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Increasing Shadow Economies all over the World - Fiction or Reality?

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ALL OVER THE WORLD -

FICTION OR REALITY?

A Survey of the Global Evidence of their Size and of their Impact from 1970 to 1995

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ABSTRACT

INCREASING SHADOW ECONOMIES ALL OVER THE WORLD - FICTION OR REALITY?

A Survey of the Global Evidence of their Size and of their Impact from 1970 to 1995*)

Using various methods (currency demand, physical input (electricity) measure, model approach), which are discussed and criticized, estimates about the size of 67 developing, transition and OECD countries are presented. The average size of the shadow economy (in % of GDP) over 1989-93 in developing countries is 39.2%, in transition countries 23.2% and in OECD countries 14.2%. An increasing burden of taxation and social security contributions combined with rising state regulatory activities are the driving forces for the size of the shadow economy. According to some findings, a growing shadow economy has a negative impact on official GDP growth, however, a positive impact of corruption on the size of the shadow economy can be found, i.e. the bigger the corruption, the larger is the shadow economy.

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1 Introduction

There are strong indications that the increasing overall tax burden (including social security payments) and rising state regulation in the OECD countries recently have led to the development of a growing non-declared „shadow" economy parallel to the „normal" or „official" economy. This has led to many attempts by researchers and statisticians to measure this phenomenon.[1] Obviously these attempts are problematic, since the shadow economy activities are performed exactly to avoid registration. Moreover, if you ask an academician, a public sector specialist, a policy or economy analyst, or a politician, what the shadow economy is all about, or even how big it is, you will surely get a wide range of answers. There is growing concern over the phenomenon of the shadow economy and there are several important reasons why politicians and public sector workers should be especially worried about the rise and growth of the shadow economy. Among the most important of these are:

(1)An increase of the shadow economy is mainly caused by a rise in the overall tax and social security burden, which may lead to an erosion of the tax and social security bases and finally to a decrease in tax receipts and thus to a further increase of the budget deficit or to a further increase of tax rates with the consequence of an additional increase in the shadow economy and so on. Hence a growing shadow economy can be seen as a reaction by individuals being overburdened by state activities.

(2) Under a growing shadow economy, (economic) policy is based on mistaken „official" indicators (like unemployment, official labor force, income, consumption). In such a situation a prospering shadow economy may cause politicians severe difficulties, because it „causes"/ „provides" unreliable official indicators and the direction of the intended policy measures may therefore be questionable.

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[1]The literature about the „shadow", „underground", „informal", „second" or „parallel", economy is strongly increasing. Various topics, how to measure it, its causes, its effect on the official economy are analyzed (compare for example, the first publications by Tanzi (1982), Frey and Pommerehne (1984), and Feige (1989); the latest (survey type) publications by Thomas (1992), Loayza (1996), Pozo (1996), Lippert and Walker (1997), Schneider (1994a, 1997, 1998a), Johnson, Kaufmann and Shleifer (1997), and Johnson, Kaufmann and Zoido-Lobaton (1998a), but an overall survey of the global evidence of its size and of its impact is missing!

(3) On one hand, a growing shadow economy may provide strong incentive effects to attract (domestic and foreign) workers away from the official economy. On the other hand at least 2/3 of the income earned in the shadow economy is immediately spend in the official economy[2] resulting in a considerable (positive) stimulating effect on the official economy.

These growing concerns and the scientific fascination (since it is quite difficult to observe and to measure) of the underground economy has inspired the authors to undertake the challenging task of collecting all available data (including our own calculations) on the shadow economy, so that the development and size of the shadow economy from 1970 to 1995, for as many countries as possible, can be shown. Section 2 presents a short and critical discussion of the various methods which have been used. Section 3 presents some empirical results of the size of the shadow economy of 67 countries all over the world. In Section 4 we examine the main causes of the shadow economy and analyze the interactions of the official and unofficial economies. Section 5 provides a preliminary analysis of the link between corruption and the shadow economy. Finally, in section 6, a summary and some conclusions are drawn.

2   Methods to estimate the size of the shadow economy

2.1   Attempts to define the shadow economy

Studies trying to measure the shadow economy face the difficulty of how to define it. One commonly used working definition is: all currently unregistered economic activity which contributes to the officially calculated (or observed) Gross National Product.[3] Smith (1994, p. 18) defines it as „market-based production of goods and services, whether legal or illegal that escapes detection in the official estimates of GDP." As these three definitions still leave open a lot of

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[2]This figure has been derived from polls of the German and Austrian population about the (effects of) the shadow economy. For further information see Schneider (1998b). These polls also show that 2/3 the value added produced in the shadow economy would not be produced in the official economy if the shadow economy did not exist.

[3] This definition is used for example, by Feige (1989, 1994), Schneider (1994), Frey and Pommerehne (1984), and Lubell (1991).

questions, table 2.1 may be helpful for developing a better feeling for what could be a reasonable consensus definition of the legal and illegal underground or shadow economy.

Table 2.1: A taxonomy of types of underground economic activities[1)]

Type of activity	Monetary transactions		Non-monetary transactions	
Illegal activities	Trade in stolen goods; drug dealing and manufacturing; prostitution; gambling; smuggling and fraud		Barter: drugs, stolen goods, smuggling etc. Produce or growing drugs for own use. Theft for own use.	
	Tax evasion	**Tax avoidance**	**Tax evasion**	**Tax avoidance**
Legal activities	unreported income from self-employment; wages, salaries and assets from unreported work related to legal services and goods	employee discounts, fringe benefits	barter of legal services and goods	all do-it-yourself work and neighbor help

(1) Structure of the table is taken from Lippert and Walker (1997, p. 5) with additional remarks.

From table 2.1 it becomes clear that the shadow economy includes unreported income from the production of legal goods and services either from monetary or barter transactions - hence all economic activities which would generally be taxable were they reported to the tax authorities. However, 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, respect for sanctions from the tax authorities, general moral attitudes, etc." (Mogensen et. Al. 1995 p. 5). To measure the size and development of the shadow economy, three different types of methods are most widely used. They are briefly discussed in the following three subsections:[4]

2.2 Direct approaches

These micro approaches employ either well designed surveys and samples based on voluntary replies or tax auditing and other compliance methods. Sample surveys designed for estimation of

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[4]For a detailed discussion, see Frey and Pommerehne (1984), Feige (1989), Thomas (1992), and Schneider (1986, 1994a, and 1998a).

the shadow economy are widely used in a number of countries[5] to measure the shadow economy as a whole. The main advantage of this method lies in the detailed information about the structure of the shadow economy, but the results from this kind of surveys are very sensitive to the way the questionnaire is formulated[6].

Estimates of the shadow economy can also be based on the discrepancy between income declared for tax purposes and that measured by selective checks. Fiscal auditing programs have been particularly effective in this regard. Designed to measure the amount of undeclared taxable income, they have been used to calculate the shadow economy in numerous countries.[7]

A disadvantage of both methods is that they lead only to point estimates. Moreover, it is unlikely that they capture all „shadow" activities, so they can be seen as providing lower bound estimates. They are unable (at least at present) to provide estimates of the development and of the growth of the shadow economy over a large period of time. They have, however at least one considerable advantage - they can provide detailed information about shadow economy activities and the structure and composition of those who work in the shadow economy.

2.3 Indirect approaches

These approaches, which are also called „indicator" approaches, are macroeconomic ones and use various economic indicators that contain information about the development of the shadow economy (over time). There are at least five macroeconomic indicators which leave some „traces" of the development of the shadow economy:

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[5]The direct method of voluntary sample surveys has been extensively used for Norway by Isachsen, Klovland and Strom (1982), and Isachsen and Strom (1985). For Denmark this method is used by Mogensen (et. al, 1995) in which they report „estimates" of the shadow economy of 2.7 percent of GDP for 1989, of 4.2 percent of GDP for 1991, of 3.0 percent of GDP for 1993 and of 3.1 percent of GDP for 1994.

[6]The advantages and disadvantages of this method are extensively dealt by Mogensen et. al (1995) in their excellent and very carefully done investigation.

[7]In the United States, IRS (1979, 1983), Simon and Witte (1982), Witte (1987), Clotefelter (1983), and Feige (1986). For a more detailed discussion, see Dallago (1990) and Thomas (1992).

(1) *The Discrepancy between national expenditure and income statistics*

In most OECD countries the size of the GNP is computed both from the expenditure and income side of the national accounts, which often reveal that expenditure is higher than income. Such an „initial discrepancy" can be seen as a result of activity in the hidden economy.[8] The weakness of this „fiscal" method is that the differences may arise not only because of activities in the shadow economy, but also because of well-known errors in measurement statistics. These estimates may therefore be very crude and of questionable reliability.

(2) *The discrepancy between the official and actual labor force*

A decline in participation in the labor force in the official economy can be seen as an indication of increased activity in the shadow economy. If total labor force participation is assumed to be constant, a decreasing official rate of participation can be seen as an indicator of an increase in the activities in the shadow economy.[9] The weakness of this method is that differences in the rate of participation may also have other causes. Moreover, people can work in the shadow economy and have a job in the „official' economy. Therefore such estimates may be viewed as weak indicators of the size and the development of the shadow economy.

(3) *The transactions approach*

This approach has been developed by Feige.[10] It assumes, that there is a constant relation over time between the volume of transaction and official GNP. This approach therefore starts from Fisher's quantity equation, $M*V = p*T$ (with M = money, V = velocity, p = prices, and T = total

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[8] See, e.g., Franz (1983) for Austria; MacAfee (1980) O'Higgins (1989) and Smith (1985), for Great Britain; Petersen (1982) and del Boca (1981) for Germany; Park (1979) for the United States. For a survey and critical remarks, see Thomas (1992). The latest international comparison of the shadow economy using micro-level data has been undertaken by Yoo and Hyun (1998). They calculate the size of the shadow economy of Korea (1996: 20,3 %), Taiwan (1995: 16,50 %), Italy (1995: 19,2 %), Spain (1990: 50,5 %), Russia (1995: 74,9 %) and Hungary (1994: 56,9 %).

[9] Such studies have been made for Italy, see e.g., Contini (1981, 1982) and Del Boca (1981); for the United States, see O'Neil (1983), for a survey and critical remarks, see Thomas (1992).

[10] For an extended description of this approach, see Feige (1979, 1989 and 1996), and for a further application for the Netherlands, Boeschoten and Fase (1984), and for Germany, Langfeldt (1984).

transactions). Assumptions have to be made about the velocity of money and about the relationships between the value of total transactions (p*T) and total nominal GNP. Relating total nominal GNP to total transactions, the GNP in the shadow economy can be calculated by subtracting the official GNP from total nominal GNP. However, to derive figures for the shadow economy, Feige has to assume a base year in which there is no shadow economy, and therefore the ratio of p*T to total nominal (official = total) GNP was „normal" and would have been constant over time, if there had been no shadow economy. This method, too, has several weaknesses: for instance, the assumption of a base year with no shadow economy, and the assumption of a „normal" ratio of transactions constant over time. Moreover, to obtain reliable estimates, precise figures of the total volume of transactions should be available. This availability might be especially difficult to achieve for cash transactions, because they depend, among other factors, on the durability of bank notes, in terms of the quality of the papers on which they are printed.[11] Also, in this approach the assumption is made that all variations in the ratio between the total value of transaction and the officially measured GNP are due to the shadow economy. In general, although this approach is theoretically attractive, the empirical requirements necessary to obtain reliable estimates are so difficult to fulfill, that ist application may lead to doubtful results.

(4) *The currency demand approach*

The currency demand approach was first used by Cagan (1958), who calculated a correlation of the currency demand and the tax pressure as one cause of the shadow economy for the United States over the period 1919 to 1955. 20 years later Gutmann (1977) used the same approach, but did not use any statistical procedures; instead he „only" looked at the ratio between currency and demand deposits over the years 1937 to 1976. Cagan's approach was further developed by Tanzi (1980, 1983), who econometrically estimated a currency demand function for the United States for the period 1929 to 1980 in order to calculate the shadow economy.

This approach assumes, that shadow (or hidden) transactions are undertaken in the form of cash payments, so as to leave no observable traces for the authorities. An increase in the size of the

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[11]For a detailed criticism of the transaction approach see Boeschoten and Fase (1984), Frey and Pommerehne (1984), Kirchgaessner (1984), Tanzi (1982, 1986), Thomas (1992) and Dallago (1990).

shadow economy will therefore increase the demand for currency. To isolate the resulting „excess" demand for currency, an equation for currency demand is econometrically estimated over time. All conventional possible factors, such as the development of income, payment habits, interest rates, and so on are controlled for. Additionally, such variables as the direct and indirect tax burden, government regulation and the complexity of the tax system, which are assumed to be the major factors causing people to work in the shadow economy, are included in the estimation equation. The „excess" increase in currency, which is the amount unexplained by the conventional or normal factors (mentioned above) is then attributed to the rising tax burden and the other factors leading people to work in the shadow economy. Figures for the size and development of the shadow economy can be calculated by a comparison of the difference between the development of currency when the direct and indirect tax burden and government regulations are held at its lowest value, and the development of currency with the current (much higher) burden of taxation and government regulations. The currency demand approach is one of the most commonly used approaches. It has been applied to many OECD countries,[12] but has nevertheless been criticized on various grounds.[13] The most commonly raised objections to this method are:

(i) Not all transactions in the shadow economy are paid in cash. Isachsen and Strom (1980, 1985) used the survey method to find out that in Norway in 1980 roughly 80 percent of all transactions in the hidden sector were paid in cash. The size of the total shadow economy (including barter) may thus be even larger than previously estimated.

(ii) Most studies consider only one particular factor, the tax burden, as a cause of the shadow economy. But others (such as the impact of regulation, taxpayers' attitudes to the state, „tax morality" and so on) are not considered because reliable data for most countries is not available. If, as seems likely, these other factors also have an impact on the extent of the hidden economy, it might again be higher than reported in most studies.[14]

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[12]See Schneider (1997, 1998a), Johnson, Kaufmann and Zoido-Lobaton (1998a), and Williams and Windebank (1995).

[13]See Thomas (1986, 1992), Feige (1986), and Pozo (1996).

[14]One (weak) justification for the use of only the tax variable is that this variable has by far the strongest impact of any variable on the size of the shadow economy in the studies known to the authors. The only exception is the study by Frey and Weck-Hannemann (1984) where the variable „tax immorality" has a quantitatively larger and statistically stronger influence than the direct tax

(iii) A further weakness of this approach, at least when applied to the United States, is discussed by Garcia (1978), Park (1979), and Feige (1996), who point out that increases in currency demand deposits are due largely to a slowdown in demand deposits rather than to an increase in currency caused by activities in the shadow economy. Blades (1982) and Feige (1986, 1997), criticize Tanzi's studies on the grounds that the US dollar is used as an international currency. Tanzi should have considered (and controlled for) the US dollars, which are used as an international currency and held in cash abroad.[15] Moreover, Frey and Pommerehne (1984) and Thomas (1986, 1992) claim that Tanzi's parameter estimates are not very stable.[16]

(iv) Another weak point of this procedure, in most studies, is the assumption of the same velocity in both types of economies. As Hill and Kabir (1996) for Canada and Klovland (1984) for the Scandinavian countries argue, there is already considerable uncertainty about the velocity of circulation of currency in the official economy; the velocity of currency in the hidden sector is even more difficult to estimate. Without knowledge about the velocity of currency in the shadow economy, one has to accept the assumption of an „equal" currency velocity in both sectors.

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share in the model approach. In the study of Pommerehne and Schneider (1985), for the U.S., besides various tax measures, data for regulation, tax immorality, minimum wage rates are available, the tax variable has a dominating influence and contributes roughly 60-70 percent to the size of the shadow economy. Compare also Zilberfarb (1986).

[15] In another study by Tanzi (1982, esp. pp. 110-113) he explicitly deals with this criticism. A very careful investigation of the amount of US-$ used abroad and the US currency used to the shadow economy and to "classical" crime activities has been undertaken by Rogoff (1998), who concludes that large denomination bills are major driving force for the growth of the shadow economy and classical crime activities due to reduced transactions costs.

[16] However in studies for European countries Kirchgaessner (1983, 1984) and Schneider (1986) reach the conclusion that the estimation results for Germany, Denmark, Norway and Sweden are quite robust when using the currency demand method. Hill and Kabir (1996) find for Canada that the rise of the shadow economy varies with respect to the tax variable used; they concluded „when the theoretically best tax rates are selected and a range of plausible velocity values is used, this method estimates underground economic growth between 1964 and 1995 at between 3 and 11 percent of GDP." (Hill and Kabir [1996, p. 1553]).

(v) Finally, the assumption of no shadow economy in a base year is open to criticism. Relaxing this assumption would again imply an upward adjustment of the figures attained in the bulk of the studies already undertaken.

(5) The physical input (electricity consumption) method
(1) The Kaufmann method

With this method, the ratio of a physical input of wide use (e.g. electricity consumption to GDP) for a base period is calculated and then extrapolated to the present. Assuming that the short-run electricity/ GDP elasticity is close to one and assuming a relative constant ratio of electricity consumption to GDP, it is possible to calculate the expected (or overall) GDP for each year following the base period. As officially measured GDP by definition captures only the official part of the economy, the difference between an overall (or expected) and officially measured GDP gives an estimate of the size of the shadow economy.[17] This method can also be criticized on various grounds:

(i) Not all shadow economy activities require a considerable amount of electricity (e.g. personal services), and other energy sources can be used (gas, oil, coal, etc.), so that only a part of the shadow economy will be captured.

(ii) Over time, there has been considerable technical progress. Both the production and use of electricity are more efficient than in the past, and that will apply in both official and unofficial uses.

(iii) There may be considerable differences or changes in the elasticity of electricity demand across countries and over time.[18]

(iv) Finally, the assumption of a base year is questionable, as it was in the currency demand approach.

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[17]This method was used earlier by Lizzeri (1979), Del Boca and Forte (1982), and then was used much later by Portes (1996), Johnson, Kaufmann and Shleifer (1997). For a critique see Lacko (1996, 1997a, 1997b).

[18]Johnson, Kaufmann and Shleifer (1997) make an attempt to adjust for changes in the elasticity of electricity demand.

(2) The Lacko method

Lacko (1996, 1997a, 1997b) assumes that a certain part of the shadow economy is associated with the household consumption of electricity. It comprises, among others, the so-called household production, do-it-yourself activities, and other non-registered production and services. Lacko assumes that in countries where the section of the shadow economy associated with the household electricity consumption is high, the rest of the hidden economy, i. e. the part Lacko cannot measure, will also be high. Lacko (1996, pp.19 ff.) assumes that in each country a part of the household consumption of electricity is used in the shadow economy. In a cross country study, she econometrically estimates the per capita household electricity consumption as a function of per capita real consumption of households (without electricity consumption), real price of electricity consumption; the relative frequency of months need of heating in houses, the ratio of energy sources other than electric energy to all energy sources in the household energy consumption, the number of dependants over 14 years, the number of inactive earners per 100 active earners, and the per capita size of the shadow economy. Furthermore Lacko assumes that the size of the shadow economy is driven by the following three variables: the ratio of the sum of paid personal income, corporate profit and value added taxes to GDP; the ratio of public welfare expenditure to GDP; and the number of dependants over 14 years and of inactive earners per 100 active earners. The econometric estimation results can then be used to establish an ordering of the countries with respect of the electricity use in their shadow economies. For the calculation of the actual size (value added) of the shadow economy, Lacko should know how much GDP is produced by one unit of electricity in the shadow economy of each country. Since she does not have these data she takes the result of one of the known shadow economy estimates, that were undertaken for a market economy with another approach for the early 1990s, and she proportions the other countries to this base country. Lacko used as base country the United States (the shadow economy value of 10.5% of GDP taken from Morris), and then calculated the size of the shadow economy for other countries. Lacko's method is open to criticism, too:

(i)   Not all shadow economy activities require a considerable amount of electricity and other energy sources can be used;

(ii)   Shadow economy activities take place not only in the household sector.

(iii)   It is doubtful whether the tax burden and the ratio of social welfare expenditures can be used as the explanatory factors for the shadow economy, especially in transition and developing countries.

(iv)   It is questionable which base value to use in order to calculate the size of the shadow economy for all countries, especially, for the transition and developing countries.
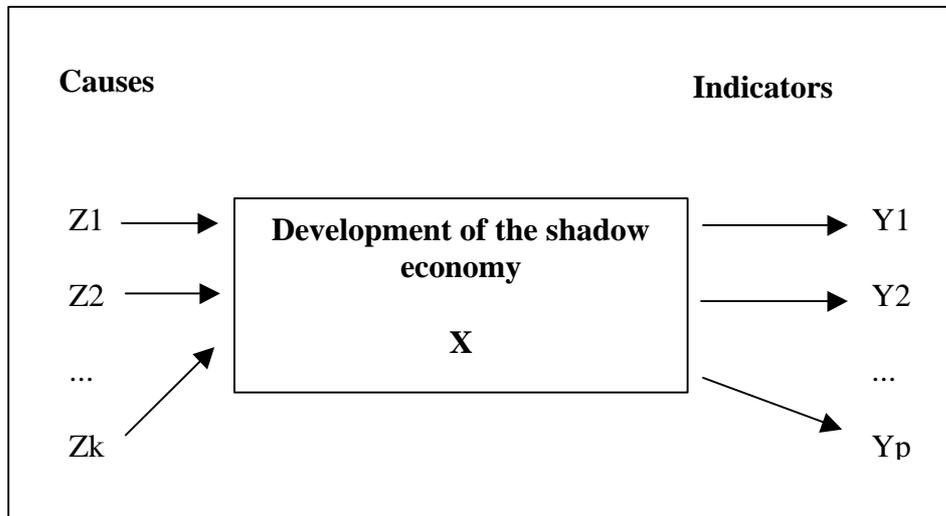

2.4   *The model approach*[19]

So far, all previously discussed methods designed to estimate the size and development of the shadow economy consider only one indicator to capture all effects of the shadow economy. But it is obvious that the shadow economy effects show up simultaneously in the production, labor, and money markets. An even more important criticism is that the various determinants of the size of the hidden economy are only taken into account in some of the monetary approach studies, which in most cases consider a single cause, the burden of taxation. The model approach explicitly considers multiple causes of the existence and growth of, as well as the multiple effects of, the shadow economy.[20] The empirical method used is quite different from the approaches discussed above. It is based on the statistical theory of unobserved variables, which considers multiple causes and multiple indicators of the phenomenon to be measured. For the estimation, a factor analytic approach is used to measure the hidden economy as an unobserved variable. The unknown coefficients are estimated in a set of structural equations within which the „unobserved" variable cannot be directly measured. The MIMIC (Multiple Indicators Multiple Causes) model in general consists of two parts, the measurement model and the structural equations model. The measurement model links the unobserved variables to observed indicators. The structural equations model specifies causal relationships among the unobserved variables. In this case, one has only one unobserved variable, the size of the shadow economy. It is assumed to be influenced

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[19]This part is a summarized version from a longer study by Aigner, Schneider and Ghosh (1988), applying this approach for the United States over time.

[20]The pioneers of this approach are Weck (1983), Frey and Weck-Hannemann (1984), who applied this approach to cross section data from the 24 OECD-countries for various years. Before they turned to this approach they developed the concept of „soft modeling" (Frey, Weck and Pommerehne (1982), Frey and Weck (1983a and 1983b)), an approach which has been used to provide a ranking of the relative size of the shadow economy in different countries.

by a set of exogenous causes, namely, another set of variables, assumed to serve as the set of indicators for the size of the shadow economy. The interaction between the causes Z (I = 1, 2, … k), the size of the shadow economy X, and the indicators Y (j = 1, 2, ..., p) is shown in figure 2.1.

Figure 2.1: The development of the shadow economy

There is a large body of literature[21] on the possible causes and indicators of the shadow economy, in which the following three types of causes are distinguished:

(i) The burden of direct and indirect taxation, both actual and perceived: a rising burden of taxation provides a strong incentive to work in the shadow economy.

(ii) The burden of regulation as proxy for all other state activities. It is assumed that increases in the burden of regulation give a strong incentive to enter the shadow economy.

(iii) The „tax morality" (citizens' attitudes toward the state), which describes the readiness of individuals (at least partly) to leave their official occupations and enter the shadow economy. It is assumed that a declining tax morality tend to increase the size of the shadow economy.

A change in the size of the shadow economy may be reflected in the following indicators:

(i) Development of monetary indicators: if activities in the shadow economy rise, additional monetary transactions are required.

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[21]Thomas (1992); Schneider (1994a, 1997); Pozo (1996); Johnson, Kaufmann and Zoida-Lobaton (1998a, 1998b).

(ii) Development of the labor market: increasing participation of workers in the hidden sector results in a decrease in participation in the official economy. Similarly, increased cavities in the hidden sector may be expected to be reflected in shorter working hours in the official economy. (iii) Development of the production market: an increase in the shadow economy means that inputs (especially labor) move out of the official economy (at least partly); this displacement might have a depressing effect on the official growth rate of the economy.

A weakness of the model approach is that, at present, the estimation procedure does not allow for undertaking a pure time series analysis.[22] Another difficulty, when applying this approach for European countries, is to obtain reliable data for the cause series, besides the ones of direct and indirect taxes burden.[23]

This discussion of the various methods for estimating the shadow economy demonstrates that each one has difficulties, and that none is anywhere near perfect. Because of their various strengths and weaknesses, it makes sense to apply as many as possible, using a variety of methods, so that they may complement one another and produce more valid results. However, for data reasons in most cases only the currency demand, physical input (electricity) and model approaches are used.

3   Empirical results for the size of the shadow economy

3.1   Findings for 67 countries

For single countries and sometimes for a group of countries (like the OECD or transition countries) research has been undertaken to estimate the rise of the shadow economy[24] using various methods and different time periods. Until now, there has not been a consistent comparison of estimates of the sure of the shadow economies of various countries, for a fixed period,

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[22]Aigner, Schneider and Ghosh (1988) make an attempt to use this method for a time series estimation of the U.S. shadow economy.

[23]The study of Frey and Weck-Hannemann was criticized by Helberger and Knepel (1988) arguing that the results were unstable with respect to changing variables in the model and the years.

[24]Recently, Pozo (1996), Loayza (1996), Lippert and Walker (1997) and Schneider (1998).

generated using 2 or 3 of the methods discussed above.[25] In Table 3.1, such an attempt is made by reporting the results for the shadow economy for 67 countries of the period 1989–90, using the physical input (electricity) method, the currency demand approach and the Model approach (MIMIC-method). Unfortunately, at least two methods have not been applied for all 67 countries, so that a comparison of the size of the shadow economy between countries remains crude when different methods were used.[26]

In Table 3.1 (see page 44), the countries are grouped as developing, transition, and OECD, and subdivided by continent. The physical input (electricity) method is used for the developing countries. Both the physical input and MIMIC methods are used for Central and South America. In Africa, the results from seven countries are reported. Nigeria and Egypt have the largest shadow economies with 76.0 percent and 68.0 percent of GDP, the smallest is Mauritius with 20 percent. Applying the currency demand approach, Tanzania had a shadow economy of 31.5 percent (of GDP) in 1989–90.[27]

For Central and South American countries, we have two estimates - one from the physical input method (Lacko (1996) and one from the MIMIC approach (Loayza (1996). For some countries, the estimates of the size of the shadow economy are quite similar, such as Venezuela, Brazil, and Guatemala. For others there are great differences, for example, Panama, Peru, and Mexico. Using the MIMIC approach for a ranking of the South American countries, the biggest shadow economies can be found in Bolivia with 65 percent of GDP, Panama with 62.1 percent, Peru with

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[25]The physical input (electricity) and the currency demand method are comparable, because both assume an excessive use of a source (electricity and cash, respectively) for shadow economy activities, and in both a „potential GNP" is calculated. These two methods are also used in a comparable way by Lacko (1996, 1997a, 1997b), Portes (1996), and Johnson, Kaufmann and Zaido-Labaton (1998a, 1998b), who even calculate one shadow economy series of these two methods for a cross section country sample.

[26]One should be aware that such country comparisons give only a very rough picture of the ranking of the size of the shadow economy over the countries, because each method has shortcomings. See, e.g., Thomas (1992). A least in this comparison the same time periods (either 1989–90 or 1990–93) are used for all countries. If possible, the values were calculated as averages over the period 1989–90 or 1990–93, respectively.

[27]The ranking of the size of the shadow economy for the African countries is supported by similar findings and anecdotal evidence from Lubbel (1991), Chickering and Salahdine (1991), and Pozo (1996).

57.9 percent, and Guatemala with 50.4 percent. The lowest can be found in Costa Rica with 23.2 percent, Argentina with 21.8 percent, and Chile with 18.2 percent (all over the period 1990–93).[28] In Asia, Thailand ranks number one with 71.0 percent followed by the Philippines with 50 percent and Sri Lanka with 39 percent. Hong Kong and Singapore rank lowest with a shadow economy of 13 percent GNP.[29] High values are observed for the size of the shadow economy of all developing countries. If one compares the averages of the countries from these three continents, one gets the following results:

Table: 3.1.1: Average shadow economy on three continents

Continent	Mean (unweighted) of the shadow economy (in % of GDP) 1989-90
Africa	43.9
Central and South America	38.8
Asia	35.0
All continents	**39.2**

Source: our calculations

The average shadow economy is the highest in Africa, followed by Central and South America and then by Asia.[30]

The physical input (electricity) method has been applied to the transition countries in Central and Eastern Europe and to ones of the former Soviet Union. Hungary has the largest shadow economy with 27.5 percent of GNP in 1989–90 followed by Bulgaria with 24.0 percent. The lowest two are Slovakia with 6.9 percent and the Czech Republic with 6.4 percent. With the exception of Romania, the shadow economies increased considerably (on average 3.1 percentage points) in the

[28]The ranking of the size of the shadow economy for Central and South America is supported by similar findings in Pozo (1996), Lippert and Walker (1997) and Lubbel (1991). For Mexico, the results from all three methods are shown. Whereas the MIMIC-approach and the currency demand method are in a similar range (27.1 MIMIC and currency demand method 35.1); the physical impact measure provides a size of 49.1 percent, far above the other two.

[29]Chickering and Salahdine (1991) and Lubbel (1991) reach a similar conclusion.

[30]According to Lubbel (1991), and Chickering and Salahdine (1991), this ranking is supported by their evidence.

period 1990-93; for Slovakia and the Czech Republic the size of the shadow economy even doubled. Considering the countries of the former Soviet Union over the period 1990–93,[31] Georgia has the largest shadow economy with 43.6 percent of GDP followed by Azerbaijan with 33.8 percent and Moldova 29.1 percent. Russia can be found in middle with a shadow economy of 27 percent. Belarus with 14 percent and Uzbekistan with 10.3 percent have the smallest values. Except Belarus and Uzbekistan, all other former Soviet Union countries experienced a strong increase in the shadow economy from an average of 16.7 percent for 1989–90 to 25.7 percent for 1990–93 (calculated over all 11 countries of the former Soviet Union).

If one finally turns to the 19 investigated OECD western type countries, results for the shadow economy using either the currency demand method or the physical input method are available. For the currency demand method, two series of figures are shown—one from Schneider and one obtained from Johnson, Kaufmann, and Ziodo-Lobaton (1998a, 1998b).[32] Considering the period 1990–93 and using the series by Johnson et al., where estimates of the shadow economy for most OECD countries are available (18 out of the 19 investigated countries), the southern European states have the largest shadow economies: Greece (27.2 percent), Italy (20.4 percent), Spain (16.1 percent), and Portugal (15.6 percent). A similar result can be found by using series of Schneider, and to some extent the ones achieved by the physical input (electricity) method by Lacko (1997b). At the lower end, Johnson et al. Rank Switzerland (6.9 percent), Norway (5.9 percent), and Austria (5.8 percent); Schneider finds USA (8.2 percent), Switzerland (6.9 percent), and Austria (6.1 percent). In general, this ranking of the size of the shadow economies of the OECD countries is supported by other studies.[33] Due to the different calculation approaches for

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[31]The period 1989-90 is not discussed here because the 1989 data are unavailable for these countries.

[32]The main difference between the two series is that Johnson, Kaufmann, and Zoido-Lobaton (1998a, 1998b) use average values of the size of the shadow economy of a country coming from different sources, if a monetary approach was applied, whereas in Schneider the currency-demand approach is used for these countries and only one value for that year (or an average over a time period) is used. The problem using averages from various sources is (a) that the time period is greater (1985–95); and (b) the specification of the monetary approaches from different authors may be quite different.

[33]See Frey and Pommerehne (1984), Frey and Weck-Hannemann (1984), Williams and Windebank (1995), Thomas (1992), and Lippert and Walker (1997) who reach quite similar rankings.

the two monetary series, considerable differences between the size of the shadow economy for some countries show up. But for other countries, the differences are quite small:

Table 3.1.2: A comparison of Johnson's et al. And Schneider's findings using the currency demand approach

Size of the shadow economy (in % of GDP) (1989-90) using the currency demand approach from			Absolute Differences Between the two approaches
Country	Johnson et al. Figures	Schneider figures	
Ireland	7.8	14.2	6.4
Great Britain	7.2	11.2	4.0
Norway	9.9	16.7	6.8
Spain	16.1	17.3	1.2
The Netherlands	11.8	12.7	0.9
Germany	10.5	12.5	2.0

Source: our calculations

Comparing the values obtained by the currency demand approach (cd) with the one by the electricity approach (el), there are considerable differences with respect to the average shadow economy (cd 12.3 percent and el 15.4 percent) and with respect to size of the single countries:

Table 3.1.3: A comparison of the currency demand and the electricity approach

Size of the shadow economy (in % of GDP) 1989-90			Absolute Differences Between the two approaches
Country	Currency demand approach	Electricity approach	
Austria	5.1	15.0	9.9
Ireland	11.0	20.7	9.7
Spain	16.1	23.9	7.8
USA	6.1	10.5	4.4

Source: our calculations

It is an open question which method is more reliable, but it seems that the electricity approach causes problems when applied to western OECD countries because of the technical progress using electricity, and due to the fact that Lacko (1996) has to choose a value for the size of the shadow

economy for a base country (e.g. the USA) for use in calculating the size of the shadow economy in other countries.

If one finally compares the average sizes of the shadow economies for the three types of countries, one gets the following results:

Table 3.1.4: **Average Size of the Shadow Economy for developing, transition and OECD countries**

Type of country	Average size of the shadow economy (in percent of GDP)				
	Physical input approach		Currency demand approach		
	1989-90	**1990-93**	**1990-93**	**1990-93**	**1989-90**
Developing Countries					
Africa	43.9	-	-	-	-
Central and South America	38.8	39.1 [1]	-	-	-
Asia	35.0	-	-	-	-
Transition Countries					
Central and Eastern Europe	17.6	20.7	-	-	-
Former Soviet Union Countries	16.7	25.7	-	-	-
OECD-Countries	15.4 [2]	-	11.9	14.0	12.3

Source: our calculations and

1) MIMIC method used value from Loayza (1996).
2) Figures from Lacko (1996, 1997a, 1997b).

As can be clearly seen from the table the developing countries have by far the largest average shadow economies, between 35 and 44%, followed by the transition countries, between 17% and 18% and finally the OECD countries have an average shadow economy of 15.4% using the electricity approach and 12.3% using the currency demand approach.

3.2 The latest findings of transition and OECD - Countries

In table 3.2 (see page 47), the latest results are shown for the shadow economies of transition and OECD Countries over the period 1994-95, and also for some OECD countries for the period 1996-97.

In principle the results are similar to the ones in section 3.1 with the exception that the shadow economy has increased compared to the results of the period 1990-93. The average shadow economy in transition countries of central and eastern Europe is now 20.3% (compared to 17.6% for 1989-90), in former Soviet Union countries 35.3% (compared to 16.7% of 1988/90) and in OECD countries 15.5% (compared to 12.3% in 1989/90). A further increase can be observed for some OECD countries to 16.2% (average of 15 OECD Countries) for the period 1996-97. From these results it is obvious that the shadow economy is still growing.

3.3 The development of the shadow economy over time

So far only three periods of time, 1989-90, 1990-93, and 1995-96 have been considered in parts 3.1 and 3.2. In this part an attempt is made to study the long(er)-term development of the shadow economy a) for the transition countries and b) for western type OECD countries. The development of the size of the shadow economy of transition economies is shown for the period 1990 to 1995 in table 3.3.1 (see page 49).

Whereas the shadow economy steadily increases in only two countries (in Bulgaria from 25.1% (1990) to 36.1% (1995) and in Romania from 13.7% (1990) to 19.1%), in the other five transitions countries the shadow economy reached peak values in 1991 or 1992 and declined than again. Poland, for example, rose from 19.6% (1990), to 23.5% (1991) and then declined to 12.6% (1995). A possible explanation for this might be the overall economic recovery in these countries.[34] In 8 out of 11 of the former Soviet Union states, the shadow economy increased considerably from 1990 to 1995; e.g. in Georgia from 24.5% (1990) to 62.6% (1995), in the Ukraine from 16.3% to 48.9%, and in Russia from 14.7% to 41.6% . Whereas the average

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[34]This argument is also brought forward by Lacko (1996) and by Johnson, Kaufmann and Shleifer (1997).

shadow economy share in East European countries starts in 1990 at 17.7%, peaks at 22.1% in 1992, and falls to 18.4% by 1995, the average shadow economy share in former Soviet Union countries starts at 16.7% and rises to 36.2% in 1994 before it drops to 34.4% in 1995. In Russia and the Ukraine the share of the shadow economy rises by 26.9 and 37.5 percentage points, respectively, over the same period. In both Belarus and Uzbekistan the shadow economy is small; it has hardly increased in Belarus and even declined in Uzbekistan. According to Johnson, Kaufmann and Shleifer (1997, p. 185), this is consistent with their finding that in these two countries the state has suppressed the shadow economy.[35]

Turning to the results of the shadow economy of the OECD western-type countries they are shown in table 3.3.2 (see page 50), for 15 countries.

If one examines the results - achieved by the currency demand method for the latest available year, 1994, it can be seen that Italy (25.8%), Spain (22.3%), and Belgium (21.4%) have the largest shadow economies. In the mid-group are Sweden (18.3%), Norway (17.9%), Denmark (17.6%), Ireland (15.3%), Canada (14.6%), France (14.3%), the Netherlands (13.6%), and at the lower end USA (9.4%), Austria (6.7%) and Switzerland (6.6%).[36]

From table 3.3.2, where the currency demand method has been applied, it can be seen that the shadow economy has increased over time for all countries. Whereas in the investigated countries in 1960 the size of the shadow economy was far below 5% of GNP, the shadow economy increased in 1994 in the countries Belgium, Canada, Denmark, Germany, France, Ireland, Italy, the Netherlands, Norway, Spain, Sweden and United Kingdom to far above 10% of GNP. If one considers the development of the shadow economy over time for single countries, the size of the shadow economy in Belgium was 10.4 % in 1970, and had more than doubled to 21.4 % in 1994.

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[35]In total, the results for the shadow economy of the transition countries are generally consistent with other estimations; e.g. by Lacko (1997) shown in table 3.1 and by Kaufmann (1997).

[36]If one compares this ranking with the model approach by Frey and Weck-Hanneman (1984), Italy, Belgium and Sweden are also among the three countries with the largest shadow economy. Also in the middle group are Norway and Germany, and at the bottom, Switzerland. This comparison, which is crude, shows some degree of coincidence between the two approaches. In general, both approaches demonstrate that these results are all in the plausible range.

In Italy the size of the shadow economy was 10.7% in 1970 and reached a size of 25.8% in 1994 - an increase of more than 140% in 20 years. The increase has also been remarkable in countries where the size of the shadow economy is considerably smaller. In the United States the shadow economy was 3.6% in 1970 and rose to 9.4 % in 1994 - an increase of more than 180%. These results demonstrate a strong expansion of the shadow economy in the examines countries in the years 1970 to 1994.

3.4   A comparison of the results of the shadow economy using different methods

As already discussed in section two, there are at least nine different methods used to estimate the shadow economy. In table 3.4 (see page 51), the nine methods are applied to Canada, Germany, Great Britain, Italy and the United States.

The survey method, which has been used for Canada, Germany, and Great Britain, Italy and the United States, provides lower bound estimates ranging from 1.5% to 4.5% for the period 1970-80. The tax auditing method provides higher estimates of the shadow economy ranging from 2.9% to 8.2% for the period 1970-90. Both methods also show that the shadow economy increases over time (e.g. for the United States). The two discrepancy methods (expenditure versus income and official versus actual labor force) show no clear pattern. For some countries they „produce" high shadow economy values (compared to the other methods for these countries, e.g. Germany), for some low (e.g. Canada). Also, they do not show a consistent time pattern. The physical input (electricity) method, for which only values for the period 1986-90 are available for all five countries, shows values in the middle size range for all countries (average value of 12.7% over all countries and all periods). If one compares the three monetary approaches (currency demand, cash-deposit ratio and transactions approach), a clear pattern shows up. The by far largest size of the shadow economies for all five countries were achieved using the transactions approach (Feige method) ranging from 15% to 35% of GNP (average value of 21.9 % over all countries and periods). Somewhat lower results are achieved with the cash-deposit ratio (Gutmann method), ranging between 10 % and 30% for all countries (average value of 15.5% over all countries and all periods). Considerably lower values were achieved using the currency demand approach, ranging from 4% to 20% of GNP over the period 1970-90 for all five countries

(average value of 8.9% over all countries and periods). The currency demand method shows a strongly rising shadow economy in all five countries, a result opposite that given by the transactions and cash deposit methods. The model approach shows values in the medium range from 6.1% to 10.5% for the period 1976-80 (average value of 7.9% for all countries over all periods).

In general these results demonstrate quite clearly what a huge range of estimates of the shadow economy for a country in a given time span are achievable using different calculation methods. Hence one should be very careful when interpreting the size of shadow economy in a country. The comparison of the results of the shadow economies using the different methods also shows that there is a clear ranking of these methods with respect to the size of the shadow economy, as is demonstrated in table 3.4.1:

Table 3.4.1: A comparison of the different methods for calculating the shadow economy

Mean value over 5 countries[1] and all periods (1970-90) of the shadow economy	Methods
24.4	**Discrepancy between actual and official labor force.**
21.9	**Transactions approach (Feige)**
15.5	**Cash-deposit ration (Gutmann)**
12.7	**Physical input (electricity) approach**
8.9	**Currency demand approach**
7.9	**Model approach (Frey/Weck-Hanneman)**
6.4	**Discrepancy between expenditure and income**
6.1	**Tax auditing**
3.1	**Survey method**

Source: our calculations

1) Canada, Germany, Great Britain, Italy, United States.

This ranking seems plausible and is also found in many other studies on the size of the shadow economy.[37]

3.5 Some remarks on a shadow economy labor force

Having extensively examined the rise of the shadow economy in terms of value added over time in parts 3.2 to 3.4, the analysis in this part focuses on the „shadow" labor market. Within the labor market there is a particularly close contact among those people who are not active in the shadow economy.[38] Moreover every shadow economic activity involves the labor market to some extent: For some activities this involvement may be direct (e.g. tax evasion); in others it may be direct and paramount (e.g. the rise of clandestine workers). Hence the shadow labor market includes all

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[37] Frey and Pommerehne (1984), Dallago (1990), Thomas (1992), Pozo (1996) and Lippert and Walker (1997).

[38] Pioneering work in this area has been done by L. Frey (1972, 1975, 1978, 1980), Cappiello (1986), Lubell (1991), Pozo (1996), and Bartlett (1998).

cases, where the employees or the employee, or both, occupy a „shadow economy position" with regard to the rules in force. This is true regardless of whether such employees or employees have official (legal) position (too) as long as the production is for the market.

Why do people work in the shadow economy? In the official labor market, the costs that firms (and individuals) have to pay when hiring someone are tremendously increased by the burden of tax and social contributions on wages as well as the legal administrative regulation to control economic activity.[39] In various OECD Countries these costs are greater than the wage effectively earned by the worker-providing a strong incentive to work in the shadow economy.[40] The irregular use of labor may consist of a second job after (or even during) regular working hours. A second form is shadow economy work by individuals who do not participate in the official labor market. A third component is the employment of people (e.g. clandestine or immigrants), who are not allowed to work.

In this research area it is not easy to provide empirical facts. The few existing results are shown in table 3.5 (see page 53) for western-type OECD countries.[41] The figures in this table give a good idea of the size of the shadow labor market, e.g. the results for Denmark show that the population of adult Danes engaged in the shadow economy ranged from 8.3% (of the total labor force) in 1980 to 15.4% in 1994. In Germany, this figure ranged from 8.0 %-12.0 % in 1974-82 to 22.0% in 1998. This is for both countries a very strong increase. In other countries the amount of the shadow economy labor force is quite large, too, in Italy 10.0%-35.0% (1979); Spain 9.0%-26.5% (1979-80); Sweden 13-14.0% (1978) and France 3.0-6.0% (1979-82). In the European Union 10% (of the workforce) is at least engaged in shadow economy activities and in all OECD countries about 16 million work "black" (illicit/ irregular/ inofficial). These figures demonstrate that the shadow economy labor market is lively and provides one explanation why in Germany, for example, we observe such high and persistent unemployment.

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[39]This is especially true in Europe, where e.g. in Germany and Austria the total tax and social security burden adds up to 100% on top of the wage effectively earned.

[40]See Dallago (1985, 1990).

[41]For developing countries a huge literature about the shadow labor market exists, e.g. the latest works by Dallago (1990), Pozo (1995), Laoyza (1995), especially Chickering and Salahdine (1991).

4 The influence of state activity on the shadow economy

4.1 Macro and micro economic approaches

In the economic literature on the shadow economy two main approaches can be found to analyze the causes and effects of the shadow economy. One is based on macroeconomic theories like the theory of growth, and the other is based on microeconomic grounds like the neoclassical leisure-income model.[42]

A recent macroeconomic analysis of some of the causes for the increase of the shadow economy is presented by Loayza (1996). He presents a simple macroeconomic endogenous growth model whose production technology depends on congestable public services. The determinants and effects of excessive taxes and regulations on the informal sector are studied, where the government lacks the capability to enforce compliance. His empirical approach treats the informal sector as an unobserved variable for which multiple causes and multiple indicators exist and he uses the Multiple-Indicator-Multiple-Cause (MIMIC) model, which was first used by Frey and Weck-Hanneman (1984) for OECD countries. He estimates the size of the informal sector in 14 Latin American countries and finds some evidence for three determinants being significantly relevant at the 10% confidence level. Tax burden (0.33) and labor-market restrictions (0.49) affect the relative size of the informal sector positively, while the strength and efficiency (-0.42) of the government institutions have an negative influence leading to a decrease of the informal sector.[43] These three causes are among those which are mentioned often in the analysis of causes for the increase of the shadow economy. While macroeconomic approaches can often only show statistical correlation rather than causal relations, they cannot provide answers to questions like: Why do people choose to work in the shadow economy? What other factors (besides income motive) cause an increase of informal activities? Can other theories provide further help to find

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[42]A brilliant overview of the theoretical approaches is given by Thomas (1992).

[43]The numbers indicate the change of the size of the informal sector (in standard-deviation) with a one-standard-deviation increase in each of the determinants.

relevant factors? Since, only individuals can choose, according to methodological individualism, it might be helpful to have a closer look at the individual decision process.

The main focus of research on the shadow economy is based, therefore, on the microeconomic approach. Figure 4.1 (see page 54) shows why a deeper analysis has to focus on individual decisions. The figure is divided into two main sections: The top right area shows the macroeconomic level of research on the shadow economy. Aggregate data can be used to analyze possible correlations between causes (e.g. a rise in the overall tax and social security burden) and consequences (e.g. additional growth of the shadow economy). The methods used here are described in Chapter 2. The next step is to analyze effects and (political) implications of an increasing shadow economy, which is shown at the upper right side of the figure. The rest of the figure covers the research area for microeconomic, microsociological and psychological approaches. The preferences of individuals, which are assumed to be stable, are the starting point of these approaches. In an interdisciplinary approach (like undertaken in Economic Psychology) intervening variables such as tax morale, which was first discussed by Schmölders (1960, 1975), are included in the analysis. The individual decision process is the basis for such an analysis. The choice behavior is then examined under different and variable constraints. Under what circumstances will individuals choose to work in the informal rather than in the formal sector? The answer to this question provides further information about the reasons for the increase of the shadow economy. The theoretical foundations for the analysis is provided by various microeconomic theories like utility theory, the neoclassical leisure-income model etc. An interdisciplinary approach which is necessary for a successful analysis would also consider factors like acceptance and perceived fairness of the tax system, and the tax morale. However, since this paper concentrates on economic factors, we will focus on economic reasoning.

4.2 Factors influencing the shadow economy

Figure 4.2 (see page 55)gives an overview of some state activities and other economic factors influencing the shadow economy. Most of these factors are derived from economic theories and are often used in empirical studies. The most important ones are now discussed:

4.2.1 Increase of the tax and social-security contribution burden

In almost all studies[44], the increase of the tax and social security contribution burden is one of the main causes for the increase of the shadow economy. Since taxes affect labor-leisure choices, but also stimulate labor supply in the shadow economy, or untaxed sector of the economy, the distortion of this choice is a major concern of economists. The bigger the difference between the total cost of labor in the official economy and the after tax earnings (from work), the greater is the incentive to avoid this difference and to work in the shadow economy. Since this difference depends broadly on the social security system and the overall tax burden, they are key features of the existence and the increase of the shadow economy. Nowadays, major tax reforms and reforms of the social security systems are carried out to reduce the incentives for irregular work and tax evasion. The reduction of these burdens was necessary [45], and is now even more urgent as the following table 4.1 (see page 56) shows.

But even major tax reforms with major tax rate deductions will not lead to a substantial decrease of the shadow economy. They will only be able to stabilize the size of the shadow economy and avoid a further increase. Social networks and personal relationships, the still high profit from irregular activities and associated investments in real and human capital are strong ties which prevent people from ceasing to work in the shadow economy. For Canada, Spiro (1993) expected similar reactions of people facing an increase in indirect taxes (VAT, GST). After the introduction of the GST in 1991 - in the midst of a recession - , the individuals, suffering economic hardship because of the recession, turned to the shadow economy, which lead to a substantial loss in tax revenue. "Unfortunately, once this habit is developed, it is unlikely that it will be abandoned merely because economic growth resumes." (Spiro 1993 p. 255). They may not return to the formal sector, even in the long run. This fact makes it even more difficult for politicians to carry out major reforms, because they may not gain a lot from them.[46]

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[44] See Thomas (1992), Lippert and Walker (1997), Schneider (1994, 1997, 1998), Johnson, Kaufmann, and Zoido-Lobatón (1998a,1998b) and Zilberfarb (1986) just to quote a few recent ones.

[45]See for example Buchanan (1968) for an early radical reform leading to a reduction of the social security burden.

[46]See Schneider (1994b, 1998b) for a similar result of the effects of a major tax reform in Austria on the shadow economy. It is shown there, that a major reduction in the direct tax burden did not

The most important factor in neoclassical models is the marginal tax rate. The higher the marginal tax rate, the greater is the substitution effect and the bigger the distortion of the labor-leisure decision. Especially when taking into account that the individual can also receive income in the shadow economy, the substitution effect is definitely larger than the income effect[47] and, hence, the individual works less in the official sector. The overall efficiency of the economy is, therefore (ceteris paribus), lower and the distortion leads to a welfare loss (according to official GNP and taxation.) But the welfare might also be viewed as increasing, if the welfare of those, who are working in the shadow economy, were taken into account, too.[48]

While there have been many theoretical studies of tax evasion in the last twenty years, empirical studies of tax evasion are harder to find.[49] Most of them are based on tax compliance experiments and they cover only some parts of the shadow economy.[50] Convincing empirical evidence for the theoretical hypothesis, why people evade taxes, is hard to find and the results are ambiguous (Pommerehne and Weck-Hanneman 1992). The results are more convincing for the shadow economy, for example Schneider (1994) and Johnson, Kaufmann and Zoido-Lobatón (1998a, 1998b) found strong evidence for the general influence of taxation on the shadow economy.

Two other recent studies provide strong evidence for the influence of income taxes on the shadow economy: Cebula (1997), using Feige data for the shadow economy, found evidence of the impact of government income tax rates, IRS audit probabilities, and IRS penalty policies on the relative size of the shadow economy in the United States. Cebula concludes that a restraint of any further

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lead to a major reduction in the shadow economy. Because legal tax avoidance was abolished and other factors, like regulations, were not changed, for the majority of the tax payers the actual tax and regulation burden remained unchanged.

[47]If leisure is assumed to be a normal good.

[48]See Thomas (1992) p. 134-7.

[49]For a broad survey see Andreoni, Erard, Feinstein (1998).

[50]See Alm (1996) for an overview of tax compliance explanations in different studies. The theoretical literature on tax evasion is summarized in Cowell (1990); see also Allingham and Sandmo (1972) for their path breaking study in this area.

increase of the top marginal income tax rate may at least not lead to an further increase of the shadow economy, while increased IRS audits and penalties might reduce the size of the shadow economy. His findings indicate that there is in general a strong influence of state activities on size of the shadow economy: For example, if the marginal federal personal income tax rate increases by one percentage point, ceteris paribus, the shadow economy rises by 1.4 percentage points.

More detailed information of the labor-supply decision in the underground economy is given by Lemieux, Fortin and Fréchette (1994) using microdata from a survey conducted in Quebec City (Canada). In particular, their study provides some economic insight into the size of the distortion caused by income taxation and the welfare system. The results of this study suggest that hours worked in the shadow economy are quite responsive to changes in the net wage in the regular (official) sector. It provides also some support for the existence of a Laffer curve. The Laffer curve suggests, that an increase of the (marginal) tax rate leads to an decrease of tax revenue, when the tax rate is too high. Their empirical results, attribute this to a (mis-)allocation of work from the official to the informal sector, where it is not taxed. In this case, the substitution between labor-market activities in the two sectors is quite high. These empirical findings clearly indicate, that "participation rates and hours worked in the underground sector also tend to be inversely related to the number of hours worked in the regular sector" (Lemieux, Fortin, Fréchette 1994 p. 235). The findings demonstrate a large negative elasticity of hours worked in the shadow economy with respect to the wage rate in the regular sector resp. A high mobility between the sectors.

In another investigation, Hill and Kabir (1996) found empirical evidence that marginal tax rates are more relevant than average tax rates, and that a substitution of direct taxes by indirect taxes seems unlikely to improve tax compliance. More evidence for the effect of taxation on the shadow economy is presented by Johnson, Kaufmann and Zoido-Lobaton (1998b). They come to the conclusion, that it is not higher tax rates *per se* that increase the size of the shadow economy, but the ineffective and discretionary application of the tax system and the regulations by governments. Their finding, that there is a *negative* correlation[51] between the size of the unofficial economy and

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[51]The higher the top marginal tax rate, the lower the size of the shadow economy.

the *top* marginal tax rate, might be unexpected. But, since other factors like tax-deductibility, tax reliefs, tax exemptions, the choice between different tax systems and various other options for legal tax avoidance were not taken into account, it is in end not all that surprising.[52] For example, hardly anybody is paying the top marginal tax rate in Germany, since there are many legal tax loopholes, of course mostly used by wealthy people.[53] Johnson, Kaufmann and Zoido-Lobatón (1998b) find a *positive* correlation between the size of the shadow economy and the corporate tax burden. They come to the overall conclusion that there is a large difference between the impact of either direct taxes or the corporate tax burden. Institutional aspects, like the efficiency of the administration, the extent of control rights held by politicians and bureaucrats, and the amount of bribery and especially corruption, therefore, play a major role in this "bargaining" or "arbitrary discretion game" between government and the tax payer.

4.2.2 Intensity of regulations

The increase of the intensity of regulations (often measured in the numbers of laws and regulations, like licenses requirements) is another important factor, which reduces the freedom (of choice) for individuals engaged in the official economy.[54] One can think of labor market regulations, trade barriers and labor restrictions for foreigners. Although Johnson, Kaufmann and Zoido-Lobatón (1998b) did not find overall significant empirical evidence of the influence of labor regulations on the shadow economy, the impact is clearly described and theoretically derived in other studies, e.g. for Germany (Deregulation Commission 1990/91). Regulations lead to a substantial increase in labor costs in the official economy. But since most of these costs can be shifted on the employees, these costs provide another incentive to work in the shadow economy, where they can be avoided.

Empirical evidence supporting the model of Johnson, Kaufmann and Shleifer (1997), which predicts - inter alia - that countries with more general regulation of their economies tend to have higher share of the unofficial economy in total GDP, is found in their empirical analysis. A one

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[52]See also Cebula (1997) for opposite findings.

[53]See Enste (1997) for further details on the (postponed) major German tax reform.

[54]See for a (social) psychological, theoretical foundation of this feature Brehm (1966, 1972), and for a (first) application to the shadow economy Pelzman (1988)

point increase of the regulation index (ranging from 1 to 5, 5 = the most regulation in a country), ceteris paribus, is associated with a 8.1 percentage point increase in the share of the shadow economy, when controlled for GDP per capita (Johnson et. Al. (1998b), p. 18). They conclude that it is the *imposition* of a regulation, which is the key factor for the burden levied on firms and individuals, and not the overall extent of regulation - mostly not enforced - which drive firms into the shadow economy.

These findings demonstrate that governments should put more emphasis on improving enforcement of the laws and regulations, rather than increasing their number. Governments, however, prefer this policy option (more regulations and laws), when trying to reduce the shadow economy, mostly because this leads to an increase in power of the bureaucrats and to a higher rate of employment in the public sector.[55]

4.2.3 Social transfers

The social welfare system leads to strong negative incentives for beneficiaries to work in the official economy since their marginal tax rate often equals or nearly reaches 100 %. This can be derived either from the neoclassical leisure-income model or from empirical results.[56]. This provides major disincentives for individuals getting welfare payments to even search for work in the official economy, since the overall income is much higher when they are still receiving these transfers, while possibly working in the underground economy.

4.2.4   Labor market

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[55]See for example Frey (1989) for a first application of the Public Choice Theory to the shadow economy.

[56]See for example Lemieux, Fortin, and Frechette (1994).

The numerous regulations in the official labor market and the total wage costs are also driving forces for the shadow economy. Two main aspects, the effects of the reduction in official working hours and the influence of the unemployment rate on the increase of the shadow economy are discussed quite often in this context: (1) As in most OECD-countries unemployment is to a large extend caused by the fact that local labor costs are too high, it can be seen as a cause for an increase of the shadow economy.

(2) The reduction in working hours in the official economy was introduced by several decisions of governments (e.g. France) or labor unions (e.g. Germany) in order to reduce the unemployment rate. The idea behind this is that there is only a limited quantity of work, and that this quantity has to be "redistributed". But this idea neglects a key factor, that especially a forced reduction (but an increase in flexibility of working hours, too) increases the potential of hours that can be worked in the shadow economy.[57] Early retirements can also lead to more unofficial activities and part time work offers great opportunities to the individual to adopt another job in the untaxed, unregulated economy, as argued by de Gijsel (1984) and Riebel (1983, 1984).[58] Furthermore, this notion of working less means a welfare for the whole loss economy, since a substantial part of the economic resources is wasted.

4.2.5 Public sector services

An increase of the shadow economy leads to a reduction of state revenues which reduces the quality and quantity of publicly provided goods and services. Finally, this can lead to an increase of the tax rates for firms and individuals in the official sector, quite often combined with a deterioration of the quality of the provided public goods (like the public infrastructure) and of the administration, with the consequence of even stronger incentives to participate in the shadow economy. Johnson, Kaufmann and Zoido-Lobatón (1998b) present a simple model of this relationship. Their findings show, that smaller shadow economies appear in countries with higher tax revenue (if achieved by lower tax rates) less laws and regulations and less bribery on enterprises. Countries with a better rule of the law, which is financed by tax revenues, also have smaller shadow economies. Transition countries have higher levels of regulation leading to a

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[57]After Volkswagen in Germany reduced the working hours considerably, there is some evidence, that in the area around the firm, much more reconstruction and renovation of houses took place compared to similar other regions.

[58]See Becker (1965), Trockel (1987), Werner (1990) for a more detailed analysis and description.

significantly higher incidence of bribery, higher effective taxes on official activities and a large discretionary framework of regulations with the consequences of a higher shadow economy.

The overall conclusion is, that "wealthier countries of the OECD, as well as some in Eastern Europe find themselves in the 'good equilibrium' of relatively low tax and regulatory burden, sizeable revenue mobilization, good rule of law and corruption control, and [relatively] small unofficial economy. By contrast, a number of countries in Latin American and the Former Soviet Union exhibit characteristics consistent with a 'bad equilibrium': tax and regulatory discretion and burden on the firm is high, the rule of law is weak, and there is a high incidence of bribery and a relatively high share of activities in the unofficial economy." (Johnson, Kaufmann and Zoido-Lobatón 1998a p. I).

4.3 The effects of the shadow economy on the official economy

In order to study the effects of the shadow economy on the official one, several studies integrate underground economies into macro economic models[59] Huston (1990) develops a theoretical macro model of business cycle as well as tax and monetary policy linkages with the shadow economy. He concludes from his investigation of the growth of the shadow economy that on the one side its effect should be taken into account in setting tax and regulatory policies and one the other side that the presence of a shadow economy could lead to an overstatement of the inflationary effects of fiscal or monetary stimulus Adam and Ginsburgh (1983) focus on the implications of the shadow economy on "official" growth in their study for Belgium. They find a positive relationship between the growth of the shadow economy and the "official" one and under certain assumptions (i.e. very low entry costs into the shadow economy due to a low probability of enforcement) they conclude that an expansionary fiscal policy has a positive stimulus for both the formal and informal economies. A study for the United States by Fichtenbaum (1989) argues that the U. S. productivity slowdown over the period 1970 to 1989 was vastly overstated, as the underreporting of income due to the more rapid growth of the U. S. shadow economy during this period was <u>not</u> taken into account.[60]

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[59] For Austria this was done by Schneider, Hofreither, and Neck (1989) and Neck, Hofreither, Schneider (1989). For further discussion of this aspect see Quirk (1996).

[60] Compare also the findings of Pommerehne and Schneider (1985), who come to similar conclusions.

Another hypothesis is, that a substantial reduction of the shadow economy leads to a significant increase in tax revenues and therefore to a greater amount and quality of public goods and services, which finally can stimulate economic growth. Some authors found evidence for this hypothesis. A recent study by Loayza (1996) presents a simple macroeconomic endogenous growth model whose production technology depends on congestable public services. The determinants and effects of the informal sector are studied, when excessive taxes and regulations are imposed by governments and when the capability to enforce compliance is low. The model concludes that in economies where (1) the statutory tax burden is larger than the optimal tax burden and where (2) the enforcement of compliance is too weak, the increase of the relative size of the informal economy generates a reduction of economic growth. The reason for this correlation is the strongly negative correlation between informal sector and public-infrastructure index, while the public-infrastructure is the key element for economic growth. For example, Loayza finds empirical evidence for Latin America countries that if the shadow economy increases by one percentage point (of GDP) - ceteris paribus - the growth rate of official real GDP per capita decreases by 1.22 percentage points. This negative impact of the informal sector activities on economic growth is not broadly accepted.[61] E.g. the key feature of the model has been criticized, because the model is based on the assumption that the production technology essentially depends on tax-financed public services, which are subject to congestion. In addition, the informal sector is not paying any taxes but must pay penalties which are not used to finance public services. The negative correlation between the size of the informal sector and economic growth is therefore not very surprising.

Depending on the prevailing view of the informal sector, one might also come to the opposite conclusion. In the neoclassical view the underground economy is optimal in the sense that it responds to the economic environment's demand for urban services and small-scale manufacturing. From this point of view the informal sector provides the economy with dynamic and entrepreneurial spirit and can lead to more competition, higher efficiency and strong boundaries and limits for government activities. The informal sector may offer great contributions "to the creation of markets, increase financial resources, enhance entrepreneurship, and transform the

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[61]See Asea (1996) for a more detailed criticism of the Loayza model.

legal, social, and economic institutions necessary for accumulation" (Asea (1996) p. 166). The voluntary self-selection between formal and informal sector, as described above in microeconomical models, may provide a higher potential for economic growth and, hence, a positive correlation between an increase of the informal sector and economic growth. The effects of an increase of the shadow economy on economic growth remain, therefore, considerably ambiguous.

The empirical evidence of these hypotheses is also not clear. Since many Latin American countries had or still have a tradition of excessive regulations and weak government institutions, Loayza (1996) finds some evidence for the implications of his growth model in the early 1990s in these countries: The increase in the size of the shadow economy negatively affects growth (1) by reducing the availability of public services for everyone in the economy, and (2) by using the existing public services less efficiently or not at all.

On the other side, the positive „side effects" of shadow economy activities must be considered. Empirical findings of Schneider (1998b) show clearly that over 66 % of the earnings in the shadow economy are rather immediately spent in the official sector. The positive effects of this expenditure for economic growth and for the (indirect) tax revenues must be taken into account as well. Bhattacharyya (1993) found clear evidence for the U.K. (1960-1984) that the hidden economy has a significant effect on the consumer expenditure. He points out that the hidden economy has a positive effect on consumer expenditure of non-durables, but an even stronger positive effect on consumer expenditure of durables.

5 Corruption and the shadow economy - substitutive or complementary effects?

Over the last ten years corruption has gained growing attention among scientists, politicians and public officials. Its origins, consequences and ways to fight it have been analyzed.[62] Corruption has been defined in many different ways but „the most popular and simplest definition of corruption is, that it is the abuse of public power for private benefit"(Tanzi 1998, p.8). From this definition the private sector seems to be excluded, which is, of course, not the case, - a more general definition is „that corruption is the intentional noncompliance with arm's length relationship from this behavior for oneself or for related individuals" Tanzi (1998, p. 8). There are various kinds of corruption including cost-reductions in response to bribes and cash payments, and there is an extensive literature about which factors stimulate corruption:[63]

- regulations or licenses to engage particular activities (e.g. opening a shop, a taxi license);
- land zoning and other similar official decision;
- access to the publicity provided goods and services;
- control over decision-making regarding procurement or public investment contracts;
- control over the provision of tax incentives;
- control over hiring and promotion within the public sector.

The effect of corruption on the official economy can be seen from two different perspectives: Romer (1994) has suggested that corruption, as a tax on ex-post profits, may in general stimulate the entry of new goods or technology, which require an initial fixed cost investment. Mauro finds a significant negative correlation between the corruption index and the investment rate or rate of GDP growth. An one-standard-deviation improvement in the corruption index is estimated by Mauro (1995) to increase the investment rate by about 3% GDP growth. Johnson et. Al. (1998b,

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[62]The literature is quite large and only some (mostly more recent) are given here like Rose-Ackermann (1978, 1997), Shleifer and Vestny (1993), Tanzi (1994, 1997, 1998), Johnson, Kaufmann and Zoido-Lobaton (1998a, 1998b), Kaufmann and Sachs (1998); for the latest survey see Bardhan (1997).

[63]See e.g. Rose-Ackermann (1997), Tanzi (1998) and Bardhan (1997).

p. 39) find a significant relationship between corruption and GDP growth (an increase in corruption on an indexed scale from 0 to 6 by 1 point decreases statistical GDP growth by 0.84 percentage points) but the relationship becomes insignificant if the shadow economy is entered as an independent variable. On the other side Bardhan (1997, p. 1329) concludes, that „it is probably correct to say that the process of economic growth ultimately generates enough forces to reduce corruption"- a view which is supported by Rose-Ackermann (1997), who further argues that any reform that increases the competitiveness of the economy will help to reduce incentives for corruption. Thus policies that liberalize foreign trade and remove entry barriers for industry promote competition and reduce corruption . Such reforms will also encourage firms to move from the shadow economy into the official economy, where they can obtain access to capital at market rates. Rose-Ackerman (1997, p. 21) concludes, that „going underground is a <u>substitute</u> for bribery, although sometimes firms bribe officials in order to avoid the official states."

There are only a few studies which empirically investigate the relationship between the shadow economy and corruption, either in a country or over a sample of countries.[64] Johnson et. Al. (1008, p. 21) find in their empirical investigation of 49 countries of Latin Amerika, the OECD, and the post-communist countries of Eastern Europe and former Soviet Union, a statistically highly significant relationship between the various measures of bribery or corruption and the shadow economy; an one point improvement (= less corruption) in the corruption index ICRG[65] leads to about an 8.0 - 11.0 percentage point decline in the shadow economy, ceteris paribus. Using another measure for corruption, the transparency International Corruption Index[66], Johnson et. Al. Found that a one-point increase in this index (= less corruption) decreases the shadow economy by 5.1 percentage points, ceteris paribus.

To summarize, the relationship between the share (size) of the shadow economy and the amount of corruption is strong and consistent using different measures. Countries with more corruption and briberies have a higher share (size) of shadow economy. Whereas Rose-Ackermann concludes

[64]See e.g. Johnson et. al. (1998a, 1998b), Johnson, Kaufmann and Shleifer (1997), Kaufmann and Sachs (1998).

[65]This index ranks between 1 and 6 (best = no corruption) and was averaged by Johnson et. al. (1998, p. 21) for the nineties.

[66]This index ranks between 0 and 10 (= best = no corruption).

from her work, that going underground is a <u>substitute</u> for corruption (bribery), the empirical results of Johnson et. Al. Point more to a complimentary process: <u>Countries with more corruption, ceteris paribus, have higher shares of the shadow economy.</u>

6   Summary and conclusions

There are many obstacles to be overcome to measure the size of the shadow economy and to analyze ist consequences on the official economy, but some progress has been made. In this paper it has been shown that though it is difficult to estimate the size of the shadow economy, it is not impossible. We have demonstrated that with various methods, e.g. the currency demand, the physical input measure and the model approach, some insights can be provided about the size and development of the shadow economy of the developing, transition and the OECD countries. The general impression from the results of these methods is that the shadow economy has reached a remarkably large size for all countries investigated. The average size of the shadow economy of the investigated countries at the beginning of the nineties (1989-1993) is:[67]

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[67]For the developing and transition countries only the physical input (electricity) method has been used except for Central and South America, where the model approach (MIMIC) is also used.

Table 6.1: Average size of the shadow economy for developing, transition and OECD Countries

Countries	Average size of the shadow economy 1989-93
Developing countries	
Africa	43.9% of GDP
Central and South America	38.9% of GDP
Asia	35.0% of GDP
Transition countries	
Former Soviet Union	25.7% of GDP
Eastern Europe	20.7% of GDP
OECD countries	
Electricity method	15.4% of GDP
currency demand method	12.9% of GDP

Source: our calculations

These results clearly demonstrate that the shadow economy is quite large and additional results indicate that it is still strongly increasing; e.g. on average in the Eastern Europe transition countries from 17.6 % (average 1989/1990) to 20.9 % (average 1994/1995); in the former Soviet Union countries from 16.7 % (1989/1990) to 35.3 % (1994/1995) ; and in OECD countries from 12.3% (1989/1990) to 16.2 % (1996/1997).

To summarize: As it has already been argued, there is no „best" or commonly accepted method; each approach has its specific strengths and weaknesses as well as gives specific insights and results. Although the different methods provide a rather wide range of estimates, there is general agreement that the size of the shadow economics for the developing, transition and OECD countries has been strongly growing over the recent decade. A similar finding can be made for the „shadow labor market" which draws growing attention due to high unemployment in European OECD countries.

Furthermore the results in these survey show that an increasing burden of taxation and social security payments, combined with rising state regulatory activities, are the major driving forces for the development of the shadow economy. According to some studies, a growing shadow

economy has a negative impact on official GDP growth. There is, however, a positive impact on the amount of corruption, i.e. the larger the corruption the larger is the shadow economy.

7 Tables and figures

Table 3.1: The share of the shadow economy (in % of GDP) at the beginning of the 1990s of developing, OECD, and transition countries .... Part 1

Countries	Share of the shadow economy (in percent of GDP) using:			
	physical input (electricity) method		currency demand method	
1. Developing countries	Average 1989-90	Average 1990-93	Average 1989-90	Average 1990-93
Africa				
1. Nigeria	76.0	-	-	-
2. Egypt	68.0	-	-	-
3. Tunisia	45.0	-	-	-
4. Morocco	39.0	-	-	-
5. Tanzania [2]	-	-	31.5	
6. Botswana	27.0	-	-	-
7. Mauritius	20.0	-	-	-
Central and South America		*MIMIC-method 1990-93*		
1. Bolivia	-	65.6	-	-
2. Panama	40.0	62.1	-	-
3. Peru	44.0	57.4	-	-
4. Guatemala	61.0	50.4	-	-
5. Honduras	-	46.7	-	-
6. Brazil	29.0	37.8	-	-
7. Colombia	25.0	35.1	-	-
8. Ecuador	-	31.2	-	-
9. Venezuela	30.0	30.8	-	-
10. Mexico	49.0	27.1	33.0	35.1
11. Paraguay	27.0	-	-	-
12. Costa Rica	34.0	23.2	-	-
13. Argentina	-	21.8	-	-
14. Chile	37.0	18.2	-	-
Asia		*Electricity method 1990-93*		
1. Thailand	71.0	-	-	-
2. Philippines	50.0	-	-	-
3. Sri Lanka	40.0	-	-	-
4. Malaysia	39.0	-	-	-
5. South Korea	38.0	-	-	-
6. Israel	29.0	-	-	-
7. Cyprus	21.0	-	-	-

	Physical input (electricity) method		Currency demand method	
8. Hong Kong	13.0	-	-	-
9. Singapore	13.0	-	-	-

Table 3.1   **Part 2**

Countries	Shares of the shadow economy (in % of GDP) using:			
	Physical input (electricity) method		**Currency demand method**	
2. Transition countries	**Average 1989-90**	**Average 1990-93**	**Average 1989-90**	**Average 1990-93**
Former Soviet Union [3)]				
1. Georgia	24.9	43.6	-	-
2. Azerbaijan	21.9	33.8	-	-
3. Moldova	18.1	29.1	-	-
4. Ukraine	16.3	28.4	-	-
5. Russia	14.7	27.0	-	-
6. Lithuania	11.3	26.0	-	-
7. Latvia	12.8	24.3	-	-
8. Estonia	19.9	23.9	-	-
9. Kazakhstan	17.0	22.2	-	-
10. Belarus	15.4	14.0	-	-
11. Uzbekistan	11.4	10.3	-	-
Central and Eastern Europe				
1. Hungary	27.5	30.7	-	-
2. Bulgaria	24.0	26.3	-	-
3. Croatia [4)]	22.8	23.5	-	-
4. Poland	17.7	20.3	-	-
5. Romania	18.0	16.0	-	-
6. Slovakia	6.9	14.2	-	-
7. Czech Republic	6.4	13.4	-	-

Table 3.1 **Part 3**

Countries	Shares of the shadow economy (in % of GDP) using:			
	Currency demand method Johnson et al. figures	Currency demand method Schneider figures		Physical input (electricity) method
3. OECD Countries[5]				
1. Greece	27.2	-	-	21.2
2. Italy	20.4	24.0	22.8	19.6
3. Spain [6]	16.1	17.3	16.1	23.9
4. Portugal	15.6	-	-	16.8
5. Belgium	15.3	20.8	19.3	22.0
6. USA	13.9	8.2	6.7	10.5
7. The Netherlands	11.8	12.7	11.9	13.5
8. Sweden	10.6	17.0	15.8	10.8
9. Germany [7]	10.5	12.5	11.8	15.2
10. France	10.4	13.8	9.0	12.5
11. Canada	10.0	13.5	12.8	11.7
12. Denmark	9.4	15.0	10.8	17.8
13. Japan	8.5	-	-	13.7
14. Ireland	7.8	14.2	11.0	20.7
15. Great Britain	7.2	11.2	9.6	13.6
16. Switzerland	6.9	6.9	6.7	10.2
17. Norway	5.9	16.7	14.8	9.0
18. Austria	5.8	6.1	5.1	15.0
19. Australia	-	-	-	15.3
20. Finland	-	-	-	13.3

1) Sources: Our calculations were used as the basis for developing countries in Africa and Asia, Lacko (1996, table 18). For transition countries, except Croatia, Johnson, Kaufmann, and Shleifer (1997, table 1, p. 183), for OECD - countries physical imput method Lacko (1996, 1997a, 1997b), OECD - countries currency demand approach Schneider (1994a, 1998a), and Williams and Windebank (1995).
2) Source Tanzania Bagachwa and Naho (1995, p. 1394), for middle and South-America the MIMIC approach is used; the figures are from Loayza (1996); for Mexico the values using the currency demand approach and taken from Pozo (1996).
3) For the column „average 89/90" only 1990 data were available.
4) Source Croatia: Madzarevic and Milculic (1997, table 9, page 17). For Croatia the discrepancy method is used.
5) Ranked on the size of the average shadow economy over 1990/93 using the Johnson, Kaufmann, Shleifer figures.
6) The figures have been calculated from Mauleon (1997), personal correspondence with Dr. Schneider.

7) From 1990 on united Germany.

Table 3.2: The size of the shadow economy (in % of the GDP) of the early and mid-1990s, of OECD and transition economies part 1

Countries	Share of the shadow economy (in % of GDP) using the		
	physical input (electricity) method	currency demand method	
Transition Countries [1]	Average 1994-95	Average 1994-95	Average 1996-97
Central and Eastern Europe			
1. Bulgaria	32.7	-	-
2. Croatia [2]	28.5	-	-
3. Hungary	28.4	-	-
4. Romania	18.3	-	-
5. Czech Republic	14.5	-	-
6. Poland	13.9	-	-
7. Slovakia	10.2	-	-
Former Soviet Union			
1. Georgia	63.0	-	-
2. Azerbaijan	59.3	-	-
3. Ukraine	47.3	-	-
4. Russia	41.0	-	-
5. Moldavia	37.7	-	-
6. Latvia	34.8	-	-
7. Kazakhstan	34.2	-	-
8. Lithuania	25.2	-	-
9. Belarus	19.1	-	-
10. Estonia	18.5	-	-
11. Uzbekistan	8.0	-	-

Table 3.2: The size of the shadow economy (in % of the GDP) of the early and mid-1990s, of OECD and transition economies **part 2**

Countries	Share of the shadow economy (in % of GDP) using the		
	physical input (elect.)method	currency demand method	
OECD-Countries	Average 1994-95	Average 1994-95	Average 1996-97
1. Greece	-	29.6	-
2. Italy	-	26.0	27.2
3. Spain	-	22.4	23.0
4. Portugal	-	22.1	-
5. Belgium	-	21.5	22.2
6. Sweden	-	18.6	19.5
7. Norway	-	18.2	19.4
8. Denmark	-	17.8	18.2
9. Ireland	-	15.4	16.0
10. Canada	-	14.8	14.9
11. France	-	14.5	14.8
12. The Netherlands	-	13.7	13.8
13. Germany	-	13.5	14.75
14. Australia	-	13.0	-
15. Great Britain	-	12.5	13.0
16. Japan	-	10.6	-
17. USA	-	9.2	8.8
18. Austria	-	7.0	8.6
19.Switzerland	-	6.7	7.8

1) Sources: own calculations using the values of the physical input method by Johnson, Kaufmann, and Shleifer (1997, table 1, p. 182), and Johnson, Kaufmann, and Zoida-Lobaton (1998, pp. 351-351), and for the currency demand method using the data by Schneider (1998a) and Schneider and Poell (1998).

2) For Croatia the discrepancy method is used the figures are taken from Madzarevic and Milculic (1997, table 9, p. 17).

Table 3.3.1: The development of the shadow economy over time in selected transition countries using the physical input electricity method, 1990-95

Transition Countries	Unofficial GDP as a percentage of total GDP (Johnson et. al results)						Hidden economy [2] (in % of GDP)		
	1990	1991	1992	1993	1994	1995	1990	1992	1994
Central and Eastern Europe									
Bulgaria	25.1	23.9	25.0	29.9	29.1	36.1	-	-	-
Czech Republic	6.7	12.9	16.9	16.9	17.6	11.3	15.2 [3]	19.9	15.4
Hungary	28.0	32.9	30.6	28.5	27.7	29.0	26.7	34.8	31.0
Poland	19.6	23.5	19.7	18.5	15.2	12.6	30.8	33.0	32.8
Romania	13.7	15.7	18.7	16.4	17.4	19.1	-	-	-
Slovakia	7.7	15.1	17.6	16.2	14.6	5.8	11.2 [3]	14.7	22.3
Croatia [4]	22.8	22.9	24.7	33.7	32.8	24.2	-	-	-
Former Soviet Union									
Azerbaijan	21.9	22.7	39.2	51.2	58.0	60.6	-	-	-
Belarus	15.4	16.6	13.2	11.0	10.9	19.3	-	-	-
Estonia	19.9	26.2	25.4	24.1	25.1	11.8	-	-	-
Georgia	24.9	36.0	52.3	61.0	63.5	62.6	-	-	-
Kazakhstan	17.0	19.7	24.9	27.2	34.1	34.3	-	-	-
Latvia	12.8	19.0	34.3	31.0	34.2	35.3	-	-	-
Lithuania	11.3	21.8	39.2	31.7	28.7	21.6	-	-	-
Moldova	18.1	27.1	37.3	34.0	39.7	35.7	-	-	-
Russia	14.7	23.5	32.8	36.7	40.3	41.6	-	-	-
Ukraine	16.3	25.6	33.6	38.0	45.7	48.9	-	-	-
Uzbekistan	11.4	7.8	11.7	10.1	9.5	6.5	-	-	-

1)   Source: Johnson, Kaufmann, and Shleifer (1997, Table 1, page 176) and Lacko (1997, Table 4), and for Croatia, Madzarevie and Milculic (1997, Table 9, page 17).
2)   hysical input (household electricity) method applied by Lacko (1997).
3)   Year 1991.
4)   For Croatia, the discrepancy method is used.

Table 3.3.2: The development of the size of the shadow economy in selected OECD-countries over time applying the currency demand approach

Countries	Currency demand approach						
	Size of the shadow economy (in % of official GDP) of the years						
	1960	**1970**	**1975**	**1978**	**1980**	**1990**	**1994**
Austria	0.4	1.8	1.9	2.6	3.0	5.1	6.8
Belgium	-	10.4	15.2	-	16.4	19.6	21.4
Canada	-	-	5.8–7.2	-	10.1–11.2	13.6	14.6
Denmark	3.8–4.8	5.3–7.4	6.4–7.8	6.7–8.0	6.9–10.2	9.0–13.4	17.6
Germany	2.0–2.1	2.7–3.0	5.5–6.0	8.1–9.2	10.3–11.2	11.4–12.0	13.1
France	-	3.9	-	6.7	6.9	9.4	14.3
Ireland	-	4.3	6.9	-	8.0	11.7	15.3
Italy	-	10.7	-	-	16.7	23.4	25.8
Netherlands	-	4.8	-	-	9.1	12.9	13.6
Norway	1.3–1.7	6.2–6.9	7.8–8.2	9.6–10.0	10.2–10.9	14.5–16.0	17.9
Spain	-	-	-	18.0	-	21.0	22.3
Sweden	1.5–1.8	6.8–7.8	10.2–11.2	12.5–13.6	11.9–12.4	15.8–16.7	18.3
Switzerland	1.2	4.1	6.1	6.2	6.5	6.6	6.9
United Kingdom	-	2.0	6.5	7.8	8.4	10.2	12.4
United States	2.6–4.1	2.6–4.6	3.5–5.2	3.7–5.3	3.9–6.1	5.1–8.6	9.4

Source: Schneider (1997).

l) A slash means that there exists no value for this period for this country. A comparison of the size of the shadow economy between the different countries is difficult and only a „crude" comparison can be done, because (i) the use of different independent (e.g., tax variables); (ii) different specification of the dependent variable and estimation equations; and (iii) different assumptions about the velocity of currency.

Table 3.4: A comparison of the results of the shadow economies of five OECD- countries using nine different methods over the period 1970-1990

Method	CANADA Average over				GERMANY Average over				GREAT BRITIAN Average over				ITALY Average over				UNITED STATES Average over			
	70/75	76/80	81/85	86/90	70/75	76/80	81/85	86/90	70/75	76/80	81/85	86/90	70/75	76/80	81/85	86/90	70/75	76/80	81/85	86/90
Surveys of households	-	-	1.3	1.4	3.6	-	-	-	1.5	-	-	-	-	-	-	-	3.7	4.5	5.6	-
Tax auditing	-	-	2.9	-	-	-	-	-	-	-	-	-	3.0	3.9	-	10.0	4.9	6.3	8.2	10.0
Discrepancy between exp. and income	-	-	-	-	11.0	10.2	13.4	-	2.5	3.6	4.2	-	3.2	4.3	-	9.3	3.2	4.9	6.1	10.2
Discrepancy bet. off. and actual empl.	-	-	-	-	23.0	38.5	34.0	-	-	-	-	-	-	18.4	-	-	-	-	-	-
Physical input (elec) method	-	-	-	11.2	-	-	-	14.5	-	-	-	13.2	-	-	-	19.3	-	-	7.8	9.9
Currency demand (Tanzi)	5.1	6.3	8.8	12.0	4.5	7.8	9.2	11.3	4.3	7.9	8.5	9.7	11.3	13.2	17.5	21.3	3.5	4.6	5.3	6.2
Cash deposit ratio (Gutmann)	13.8	15.9	11.2	18.4	-	-	-	-	14.0	7.2	6.2	-	23.4	27.2	29.3	-	8.8	11.2	14.6	-
Transactions approach (Feige)	-	26.5	15.4	21.2	17.2	22.3	29.3	31.4	17.2	12.6	15.9	-	19.5	26.4	34.3	-	17.3	24.9	21.2	19.4
Model approach. (Frey /Weck-H.)	-	8.7	-	-	5.8	6.1	8.2	-	-	8.0	-	-	-	10.5	-	-	-	8.2	-	-
Number of used methods	2	4	5	5	6	5	5	3	5	5	4	2	5	7	3	4	6	7	7	5

Size of the shadow economy (in % of GDP) in

Notes: The value were grouped (if possible averaged) in the periods 1970-75, 1976-80, 1981-85, 1986-90 in order to undertake a rough comparison. The sources of the values are given by each country.

Source: Own calculations by using the following sources:

1. For Canada Lippert and Walker (1997), Thomas (1992), Hill and Kabir (1996), Schneider (1997) and Bendelac and Clair (1994).

2. For Germany Lippert and Walker (1997), Schneider (1994a, 1994b) and Schneider (1997).

3. Great Britain Thomas (1992), Lippert and Walker (1997), Schneider (1994a, 1994b, 1997), Pozo (1996).

4. Italy Thomas (1992), Lippert and Walker (1997), Pozo (1996), Schneider (1994a, 1994b, 1997), Bendelac and Clair (1994).

5. United States Thomas (1992), Lippert and Walker (1997), Pozo (1996), Schneider (1994a, 1994b, 1997), Bendelac and Clair (1994), Tanzi (1986), Feige (1986), Thomas (1986)

Table 3.5: Estimates of the amount of the "shadow economy labor force" in some OECD-countries

Countries	Year	Participants		Size of the shadow economy (in % of GDP) currency demand approach [2]	Sources of the figures for the participants
		in 1000	in % of the people workforce		
Denmark	1980	-	8.3 [3]	8.6	Mogensen, et. al. (1995)
	1986	-	13.0 [3]	-	
	1991	-	14.3 [3]	11.2	
	1994	-	15.4 [3]	17.6	
France	75-82	800-1500	3.0-6.0	6.9	R. De Grazia (1983)
Germany	74-82	2000-3000	8.0-12.0	10.6	R. De Grazia (1983)
	1998	5000	22.0 [4]	14.7	F. Schneider (1998b)
Italy	1979	4000-7000	20.0-35.0	16.7	G. Gaetani and d'Aragona (1979)
Spain	1979-80	1250-3500	9.6-26.5	19.0	Ruesgar (1984)
Sweden	1978	750	13.0-14.0	13.0	R. De Grazia (1983)
European Union	1978	10,000	10.0	-	R. De Garzia (1983)
OECD	1978	16,000	-	-	R. De Garzia (1983)

1) Estimated full-time jobs, including unregistered workers, illegal immigrants and second jobs.
2) Source shadow economy; Schneider (1994a, 1998b).
3) In per cent of the population aged 20-69, survey method (% heavily engaged in shadow economy activities).
4) In per cent of the population aged 20-69, survey method.

Figure 4.1: Macro- and microeconomic approaches of the interaction of the shadow and the official economy
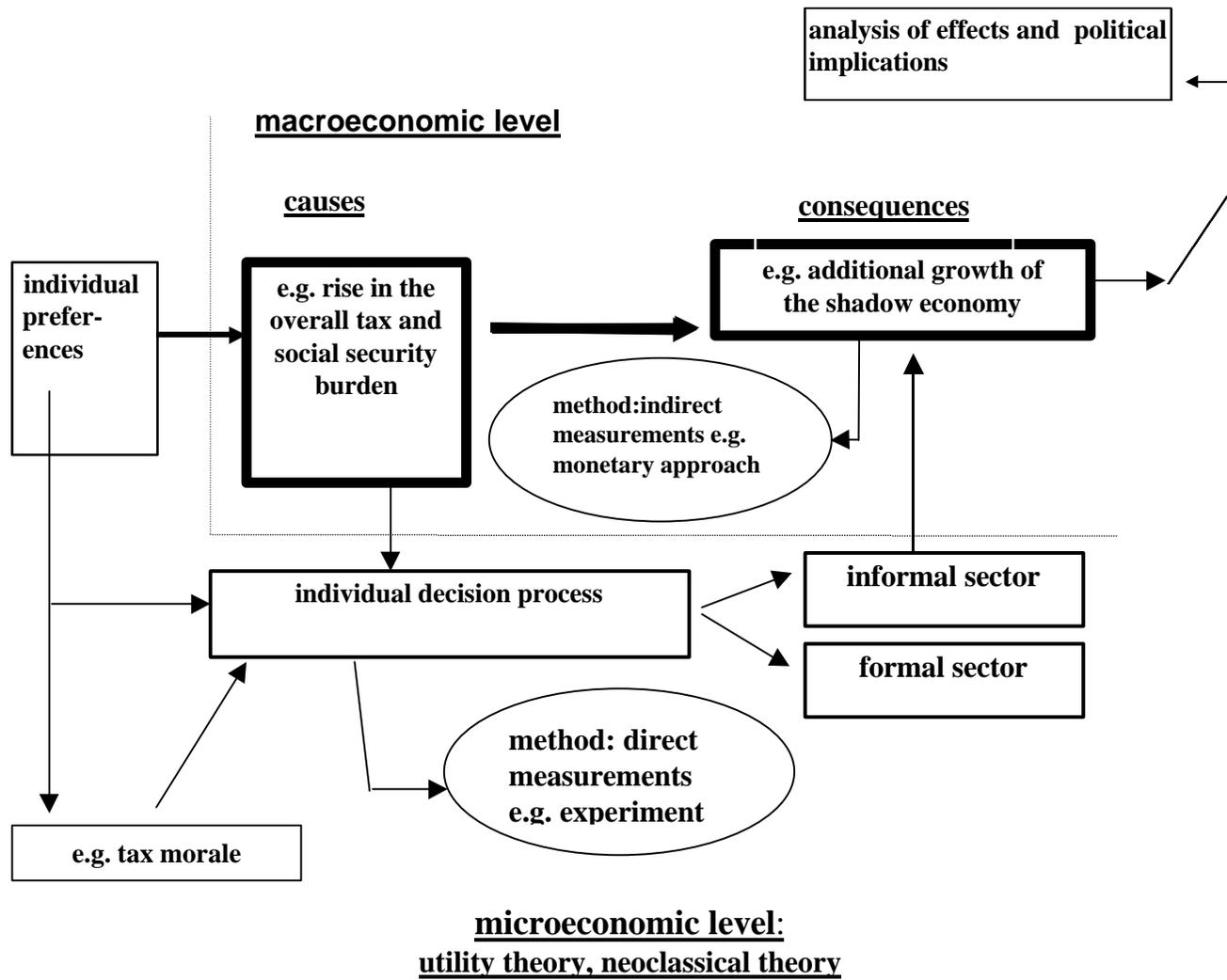
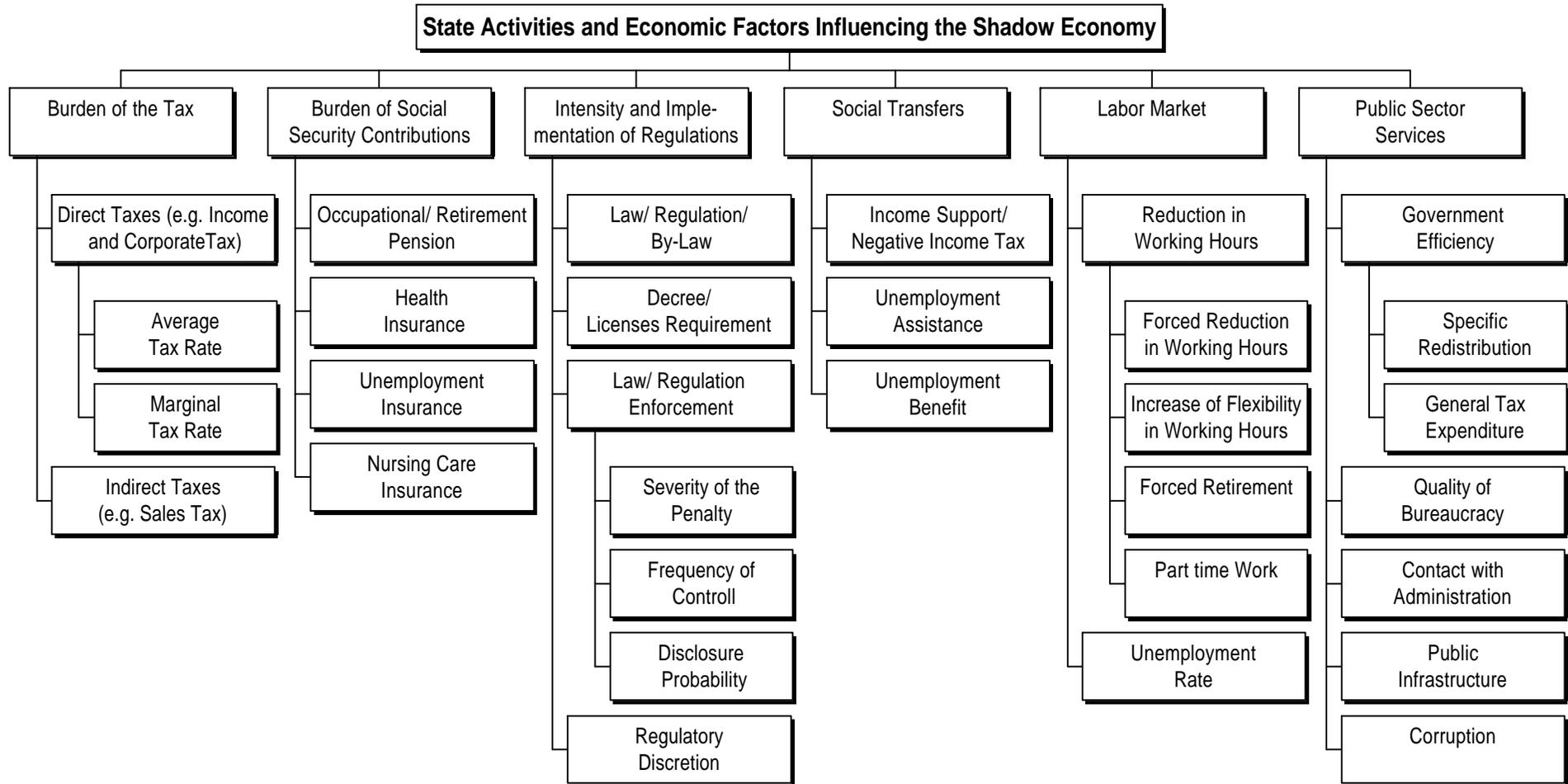**Figure 4.2: State activities and economic factors influencing the shadow economy**

State Activities and Economic Factors Influencing the Shadow Economy

Burden of the Tax
- Direct Taxes (e.g. Income and CorporateTax)
  - Average Tax Rate
  - Marginal Tax Rate
- Indirect Taxes (e.g. Sales Tax)

Burden of Social Security Contributions
- Occupational/ Retirement Pension
- Health Insurance
- Unemployment Insurance
- Nursing Care Insurance

Intensity and Imple-mentation of Regulations
- Law/ Regulation/ By-Law
- Decree/ Licenses Requirement
- Law/ Regulation Enforcement
  - Severity of the Penalty
  - Frequency of Controll
  - Disclosure Probability
- Regulatory Discretion

Social Transfers
- Income Support/ Negative Income Tax
- Unemployment Assistance
- Unemployment Benefit

Labor Market
- Reduction in Working Hours
  - Forced Reduction in Working Hours
  - Increase of Flexibility in Working Hours
  - Forced Retirement
  - Part time Work
- Unemployment Rate

Public Sector Services
- Government Efficiency
  - Specific Redistribution
  - General Tax Expenditure
- Quality of Bureaucracy
- Contact with Administration
- Public Infrastructure
- Corruption

Table 4.1: Development of the tax and social security contribution burden and government expenditure

OECD-Country	Burden of Tax and Social Security contribution in % of GDP [1]				Government Expenditure in % of GDP			
	1970	1980	1990	1996	1970	1980	1990	1996
A	35,7	41,2	41,3	44,1	38,5	48,1	48,6	51,9
B	35,7	44,4	44,9	46,6	---	58,6	55,0	53,0
D	32,9	38,2	37,7 [2]	38,2 [2]	38,1	47,9	45,1	48,8 [2]
DK	40,4	45,5	48,5	51,9	47,0	56,2	58,6	56,7
E	16,9	24,1	34,4	33,7	21,4	32,2	42,0	43,6
F	35,1	41,7	43,8	45,7	37,5	46,1	49,8	54,8
FIN	31,4	33,0	37,9	48,8	29,9	38,1	45,4	57,4
GB	36,9	35,3	36,7	35,3 [3]	37,8	43,0	39,9	41,8
GR	25,3	29,4	36,8	27,9	---	30,6	46,4	44,6
I	26,1	30,2	39,1	43,5	31,7	41,9	53,2	52,7
IRL	31,2	34,0	36,8	33,6	37,0	48,9	41,2	36,6
L	30,9	46,0	48,8	44,0	28,8	---	---	---
NL	36,7	44,7	44,6	43,9	---	55,8	54,1	49,6
P	23,1	28,7	34,8	33,4	---	23,8	41,8	45,0
S	40,0	49,1	56,9	51,9	42,1	60,1	59,1	64,3
CH	23,8	30,8	31,5	35,1	---	32,4	33,1	39,3
N	39,3	47,1	46,3	41,4	36,7	43,3	49,2	44,6
CDN	31,3	31,6	37,0	37,2 [3]	33,5	38,8	46,0	44,7
J	19,7	25,4	31,4	28,5 [3]	19,8	32,0	31,7	36,2
USA	29,2	29,3	29,5	27,9 [3]	30,3	31,8	33,3	32,7

(1) OECD-definition
(2) includes East-Germany
(3) Data from 1995

Sources: own calculations using the following sources: OECD (Paris, various years); IW-Cologne (Germany), Federal Ministry of Finance of Germany, Bonn; Federal Finance Administration of Switzerland, Bern.

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