadow economy includes those activities that are carried out using household activities and barter transactions. Some parts of the total economic activities are not included in the official statistics because of difficulties of their measurement and/or ineffective and underdeveloped mechanisms and tools used by the statistical service for collection of relevant information from all sectors of the economy. Although the concept of the gross national income suggests that the national accounts should involve all economic activities of the society, however the most of the values created by households are not measured and accounted in the national statistics. Although these activities that are sometimes also illegal (like production and sale of homemade products, readjustments and reconstruction of apartments using relatives' and neighbors' labor and without any approval from relevant regulatory bodies and others), however they create economic values by using scarce economic resources taken from the official part of the economy. The main reason for not recording these types of activities in the official statistics relates to the measurement problem, as well as the fact that this issue has not been a major development problem for the Armenian authorities mostly because of the limited policy implications that it has and the existence of other more important areas for the government to focus on. The problematic aspect of this issue is the tendency of various households to grow and carry out such regular economic activities already on a paid basis. In this case, these activities that we categorized as unrecorded become non-reported hidden economic activities that are subject to full taxation. Some of the economic activities are also left out of official statistics because of underdeveloped systems of national statistical data collection.

Barter transactions are also left unrecorded in any official agency and statistics. This type of activities especially involving various agricultural products have been very popular particularly in the regions of Armenia. However, as it was with the unrecorded economic activities, barter transactions are very difficult to measure and they do not constitute a major policy issue to be much concerned with at this stage of Armenia's development.

High level of dollarization of the Armenian economy and population's low level of trust in the national currency and in the banking sector in general has created a favorable situation in which the businesses and population prefer to use US dollars, instead of drams

for making payments in large transactions. For official reporting the parties usually use smaller contract amounts, which allows them to limit their tax liabilities by underreporting the real value of the contract and in the official accounting. The state authorities are not able to capture this type of economic transactions because it is impossible to measure the amount of informally agreed contracts' values denominated in US dollars.

#### Why does the Shadow Economy matter?

There are several reasons why the existence of the shadow economy matters. First and foremost, economic policy measures can be misdirected and be of the wrong magnitude because of the measurement errors in economic indicators such as GDP, labor force, and national income caused by the hidden economy. In addition the underground economy can also result in overestimation of unemployment and inflation. As we already discussed above it is generally accepted that the shadow economy is mainly caused by high levels of tax rates, other forms of payments by the citizens and the existing cumbersome regulatory environment. Therefore, the growth of the underground economy may result in a decrease in tax revenues creating budget deficit problems. This is especially a significant issue for countries like Armenia, where, because of underdeveloped tax systems and difficulties associated with tax collection, the governments' fiscal positions are not strong. This is particularly true when we look at the overall tax collection ratio of Armenia (see Table 1). As we can see it is the lowest among all CIS countries. Moreover, during the past four years there has been a negative trend of fall of collection of tax revenues, particularly income and profit taxes.

**Table 1: Total Government Tax Revenues in Transition Economies, Percent of GDP**  
(excluding budget grants and non-tax revenues)

	1996	1997	1998	1999	2000	2001	2002	2003
Armenia, excluding SIF	10.8	13.3	14.4	17.3	15.5	14.8	12.5	14.4
Georgia	10.7	12.7	12.8	13.8	14.2	18.0	N/A	N/A
Kyrgyz Republic	17.3	16.7	18.4	15.9	15.3	15.4	N/A	N/A
Kazakhstan	11.4	12.2	16.2	16.0	20.0	19.7	N/A	N/A
Azerbaijan	17.6	19.1	19.5	18.2	20.8	20.5	N/A	N/A
Moldova	27.4	29.9	28.3	21.8	22.3	23.0	N/A	N/A
Albania	18.3	16.6	20.3	21.3	22.4	22.5	N/A	N/A
Lithuania	29.6	32.6	32.6	32.1	30.2	28.5	N/A	N/A
Russia	22.5	33.0	28.6	28.8	31.3	30.9	N/A	N/A
Macedonia	35.7	34.7	33.2	34.2	35.2	38.5	N/A	N/A
Ukraine	36.7	38.0	36.0	33.4	35.6	32.8	N/A	N/A
Estonia	37.7	39.2	36.9	35.5	35.6	38.3	N/A	N/A
Latvia	37.4	39.9	43.9	40.8	37.0	38.7	N/A	N/A
Slovak Republic	45.3	42.8	40.5	41.6	39.2	34.4	N/A	N/A
Bulgaria	35.9	35.1	37.7	40.3	41.3	N/A	N/A	N/A
Croatia	48.9	47.6	50.8	47.7	45.2	38.2	N/A	N/A

Source: Armenia Public Expenditure Review, World Bank, 2003.

Clearly, such a low level of tax to GDP ratio suggests that some parts of the economic activities that are recorded in the official GDP are not taxed at least fully, which results in the tax revenue to GDP ratio being at this low level compared to other transition countries. According to the government MTEF program this ratio will be increased at an annual rate of 0.4 percent, which would allow the government to implement the program of activities it has planned for the next years. This is aimed to be accomplished by more effective fight against corruption.

Another negative consequence of the shadow economy is that as it grows it attracts more and more people and thereby increases the demand for labor. This negatively impacts efficiency of the labor market in the official economy and distorts the resource allocation in the economy. In addition, widespread shadow activities negate the overall rule of law in Armenia, which is essential for its sustainable development. It also demolishes the moral of the citizens and fair economic players and worsens the distrust in the government.

In discussing these negative consequences of the shadow economy, we should also mention the positive role that it has played especially in the early stages of transition of the Armenian economy. Since independence in 1991 Armenia has experienced significant economic and social problems that were caused by various internal and external factors (blockade, energy shortage, war and others) that resulted in the increase of the poverty in the country. Many shadow activities, like mini production factories, unregistered street trade and other similar activities, while completely out of any official statistics, provided employment and income to thousands of families. In many instances, the earnings from the shadow economy has been the only source of income for the significant part of our society. Under these circumstances during the early 1990s the government “closed eyes” on many shadow activities and adopted relatively “mild” policies towards the latter. However, with economic stabilization and development negative aspects of the shadow economy outweighed this positive social role, and since 1998 the reduction of the size of the shadow economy has been a major part of Armenian government program.

The shadow economy has also played a significant role in stimulating the economic activities in the country as well as in educating the new businessmen in many skills. In the early stages of establishment of market economy, many people in Armenia engaged in various forms of economic activities that were not always fully registered in the official bodies and represented some part of the shadow economy. In some sense the shadow economy has been a place where many economic entities gained the initial experience and entrepreneurial skills, as well as collected necessary initial capital to be able to transfer into official sector of the economy. The shadow economy, to some extent, has played a positive role and stimulated the overall economic activities in the country. It has generated employment and additional income, which is especially important for the poor part of the population.

### **Methods of Estimating the Size of the Shadow Economy**

It is important to realize that because of the nature of the problem, it is almost impossible to measure the exact size of the economic activities taking place in the shadow economy in any country of the world, whether developed or less developed. Over the past

decades different authors and research institutions have tried to develop effective methods for estimating the size of the shadow economy in many countries, but there is no clear preference for any particular method or approach. There is even less literature and research about the measurement methods of the shadow economies in transition countries of former Soviet Union. However, the review of the professional literature suggests that the methods used to estimate the magnitude of the underground economy can be categorized into two main groups: *direct* and *indirect*<sup>6</sup>.

The direct approaches use volunteer surveys and samples to get information about the hidden economy *directly* from its participants. A sample of individuals and businessmen is chosen and respondents are asked whether they have participated in any underground activity or not. If the sample is representative enough and the participants are sincere in their answers then it is possible to estimate the extent of the shadow economy. As one can fairly argue the results of such surveys may not capture all the hidden activities in the economy because the estimation depends on the honesty of the questioned individuals. It is unlikely that any illegal economic activity that may also involve some criminal elements be reported to surveyors. This is especially true for the transition countries like Armenia where there is still a strong fear about the real confidentiality of any survey, and the survey participants are afraid to reveal the truth about their economic activities. The direct methods are not able to provide any information about the developments or trends of the underground economy over time. They only provide "point estimates" of the size of the shadow economy. Another disadvantage of the micro approach<sup>7</sup> is that surveys are relatively expensive to conduct, and comparable surveys across different countries are unavailable. These and many other factors have brought a great deal of criticism on the direct methods as evidenced with the review of the professional literature. However, one significant advantage of this group of methods is that it reveals very useful information about the structure and composition of the labor force employed in the underground economy.

In contrast to the direct methods, the *indirect* methods use different macroeconomic indicators to estimate the size of the shadow economy. Therefore, this approach is sometime referred in the literature as macroeconomic approach. Many economic indicators are affected by the development of the hidden economy. Because they are based on existing macroeconomic data, many countries have used these methods to assess the size of the hidden economy. Bellow, we will provide the brief description of the most popular indirect methods used in different countries of the world.

The first method that has been used to measure the size of the underground economy is the *discrepancy between total national expenditure and income*. Because there are two ways to compute national income-through the measurement of aggregate expenditures or income- many countries find that national income calculated from reported total expenditure exceeds the national income calculated from reported income. The "initial discrepancy" between expenditure and income can be the estimate of the size of the

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<sup>6</sup> Aigner, Schneider, and Ghosh (1988).

<sup>7</sup> Feige (1990).

underground economy<sup>8</sup>. A much discussed disadvantage of this method is that the discrepancy in national accounts may be due to measurement errors in national account statistics rather than the size of the underground economy. This is especially true for the former socialist countries of Central and Eastern Europe that have made a transformation from an old accounting system into a new one; in these countries during the early stages of transition there were some discrepancies in the data because of the incomplete transition to the new national accounting standards.

The second macroeconomic indicator used in estimation of the size of the shadow economy is *the discrepancy between the official and actual labor forces of the country*<sup>9</sup>. The key assumption of this method is that any decrease in labor force activity in the regular economy is considered an increase in labor force participation in the underground economy. The difference between the official and actual labor forces' participation (including the hidden economy) gives the estimate of the labor force employed in the underground economy. The main shortcoming of this method is that fluctuations in the size of the labor force can be the result of changing economic incentives, rather than the growth of the underground economy.

The third *transaction* approach<sup>10</sup> is based on Irving Fisher's quantity theory of money, which can be presented by this equation:  $M*V = P*T$ , where, M - money supply (currency in circulation + demand deposits); V - velocity of money; P - prices; T - total transactions. The basis for this approach introduced by Feige (1979) is an assumption that any economic activity, whether official or underground, uses cash money for transactions. If the money supply and the velocity of money are known, then the value of total transactions (PT) can be calculated. Assuming the value of the total transactions is equal to the total nominal GNP, then the difference between total nominal GNP and officially measured GNP is the estimate of the value produced in the underground economy. Feige assumed that the velocity of money is equal for both the underground and official economies. Then he makes assumptions about the "base year", when the level of underground economy is very low. Thus, the ratio of the value of total transactions and official GNP in that particular year is minimal, and would have been unchanged over time.

The fourth group of methods widely used in different countries is called currency demand approach. These methods are based on estimation of the demand for currency in the economy. The key assumption under this two methods is that the cash is the exclusive payment method in the shadow economy, and therefore, by estimating the total demand for

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<sup>8</sup> Park (1979) calculated size of the underground economy of the United States using this method and found a difference of \$82 billion or four percent of measured GNP between the estimate of personal income provided by the Bureau of Economic Analysis and the adjusted gross income on the basis of a sample of tax revenues reported by the Internal Revenue Service (IRS) in 1977.

<sup>9</sup> Contini and Del Boca (1978) calculated the underground economy of Italy using data on the labor force participation rate.

<sup>10</sup> Developed by Feige (1979). Feige applied the transaction approach to estimate the size of the underground economy of the United States. He took 1939 as a "base year", when he assumed there was no underground economy, because of low economic activity in the country at that time. He calculated the ratio of total nominal GNP and official nominal GNP equal to 10.3 in 1939, and took that figure as "normal". Applying this ratio in 1976 Feige estimated that the size of the underground economy of the United States was equal to 22 percent of the official GNP.

cash over some period of time it is possible to calculate the excess amount of cash used for the payments of economic transactions in the shadow economy. Both methods also assume that the main reason for the existence of the shadow economy is high tax rates and strict government policy in this area. These methods have been widely used in many developed countries of the world. In the next part of this paper we will use these two methods to estimate the shadow economy of Armenia for the period of 1994-2004<sup>11</sup>.

Another interesting method for estimation of the size of the shadow economy is called Total Electricity Approach<sup>12</sup>. The difference between the changes in total electricity consumption and official GDP is the basis for the estimation in this method. It was used for estimating the size of the underground sectors of some transition economies. The elasticity of "short run electricity-to-GDP ratio" (official and underground) is said to be close to 1<sup>13</sup>. Any difference between total GDP and official measured GDP is the estimate of the size of the underground economy. This method was used for estimating the size of the shadow economies in 24 transition economies for the period of 1990-1994. Later in 2002 this method was modified<sup>14</sup> and new estimates of shadow economy for the period of 1995-1997 were presented for these transition economies.

**Table 2: Shadow economy's size using electricity consumption method, as a percentage of official GDP, 1990-1997**

	1990	1991	1992	1993	1994	1995*	1996*	1997*
<b>Armenia</b>	<b>31</b>	<b>50</b>	<b>143</b>	<b>108</b>	<b>80</b>	<b>74</b>	<b>93</b>	<b>65</b>
Azerbaijan	28	22	16	52	79	103	101	99
Belarus	18	21	20	18	23	28	20	15
Bulgaria	34	34	34	34	32	44	70	-
Croatia	30	39	28	36	34	31	27	44
Czech Republic	7	18	18	23	24	24	25	23
Estonia	25	34	33	45	66	75	78	71
Georgia	33	45	112	153	116	126	105	87
Hungary	37	43	36	38	34	38	41	37
Kazakhstan	20	35	32	41	30	46	33	27
Kyrgyz Rep.	20	30	53	91	142	261	199	180
Latvia	15	21	49	40	35	38	39	-
Lithuania	13	19	23	36	43	38	11	
Macedonia	30	44	48	75	89	108	128	135
Moldova	22	45	88	41	130	127	140	-
Poland	24	30	23	21	17	15	13	-
Romania	29	21	24	19	11	12	15	24
Russia	17	18	30	35	45	53	54	52
Slovakia	6	15	14	19	16	11	18	-
Slovenia	30	35	33	30	33	35	34	-

<sup>11</sup> In the following part of the paper we will refer to these two currency demand methods as Tanzi and Gutman methods named after the researchers who first introduced them.

<sup>12</sup> Kaufman and Kaliberda (1996).

<sup>13</sup> Johnson, Kaufman, Shleifer, 1997, p.174.

<sup>14</sup> Eilat and Zinnes (2002).

Tajikistan	20	20	61	70	105	111	137	91
Turkmenistan	20	25	-7	-3	2	22	25	-
Ukraine	19	23	34	46	71	96	115	128
Uzbekistan	13	10	5	0	12	6	15	11

Source: Eilat and Zinnes (2002).

\*-Estimates of Modified Electricity Consumption method.

This method which is based on the data on electricity consumption is quite questionable, since the source data on electricity consumption in these sample countries, especially in early 1990s is not reliable. For example, in Armenia, because of energy crisis the real level of electricity production and consumption have been a controversial issue subject to public debates even until now. Therefore, one should be very cautious in interpreting and using estimates that are based on doubtful figures.

### **Measurement of the Shadow Economy of Armenia for the period of 1994-2004**

The only official statistics about the size of the shadow economy of Armenia was published in 1999. The National Statistical Service(NSS) of Armenia conducted a survey of 9,000 individuals which provided some information about the size and structure of the shadow economy in Armenia. According to the findings of that survey the informal sector of the Armenian economy is estimated to be of 28.9% from official nominal GDP. The following are the main findings of the results of the survey:

**Table 3: Official Estimated Level of Underground Economy of Armenia by Sectors, 1999.**

	Percentage
Industry	28.7
Construction	46.1
Transport and communication	21.1
Trade	75.5
Agriculture	21.0
Other Branches	27.1
GDP at market prices	28.9

Source: National Statistical Service, 1999.

While the NSS has not conducted similar follow up surveys during the next years, however, it estimated an increase in the underground economy and for 2002 it already used 30% estimate in adjusting the official GDP. As we discussed in the previous chapters, while such direct methods of estimation provide useful information about the structure of the informal economy, however, they are somewhat subjective and biased since rely on how much were the individuals sincere. Also, as it was the case in Armenia, the surveys are not easy to conduct every year.

The international experience suggests that indirect methods, which are based on some macroeconomic indicators can yield better and reliable estimates of the shadow

sector. However, as we saw one of the major difficulties for estimating the size of the shadow economy in transition countries, including in Armenia, is the absence of reliable and long-term data on both the micro and macro levels. It is worth mentioning that for Armenia and many other countries of the former Soviet Union, the national currencies were introduced and independent economic policies were implemented only in early 1990. This limits the ability to use various methods described above as well as run regression models that will be based on yearly data.

Despite the fact that we have only up to ten yearly observations in our sample period of 1994-2004, which limits our ability to run regression model based on yearly data, we still believe that the currency demand approaches are possible to apply in Armenia by using the available monthly and quarterly data. The original models of Gutman and Tanzi<sup>15</sup> were modified to better fit a less developed, transition economy setting. As discussed above the currency demand approach assumes that the shadow economy uses only cash money for making payments. This key assumption is well defended in our case, since during our sample period of 1994-2004, the major parts of transactions in the shadow economy have been made in cash.

#### Estimating the Size of the Shadow Economy Using Tanzi's Method

The following key assumptions were made in applying new currency demand method for estimating the size of the underground sector of the Armenian economy for the period of 1998-2004<sup>16</sup>. First, strict and tough tax administration and regulations were the main reason for the existence of the shadow economy. Second, only cash money is used to make payments in the informal economy. This assumption gives us sound reason to believe that any increase in the underground economy would raise the demand for cash in the economy. Therefore, by estimating the currency demand, it is possible to calculate the "excess" demand for currency that comes from the underground part of the economy. Under this methods, it is also assumed that the income velocity of money is the same in the official and underground parts of the economy.

The procedure for estimating the size of the shadow economy involves the following steps. First, the currency demand equation for Armenia is specified. Second, the coefficients on the explanatory variables are estimated. Third, the equation is estimated assuming the coefficient on the tax variable is equal to zero, while keeping the coefficients of the other variables unchanged. Fourth, the "excess" currency is calculated by subtracting the estimated currency with zero taxes from the initially estimated currency. This "excess" currency demand is attributed to the shadow economy. Fifth, the size of the underground economy is calculated by multiplying the "excess" currency by the income velocity of money, defined as the ratio of GDP to Currency in Circulation.

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<sup>15</sup> Tanzi (1980 and 1983) modified Cagan's (1958) original model of the demand for currency and developed his currency demand approach. In contrast to Cagan (1958), who took currency as the dependent variable for his equation of the demand for currency, Tanzi (1980 and 1983) took the ratio of currency to money, defined as M2, as the dependent variable, and developed his method for estimating the size of the underground economy

<sup>16</sup> Because of unavailability of reliable quarterly data on tax revenues for earlier periods the analysis under this method starts from year 1998.

We anticipate that the demand for currency in circulation in Armenia can be estimated using the following independent variables:

$$\text{Currency Demand} = f(\text{Tax/GDP}; \text{GDP}; \text{CPI}; \text{R}; \text{Ex})$$

+            +            +    -    +

where,

*Tax/GDP = the ratio of nominal total tax revenues to nominal GDP;*

*GDP = official gross domestic product;*

*CPI= consumer price index;*

*R = the annual average interest rate on deposits;*

*Ex = Armenian dram per US dollar exchange rat.*

In contrary to the model used by Tanzi, we followed the original model of currency demand introduced by Cagan in 1958 and use currency in circulation as a dependent variable of our model, instead of the ratio of currency in circulation to M2. Also, as a key explanatory variable for taxes we use the ratio of nominal total tax revenues to nominal GDP in contrary to the Tanzi's original model where marginal tax rates were used for capturing the tax burden and the effects of tight tax administration on the demand for currency. The main reason for such a change is the unavailability of quarterly data on marginal tax rates in Armenia due to the peculiarities of the tax system and the difficult process of tax administration during this transition period (existence of lump-sum tax payments, simplified taxes, unhealthy practice of advance tax payments and other factors). Because of the limited number of observations quarterly data is used and the selection of this ratio is best suited for this analysis. The selection of tax to GDP ratio is assumed in this equation to reflect the overall tax and customs burden on the businesses; higher ratio assumes that there was increased pressure on the businesses which would increase their incentives to go underground while increasing the demand for total currency in circulation. Based on the key assumptions of the model, we expect the coefficient on the (Tax/GDP) ratio to have a positive sign.

The other determinant for the currency demand in Armenia is the interest rates. We expect the coefficient on the interest rate on demand deposits (R) to have a negative sign. A higher deposit rate stimulates people to put their cash money in deposit accounts, and thus decreases the demand for currency.

We expect that the economic development of the country has a significant influence on the determination of currency demand. As the economy grows more and more transactions are taking place in the economy. Taking into account that most of the economic transactions, both in the official and unofficial sectors, are paid by cash, then it is assumed that the demand for currency increases with the growth of the economy. As a measure of economic development the real GDP is used. We expect a positive sign for the coefficient on the GDP variable.

Dollarization of the economy is a significant problem for Armenia. Although illegal, the major economic transactions in the economy (purchases of houses and cars for example) are still being undertaken in US dollars. Also, the US dollar is considered as the

main medium for storing wealth. Therefore, we included the exchange rate of the Armenian dram per US dollar in the model as we anticipate it has a huge effect on the demand for Armenian drams in the economy. Despite the recent trends in the foreign exchange market in Armenia towards the strengthening of the national currency, however, during the whole period under consideration the Armenian dram has been depreciating. Because of the high level of dollarization of the Armenian economy and the fact that for some large part of our society the remittances from abroad, any change in the exchange rate is likely to have an impact on the demand for currency. The exchanged US dollars would be traded for more Armenian dram, thus increasing the demand for drams.

We also think that the inflation should determine the demand for currency. The increase in the prices would push for demand for more cash in the circulation. However, the regression results showed that the inflation (CPI) was very insignificant and thus we removed it from the final equation. The estimation of the equation for currency demand yielded the following results:

$$C = - 92880.3 + 217461.2 (\text{Tax/GDP}) + 0.127 (\text{GDP}) - 789.721 (R) + 163.045(\text{Ex})$$

t stat	(-2.89)	(4.47)	(7.24)	(-3.82)	(3.36)
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$$R^2 = 0.95$$

$$\text{Adjusted } R^2 = 0.94$$

The estimation results show that all of the explanatory variables were statistically significant at the five percent level of significance. Therefore, the equation with these variables is chosen for our estimation calculations. All variables in equation are statistically significant at the 5 percent level and all coefficients except (GDP) and (Ex) have the expected signs.

#### Calculating the Size of the Shadow Economy

From this regression results we can estimate the currency in circulation ( $C^{\wedge}$ ) for each quarter of our sample period of 1998-2004. Based on our key assumption that the underground economy results from strict and tough tax administration and regulations, we set the coefficient on the (Tax/GDP) variable equal to zero, while other coefficients are unchanged. We then estimate the amount of the currency that would have been demanded if there were no taxes. From this procedure we obtain the value of currency in circulation if there were no taxes ( $C^{\wedge\wedge}$ ). We calculate the size of the currency used in the shadow economy by subtracting the estimated currency with zero taxes ( $C^{\wedge\wedge}$ ) from ( $C^{\wedge}$ ). We use the velocity of money, defined as the ratio of official GDP to Currency, and multiply it with the illegal money in the circulation to get the size of the underground economy. Here, however, we should accept that the velocity of money should have been even higher if the official GDP included the full size of the shadow economy. Table 3 summarizes our results and provides annual estimates of the size of the underground economy in Armenia for the period of 1998-2004.

**Table: 4 Illegal currency and Underground Economy calculated using Tanzi's new currency demand approach.**

	Illegal currency (mln AMD)	Velocity (GDP/Currency)	Underground Economy of Armenia		
			Quarterly	Annual (mln AMD)	Percent of official GDP
Q1-98	46,281.5	3.4	157,083.0		
Q2-98	32,925.6	5.9	193,993.6		
Q3-98	23,118.3	8.0	185,656.6		
Q4-98	21,992.8	8.5	186,747.0	723,480.1	76.0%
Q1-99	46,206.8	3.9	178,867.8		
Q2-99	32,097.4	6.7	214,155.1		
Q3-99	28,513.7	8.3	236,518.0		
Q4-99	32,177.5	7.5	240,030.6	869,571.5	87.7%
Q1-00	42,456.2	3.6	152,002.1		
Q2-00	33,270.7	5.5	184,614.0		
Q3-00	25,991.5	7.4	192,553.1		
Q4-00	27,828.7	6.0	166,696.4	695,865.6	67.4%
Q1-01	48,043.2	3.2	155,244.8		
Q2-01	36,893.8	4.5	165,890.1		
Q3-01	19,640.3	7.1	139,903.2		
Q4-01	25,096.1	6.2	155,885.7	616,923.8	52.4%
Q1-02	49,574.1	2.8	137,542.4		
Q2-02	36,756.6	4.6	167,819.6		
Q3-02	23,908.7	6.7	159,330.2		
Q4-02	24,291.1	5.4	131,323.2	596,015.4	43.9%
Q1-03	48,958.1	2.5	124,280.1		
Q2-03	33,283.8	4.3	142,880.0		
Q3-03	22,358.7	6.6	147,346.4		
Q4-03	24,703.2	6.1	151,816.3	566,322.8	39.0%
Q1-04	50,712.4	2.7	137,387.9		
Q2-04	33,432.1	4.7	156,583.9		
Q3-04	22,615.8	7.4	168,284.4	616,341.5*	42.5%

Source: Monetary data is from the Central Bank of Armenia.

\*/Note: The figures for nominal GDP for the fourth quarter of 2004 were estimated based on the available data of October, November 2004.

The findings of this model suggest that the shadow economy of Armenia was at its highest level in 1999 (87.7% of the official GDP or in absolute terms about 869,571 million drams). The lowest level of shadow activities is recorded in 2003, when the size of the hidden sector was about 39% of the official GDP. These estimates reflect those shadow activities that, according to the assumptions made under this methods, are due to the tight tax administration and regulations. However, it is also important to realize that the taxes are not the only major cause of shadow activities, and thus the real magnitude of the underground economy in Armenia should be higher than these presented estimates. In any case, these findings are very important in understanding the impact of tougher and

inefficient tax administration, as reflected in higher collected tax revenues, on the businesses and their incentives to underreport activities. Also, these are only these estimates capture only those parts of the hidden economic activities that used drams as their method of payments. The shadow activities that were paid in the US or other foreign currency are not reflected in these estimates.

### Estimating the Size of the Underground Economy Using Gutman's Method

Now we will try to estimate the size of the shadow economy of Armenia using the other currency demand approach first introduced by Gutman in 1977. This currency demand approach has been applied in many countries of the world and is based around some key assumptions made about the ratio of currency in circulation to demand deposits (C/D). First, as in the previous method this approach too assumes that the economic transactions in the shadow part of the economy use cash as the medium of payment. It is assumed that in any country there is a period when the underground economy is at its minimal level<sup>17</sup>. It is also believed that during the period with no or minimal underground economy the C/D ratio also takes its lowest magnitude. But the most critical assumption of this method is that the C/D ratio is constant over time and any change in that ratio is caused by the increase in the size of underground economy.

While realizing that the last assumption is somewhat weak, especially in a developing country setting, where the C/D ratio can be changed not only because of the shadow economy, but other factors, like economic growth, trust in banking sector, however, we think that an alternative estimates of the shadow economy would give us a better understanding about its size and trends for a longer period (1994-2004). We will also be able to compare the results with the estimates from Tanzi's method.

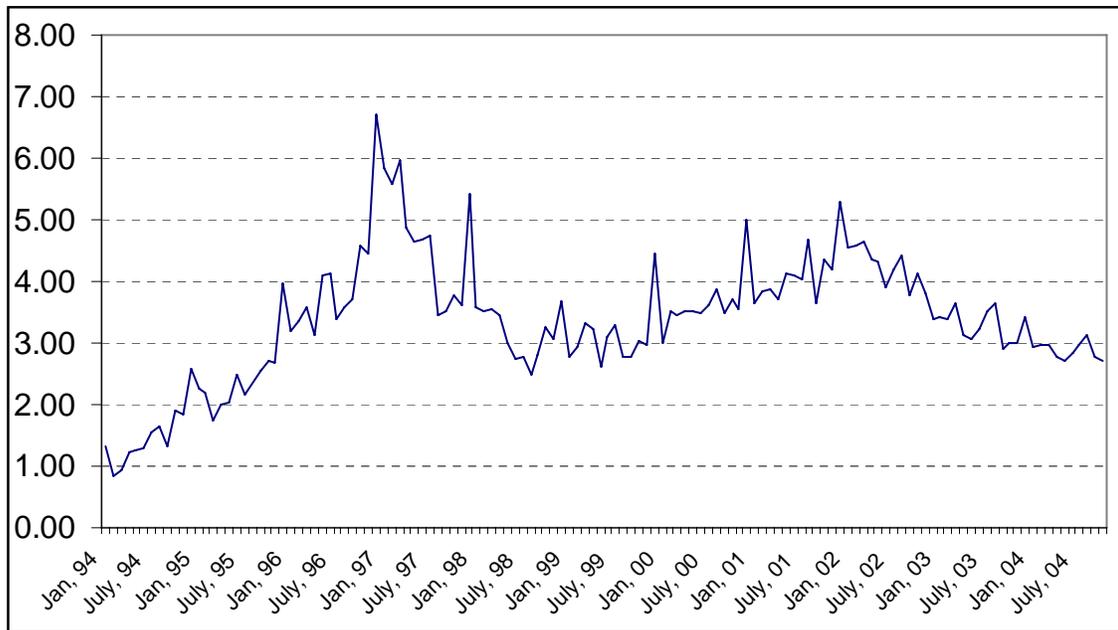
We have made several key assumptions under this method. *First*, it is assumed that during the period under consideration all transactions in the shadow economy of Armenia have been cash transactions. *Second*, the underground economy is the net result of high tax rates and restrictions imposed by government and that C/D ratio is influenced by the government rules and restrictions in the revenue mobilization area. *Third*, the average of the C/D ratio for the January-March, 1994 period is taken as "normal" assuming there was minimal underground economy in this "base period". We assume there was no underground economy or at least its size was negligible in the early phase of introduction of the national currency. Before the introduction of the Armenian dram in November 1993, the Russian ruble was the official currency in circulation. When the national currency was introduced, the Central Bank of Armenia started to convert the Russian rubles into newly introduced drams under some fixed and strict procedures. This process took several months and was overall strictly controlled, which means that the money from the underground economy was not easy, at least in the early stages of this currency change, to transfer all the funds from rubles to drams. It would have taken longer periods, at least several months to allow all cash money used in the underground sector to be transformed into drams. Therefore, we assume that the C/D ratio at the beginning of 1994 reflected an economy with minimal level of underground activities. During January-March, 1994 the average of

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<sup>17</sup> For the US, Gutman assumed that such a period was 1939-41.

the C/D ratio was equal to 1.15, which is taken as the base (“normal”) number for our calculations.

**Figure 1: Currency to Demand Deposits ratio (January, 1994-November 2004)**

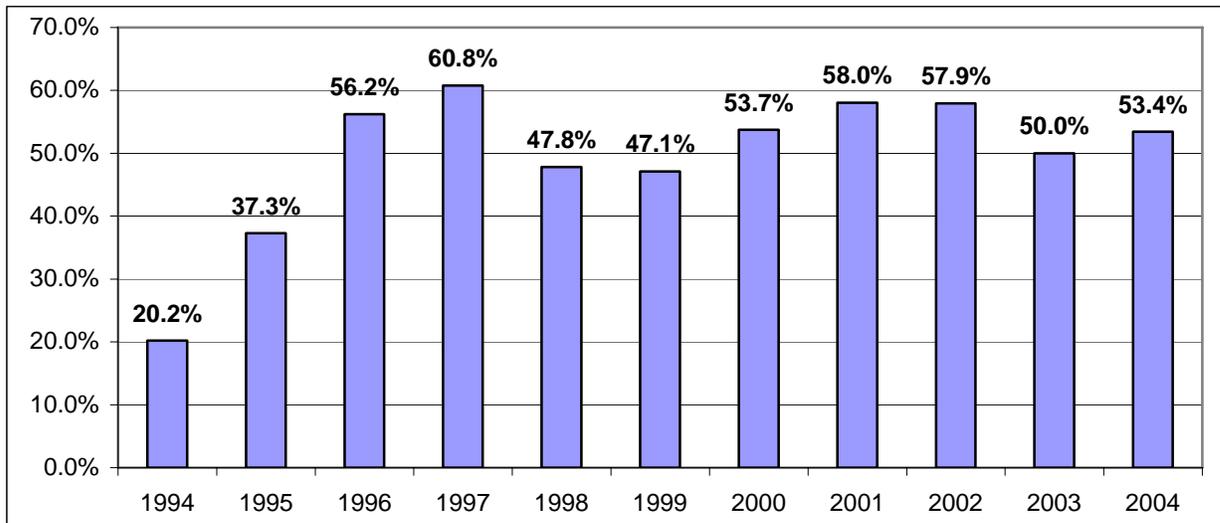


Source: Data from the Central Bank of Armenia.

As we can see from this figure the C/D ratio has had very interesting fluctuations over the period under consideration. It reached its highest level (6.7) in December, 1996. The other interesting pattern of the C/D ratio is that it had its highest levels in December of every year. This speaks about the high demand for cash in the economy at the end of calendar year, which is overall in line with the economic processes.

For estimating the size of the shadow economy we first calculate the C/D ratio for each month of the period of January, 1994-November, 2004. Then we subtract the "normal" value of the C/D ratio (1.15) from the actual value of the ratio for each month and get the "excess" C/D ratio, which, under this method, was due to the underground economy. Third, we multiply the actual demand deposits of every month by the "excess" amount of the C/D ratio and get the amount of illegal currency used in the underground sector for each month. Fourth, we define the income velocity of money, defined as ratio GDP to M1. By multiplying the illegal money by the income velocity of money, we get estimates of the underground economy. Figure 2 summarizes the findings using Gutman’s method for Armenia for the period of 1994-2004.

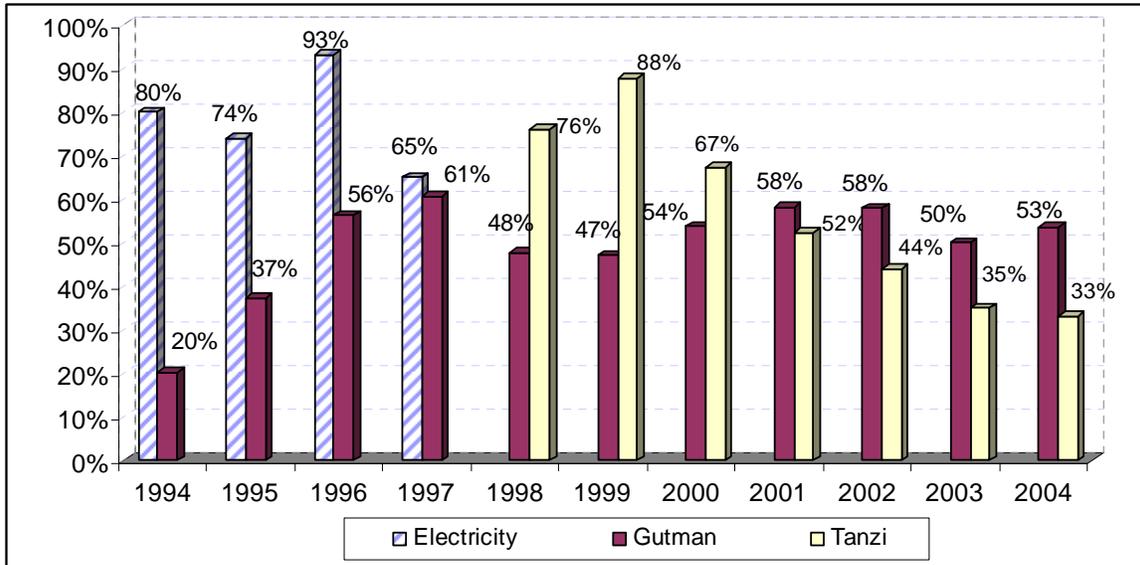
**Figure 2: The Size of the Shadow Economy of Armenia using Gutman’s Approach (1994-2004, percent of official nominal GDP of each year)**



### Comparison of Findings of Two Alternative Methods

Figure 3 summarizes our findings from these two alternative methods which provide information about the size of the shadow economy in Armenia during the period of 1994-2004. It also includes the estimates for 1990-1997 received by electricity consumption method done by Eilat and Zinnes for 24 transition countries, as described in above. The findings of this method are overall in line with those estimates received using Tanzi's method. As we mentioned the Tanzi's method capture only those shadow activities that are the solely result of taxes. Gutman's approach estimates the size of the shadow economy based on the excess demand for cash and the estimates under this method is assumed that include all shadow activities, including those that were result of tax evasion. Except the year of 2000, when there was a political instability in the country as a result of October 27, 1999 events, the estimates of Gutman's approach are higher than those received under Tanzi's method.

**Figure 3: Estimates of the Size of Shadow Economy of Armenia from three different methods (percent of official GDP, 1994-2004)**



Source: The Electricity method estimates are taken from Eilat and Zinnes, 2002. These estimates were available only for the period of 1990-1997.

Based on the estimates of the shadow economy we can calculate the losses that the government has had in the form of lost tax revenues. Using the ratio of tax revenues to GDP we can calculate the tax losses for each year of our sample. We should note that the use of the official statistics on tax revenues and nominal GDP is not the best way of calculating the amount that was lost because of the hidden activities. However, since we do not have detailed information about the composition of the shadow sector and the relevant tax rates for each segment, the use of the total Tax to GDP ratio is applied for getting some general estimates of lost tax revenues.

**Table 5: Estimates of Tax Revenue Losses as Direct Consequence of Shadow Economy, (million drams)**

	Shadow Economy /Gutman/	Shadow Economy /Tanzi/	Tax/GDP ratio	GDP nominal	Tax losses /Gutman/	Tax losses /Tanzi/
1994	37,773		0.115	187,080	4,344	
1995	194,585		0.107	522,285	20,821	
1996	371,385		0.108	660,309	40,110	
1997	485,384		0.133	798,555	64,556	
1998	455,062	723,480	0.144	951,900	65,529	104,181
1999	466,872	869,571	0.173	991,550	80,769	150,436
2000	554,950	695,865	0.155	1,032,630	86,017	107,859

2001	683,253	616,923	0.149	1,177,235	101,805	91,922
2002	786,078	596,015	0.125	1,356,983	98,260	74,502
2003	725,803	566,322	0.144	1,618,577	104,516	81,550
2004	775,385	616,341	0.140*	1,859,619*	108,554	86,288

Source: Author's estimates.

\*/ Tax/GDP ratio for 2004 is an estimate. GDP figure for 2004 is an estimate.

As we can see from these calculations significant amount of tax revenues are lost because of the fact that many economic activities are not captured by official bodies. Depending on the actual size of the shadow economy the losses only in tax revenues, for example, in year 2003 is estimated to be around 105 billion drams, based on the estimates of the Gutman method and 82 billion drams, if estimates of Tanzi method are used. It should be noted, that these are the losses occurred only in the area of tax collection; the actual negative consequences of the shadow economy can be higher if other areas (likes social payments, dollar denominated activities, and others) are also taken into account.

## Conclusions and Recommendations

It is important to realize that the shadow economy is present in almost every country of the world and it is very hard to measure its actual size. Besides its negative consequences (less collected revenues, deteriorated macroeconomic indicators, and others), the shadow economy in Armenia has played a significant stabilizing role during the early years of independence as it provided a source of income for the population. It also stimulated economic activities and provided necessary entrepreneurial skills for the start-up businesses.

The findings of both monetary methods (Tanzi and Gutman) applied in Armenia confirm the existence of huge shadow sector in the Armenian economy for every year since 1994. While realizing shortcomings of both of the methods applied (the use of Tax/GDP ratio, the assumption of constant C/D ratio, quarterly data and not high number of regression observations in the sample, and others) and the fact that these estimates are not precisely capturing all hidden economic activities in Armenia, however, these estimates of the shadow economy of Armenia provide useful information about the development of underground economy over the past decade, which can be used for making relevant adjustments and changes in the economic and social policies. The huge underground sector for a country that has very high level of poverty means that the government does not fully and effectively carrying out its important functions of essential public services' delivery and creation of fair rules for economic completion.

Based on the estimates of the shadow economy it is also possible to calculate the amount of revenue losses that Armenia has been encountering over the past years. Using the ratio of tax revenues to official GDP we can estimate the tax amount that was lost because of the existence of the shadow economy. For 2003 it can be estimated that in total of about 82-105 billion drams of additional tax revenues were lost because of the existence of the shadow economy.

One of the main directions for the government's fight against shadow economy should be the anti-corruption activities. The shadow economy and anticorruption are interrelated; on one hand the existence of the shadow economy promotes the corruption in tax authorities, on the other hand because of corruption, there is an increase in shadow activities. So, the government and the society should combine their efforts in carrying out effective anti-corruption program, that would also result in the decrease of the size of the shadow economy. Further modernization of tax and customs administrations, by strengthening and improving the professional tax and customs services and developing ethical standards of tax and customs officers with some strict mechanisms of control, can have significant impact on the size of the shadow economy.

We would suggest that the major reason for existence of the shadow sector in the economy in Armenia is the relatively easy and not risky possibility of tax avoidance. Today it is too easy to hide and too easy to avoid any punishment, and many economic entities prefer to get as much benefit from working underground, as possible, since they know that if caught there are easy and quick ways of solving their problems. Therefore, the system of penalties and punishments applied in these cases need to be reassessed, along with improvement of explanatory work with the business entities. On December 28, 2004 the President of the Republic has highlighted the problem of underreporting during his regular end-of-year meeting with the country's businessmen and announced that the government will tighten the control over underreported economic activities during 2005 and there will be no exceptions. If such a tight and wide policy adopted by the authorities in the next year, certainly there will be some significant improvement in the reduction of the shadow sector of Armenia.

Unfair and unequal tax administration is another major reason for the existence of shadow economy. Many business entities are hiding their activities in order of being able to compete with those who enjoy the protection of various tax and state officials. The unfair tax administration, unequal treatment and discretionary use of tax code are also highlighted in the recent FIAS report<sup>18</sup>, as the main problems for the investors. Therefore, as recommended in the report the government should develop right and fair mechanisms for incentives in tax administration, provide better information sharing among various state bodies.

One of the effective ways of fighting the underground economic activities can be the promotion of non-cash methods of payment in the economy. Since almost all economic activities are using cash as a mean of payment, stimulation of non-cash payment methods would of course significantly improve the situation. The ArCa (Armenian Card) network, supported by the Central Bank is already on place, however it still has a long way to go to become a popular and convenient method for making various payments. The government, in cooperation with commercial banks and the Central Bank, should play more active role and should introduce effective mechanisms for promotion of the non-cash payment methods, including ArCA cards.

More improved information and effective information sharing mechanisms between various state institutions, such as the tax, customs, state pension fund, statistics

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<sup>18</sup> Armenia-Assessment of Administrative procedures for doing business in Armenia. FIAS, The World Bank, 2004.

service, control agencies, would allow to better monitor and capture all economic transactions carried out in various sectors of the economy. The recent decision of the Armenian government to transfer the administration authority for collection of state pension fund payments to State Tax Service is aimed towards the above objective.

## References

- Aigner D, Schneider F., Ghosh D. "Me and My Shadow: Estimating the Size of the U.S. Hidden Economy From Time Series Data." *Dynamic Econometric Modeling*, 1988.
- Assessment of Administrative Procedures For Doing Business In Armenia. FIAS, The World Bank, 2004.
- Armenia-Poverty Reduction Strategy Paper. Chapter 6.3.2, para 196, Yerevan, 2003.
- Armenia- Medium Term Expenditure Framework, p. 27, Yerevan, Armenia, 2004.
- Eilat, Y. and Clifford Zinnes, "The Shadow Economy In Transition Countries: Friend Or Foe? A Policy Perspective, 2002, USA.
- Enste D. and Schneider F. "Increasing Shadow Economies all over the world-Fiction or Reality?" Discussion Paper No. 26, IZA, December 1998.
- Feige E. "Defining and Estimating Underground and Informal Economies: The New Institutional Economies Approach," *World Development*, vol.18 No 7, pp.989-1002, 1990.
- Feige E. "How Big is the Irregular Economy?" *Challenge*, Vol.22, pp.5-13 Nov. 1979.
- Johnson, Kaufman, Shleifer, *The Unofficial Economy in Transition*. Brookings Papers of Economic Activity, p.159-221, 1997.
- Kaufman, D. and Kaiberda, A. *Integrating The Unofficial Economy Into The Dynamics Of Post-Socialist Economies: A Framework Of Analysis And Evidence* (1996). *Economic Transition in the newly independent states* (Kaminski), Armonk, NY.
- Park T. "Reconciliation Between Personal Income and Taxable Income, 1947-1977". Mimeo, Washington DC: Bureau of Economic Analysis, May 1979.
- Tanzi V. "Corruption around the world: Causes, consequences, scope, and cures" IMF Working Paper, 63, W. pp. 1-39, 1998.
- Tanzi V. "The Underground Economy." *Finance and Development*, pp.10-13,1983.
- Tanzi V. "The Underground Economy in the United States and Abroad" LexingtonBooks, D.C. Heath and Company, Lexington, Massachusetts, 1982.
- Tanzi V. "The Underground Economy in the United States: Estimates and Implications." *Banka Nazionale del Lavarò, Quarterly Review*, pp. 427-53, 1980.
- Tunyan, B. "Shadow Economy of Armenia and the Ways of Reducing Its Size", Dissertation, Armenia, 2000.