Shadow Economy

by Friedrich Schneider

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1. Introduction

Crime and shadow economic activities are a fact of life around the world, and almost all societies engage in trying to control these activities through education, punishment, or prosecution. Gathering statistics about who is active in the shadow economy activities, the frequency with which underground activities occur and the magnitude of these activities, is crucial for making effective and efficient decisions regarding allocating resources in this area. Obviously it is difficult to get accurate information about underground or shadow economy activities because individuals engaged in these activities wish to remain unidentified. Hence, estimation of shadow economy activities can be considered as a scientific passion for knowing the unknowable.

These attempts at measurement are obviously problematic[1], since shadow economy activities are performed in such a way as to avoid any official detection. Moreover, if you ask an academic, a public sector specialist, a policy or economic analyst, or a politician, what is going on in the shadow economy, and even just how big it is, you will get a wide range of answers.[2] In spite of this, 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:

- If an increase of the shadow economy is caused mainly by a rise in the overall tax and social security burden, this may lead to an erosion of the tax

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[1] Compare with the feature "Controversy: On the Hidden Economy", in the Economic Journal, Vol. 109, No. 456, June 1999.

[2] Compare the different opinions of Tanzi (1999); Thomas (1999); and Giles (1999a,b).

and social security bases and finally to a decrease in tax receipts, and thus to a further increase in 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. Therefore, a growing shadow economy can be seen as a reaction by individuals who feel overburdened by state activities.

- With a growing shadow economy, (economic) policy is based on erroneous "official" indicators (like unemployment, official labor force, income, consumption), or at least indicators that are inaccurate in magnitude. In such a situation, a prospering shadow economy may cause politicians severe difficulties because it provides unreliable official indicators, and the direction of intended policy measures may therefore be questionable.

- On the one hand, a growing shadow economy may provide strong incentives to attract (domestic and foreign) workers away from the official economy. On the other hand, at least two-thirds of the income earned in the shadow economy[3] resulting in a considerable (positive) stimulating effect on the official economy.

2. What is the Shadow Economy?

Studies trying to measure the shadow economy first face the difficulty of defining it. For instance, one commonly used definition is the shadow economy includes all currently economic activities which contribute to the officially calculated (or observed) Gross National Product.[4] However, Smith (1994, p. 18)

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[3] 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 (1998a,b). These polls also show that two-thirds of the value added produced in the shadow economy would not be produced in the official economy if the shadow economy did not exist.

[4] This definition is used, e.g., by Feige (1989, 1994); Frey and Pommerehne (1984); Schneider and Enste (2000); and Schneider (2001a,b,c).

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 definitions leave open a lot of questions, Table 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 1: A Taxonomy of Types of Underground Economic Activities[1]				
Type of Activity	**Monetary Transactions**		**Nonmonetary 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 taken from Lippert and Walker (1997, p. 5), with additional remarks.

From Table 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. In general, a precise definition seems quite difficult, if not impossible, as "the shadow economy develops all the time according to the 'principle of running water': it adjusts to changes in taxes, to sanctions from the tax authorities and to general moral attitudes, etc." (Mogensen, et al. 1995 p. 5). [5] Our survey does not focus on tax evasion or tax compliance. It rather serves as a supplement to the recent survey of Andreoni, Erard, and Feinstein (1998, p.819), who excluded the shadow economy:

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

"Unfortunately, there are many important issues that we do not have room to discuss, most notably the vast literature on the underground economy which exists in part as a means of evading taxes."[6]

3. Empirical Estimates

The following tables serve to indicate approximate magnitudes of the size and development of the underground economy, defined as productive activities, i.e. using the narrow definition. Table 2 prevents a rough comparison of the size of the underground economies relative to GNP for a selection of Western European countries, Japan and the United States for the end 1990s, using the currency demand approach.

Table 2: Size of the underground economy relative to GNP in various European countries, end 1990s. Estimation based on the currency demand approach.

Greece Italy	27-30%
Spain Portugal Belgium	20-24 %
Sweden Norway Denmark	18-23%
Ireland France Netherlands Germany Great Britain	13-16%
Japan United States Austria Switzerland	8-10%

Source: Compiled from Schneider and Enste (2000).

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[6] Compare also Feinstein (1999), who tries to close the gap between tax evasion and shadow economy research.

The South European countries (Greece, Italy) have an underground economy almost one third as large as the officially measured GNP: followed by Spain, Portugal and Belgium having a shadow economy between 20-24 % (of official) GNP. According to these estimates, the Scandinavian countries also have a sizeable unofficial economy (between 18-20 % of GNP), which is attributed mainly to the high fiscal burden. The "central" European countries (Ireland, the Netherlands, France, Germany and Great Britain) have a smaller underground economy (between 13-16 % of GNP) probably due to a lower fiscal burden and moderate regulatory restrictions. The lower underground economies are estimated to exist in countries with relatively low public sectors (Japan, the United States and Switzerland), and comparatively high tax morale (United States, Switzerland).

Table 3 provides a rough comparison of the size of the underground economy relative to official GNP for a selection of developing and transition economies for the end of the 1990s, using the physical input (electricity) demand approach. Some of these countries (Nigeria, Egypt, Thai-land) are estimated to have an underground sector nearly three quarters the size of officially re-corded GNP. In many countries the size is one quarter to one third of GNP. In Asian countries with a comparatively low public sector, high tax morale or high expected punishment (Hong Kong, Singapore) the underground economy is estimated to be similar to that in many "northern" European countries.

Table 3: Size of the underground economy relative to GNP in various developing and transition countries, end of the 1990s. Estimates based on the physical input (electricity) demand approach.

Developing Countries
Africa

Nigeria Egypt	68-76%
Tunisia Morocco	39-45%

Central and South America

Guatemala Mexico Peru Panama	40-60%
Chile Costa Rica Venezuela Brazil Paraguay Columbia	25-35%

Asia

Thailand	70%
Philippines Sri Lanka Malaysia South Korea	38-50%
Hong Kong Singapore	13%

Transition Economies
Central Europe

Hungary Bulgaria	24-28 %
Poland Rumania	16-20 %
Slovakia Czech Republic	7-11 %

Former Soviet
Union Countries

Georgia Azerbaijan Ukraine Belarus	28-43 %
Russia Lithunia Latvia Estonia	20-27 %

Source: Compiled from Schneider and Enste (2000).

Transition economies are estimated to often have substantial unofficial activities, many around one quarter of GNP. An exception is ex-Czechoslovakia where according to these estimates the underground sector is clearly around ten percent of GNP.

Table 4 reports estimates of the growth of the underground economy (relative to GNP) for selected Western countries and the United States, using the currency demand approach.

Table 4: Growth of the underground economy relative to GNP for selected West European countries and the United States, 1960-1999. Estimates based on the currency demand approach (rounded figures).

	1960	1999	Percentage point increase
Sweden	2%	18,5%	16,5%
Denmark	4,5%	17,5%	13,0%
Norway	1,5%	18,0%	16,5%
Germany	2%	14,2%	11,2%
United States	3,5%	9,5%	6%
Austria	0,5%	9%	6,5%
Switzerland	1%	6,7%	5,7%

Source: Compiled from Schneider and Enste (2000).

The Scandinavian (Sweden, Norway, Denmark) and the German speaking countries (Germany, Austria) exhibit a sizeable increase of the underground

economy within the 35 years (1960-1999) covered. But also the countries with a low share in the beginning (Switzerland, the United States) show a significant increase, for the U.S. the share more than doubled. Sizeable increases have been estimated, with few exceptions, for all types of countries and all kinds of approaches: the increasing importance of the underground relative to the official economy is a robust phenomenon.

4. What are the main causes of the increase in the shadow economy?

4.1. Increase of the tax and social security contribution burdens

In almost all studies,[7] the increase of the tax and social security contribution burdens is one of the main causes for the increase of the shadow economy. Since taxes affect labor-leisure choices and also stimulate labor supply in the shadow economy, or the 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 participate 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.

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, and the high profit from shadow economy activities

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[7] See Thomas (1992); Lippert and Walker (1997); Schneider (1994a,b, 1997, 1998a,b, 2001a,b,c); Schneider and Enste (2000); Johnson, Kaufmann, and Zoido-Lobatón (1998a,1998b); De Soto (1989); Zilberfarb (1986); Tanzi (1999); and Giles (1999a), just to quote a few recent ones.

and associated investments in real and human capital are strong ties which prevent people from working 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 hardships because of the recession, turned to the shadow economy, leading 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.[8]

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[9] 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 GDP 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.[10]

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[8] See Schneider (1994b, l998b), for a similar result of the effects of a major tax reform in Austria on the shadow economy. Schneider shows that a major reduction in the direct tax burden did not lead to a major reduction in the shadow economy. Because legal tax avoidance was abolished and other factors, like regulations, were not changed; hence, for a considerable part of the taxpayers, the actual tax and regulation burden remained unchanged.
[9] If leisure is assumed to be a normal good.
[10] See Thomas (1992), p. 134B7.

While there have been many theoretical studies on tax evasion in the last twenty years, empirical studies of tax evasion are hard to come by.[11] Most of them are based on tax compliance experiments and cover only some parts of the shadow economy.[12] Convincing empirical evidence for the theoretical hypothesis why people evade taxes is hard to find and the results are ambiguous (Pommerehne and Weck-Hannemann, 1992). The results are more convincing for the shadow economy: for example, Schneider (1994a,b) and Johnson, Kaufmann, and Zoido-Lobatón (1998a, 1998b) found strong evidence for the general influence of taxation on the shadow economy.

The strong influence of indirect and direct taxation on the shadow economy will be further demonstrated by showing empirical results in the case of Austria and the Scandinavian countries. In the case of Austria, Schneider (1994b) finds out, that as the driving force for the shadow economy activities, the direct tax burden (including social security payments) has the biggest influence, followed by the intensity of regulation and complexity of the tax system.

A similar result has been achieved by Schneider (1986) for the Scandinavian countries (Denmark, Norway, and Sweden). In all three countries, various tax variables (average direct tax rate, average total tax rate (indirect and direct tax rate and marginal tax rates) have the expected positive sign (on currency demand) and are highly statistically significant. Similar results are reached by Kirchgaessner (1983, 1984) for Germany, and by Klovland (1984) for Norway and Sweden.

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[11] For a broad survey, see Andreoni, Erard, and Feinstein (1998).
[12] 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.

Two other recent studies provide strong evidence of the influence of income taxes on the shadow economy: Cebula (1997), using Feige's 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 increase of the top marginal income tax rate may at least not lead to a 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 generally a strong influence of state activities on the 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 rose 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 micro data 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 also provides some support for the existence of a Laffer curve. The Laffer curve suggests that an increase of the (marginal) tax rate leads to a 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, and 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 and also to 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 on the effect of taxation on the shadow economy is presented by Johnson, Kaufmann, and Zoido-Lobatón (1998b), who 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[13] between the size of the unofficial economy and the *top* (marginal) tax rates 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 not all that surprising.[14] For example, hardly anybody is paying the top marginal tax rate in Germany, since there are many legal tax loopholesXof course, mostly used by wealthy people.[15]

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 direct taxes as compared to the corporate tax burden. Institutional

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

[14] Friedman, Johnson, Kaufmann, and Zoido-Lobatón (1999) found a similar result in a cross-country analysis that higher tax rates are associated with less official activity as percent of GDP. They argue entrepreneurs go underground not to avoid official taxes but they want to reduce the burden of bureaucracy and corruption. However, looking at their empirical (regression) results, the finding that higher tax rates are correlated with a lower share of the unofficial economy is not very robust and, in most cases, using different tax rates, they do not find a statistically significant result.

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

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 game" between the government and the taxpayers.

4.2. 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.[16] 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, for example, 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 a higher share of the unofficial economy in total GDP, is found in their empirical analysis. A one point increase of the regulation index (ranging from 1 to 5, with 5 = the most regulation in a country), ceteris paribus, is associated with an 8.1 percentage point increase in the share of the shadow economy, when controlled for GDP per capita (Johnson et al. (1998b),

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[16] See, for a (social) psychological, theoretical foundation of this feature, Schmölders (1960, 1975), Brehm (1966, 1972); and for a (first) application to the shadow economy, see Pelzmann (1988).

p. 18). They conclude that it is the enforcement of regulation that is the key factor for the burden levied on firms and individuals, and not the overall extent of regulation mostly not enforced that drive firms into the shadow economy. Friedman, Johnson, Kaufmann, and Zoido-Lobat∴n (1999) reach a similar result. In their study, every available measure of regulation is significantly correlated with the share of the unofficial economy and the sign of the relationship is unambiguous: more regulation is correlated with a larger shadow economy. A one point increase in an index of regulation (ranging from 1–5) is associated with a 10 percent increase in the shadow economy for 76 developing, transition, and developed countries.

These findings demonstrate that governments should put more emphasis on improving enforcement of laws and regulations, rather than increasing their number. Some governments, however, prefer this policy option (more regulations and laws), when trying to reduce the shadow economy, mostly because it leads to an increase in power of the bureaucrats and to a higher rate of employment in the public sector.[17]

4.3. 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 percent. This can be derived either from the neoclassical leisure-income model or from empirical results.[18]. Such a system provides major disincentives for individuals who are getting welfare payments to even search for work in the official economy, since their overall income is much higher

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[17] See, e.g., Frey (1989), for a first application of the Public Choice Theory to the shadow economy.
[18] See, e.g., Lemieux, Fortin, and Frechette (1994).

when they are still receiving these transfers, while possibly working in the underground economy.

4.4. Labor market

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:

- As in most OECD countries, unemployment is, to a large extent, caused by the fact that total labor costs are too high. This can be seen as a cause for an increase of the shadow economy.

- The reduction in working hours in the official economy was introduced by governments (e.g., France) and/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.[19] 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).[20]

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[19] 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.

4.5. Public sector services

An increase of the shadow economy leads to reduced state revenues, which in turn reduces the quality and quantity of publicly provided goods and services. Ultimately, this can lead to an increase in the tax rates for firms and individuals in the official sector, quite often combined with a deterioration in the quality of the public goods (such as 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 revenues, if achieved by lower tax rates, fewer laws and regulations, and less bribery facing 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 significantly higher incidence of bribery, higher effective taxes on official activities, a large discretionary framework of regulations, and, consequently, to 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).

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

5. 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 macroeconomic models.[21] Houston (1987) 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, on the other side, the existence of a shadow economy could lead to an overstatement of the inflationary effects of fiscal or monetary stimulus. Adam and Ginsburgh (1985) focus on the implications of the shadow economy on "official" growth in their study concerning 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 of the United States by Fichtenbaum (1989) argues that the United States productivity slowdown over the period 1970-89 was vastly overstated, as the underreporting of income due to the more rapid growth of the United States shadow economy during this period was *not* taken into account.[22]

Another hypothesis is that a substantial reduction of the shadow economy leads to a significant increase in tax revenues and therefore to a greater quantity and quality of public goods and services, which ultimately can stimulate economic

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[21] For Austria, this was done by Schneider, Hofreither, and Neck (1989); and Neck, Hofreither, and Schneider (1989). For further discussion of this aspect, see Quirk (1996); and Giles (1999a).

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

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, where excessive taxes and regulations are imposed by governments and where 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 the informal sector and public infrastructure indices, while 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 of GDP.

This negative impact of informal sector activities on economic growth is not broadly accepted.[23] For example, 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. Based on these assumptions 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 a 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 legal, social, and economic institutions necessary for accumulation" (Asea, 1996, p. 166). The voluntary self-selection between the formal and informal sectors, as described above in microeconomic 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 therefore remain 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 of 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 percent 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, 1999) found clear evidence for the United Kingdom (1960–84) that the hidden economy has a significant effect on consumer

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

expenditures. He points out that the hidden economy has a positive effect on consumer expenditures of nondurable goods and services, but an even stronger positive effect on consumer expenditures of durable goods and services.[24]

6. Corruption and the shadow economy substitutive or complementary effects?

Over the last 10 years, corruption has gained growing attention among scientists, politicians, and public officials regarding its origins, consequences, and ways to fight it.[25] 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 caseXa more general definition is "that corruption is the intentional non-compliance 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.[26] Activities in which corruption is sometimes involved include:

- regulations or licenses to engage in particular activities (e.g., opening a shop, a taxi license);
- land zoning and other similar official decisions;
- access to publicly provided goods and services;

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[24] A close interaction between official and unofficial economies is also emphasized in Giles (1999a), and in Tanzi (1999).

[25] The literature is quite large and only some of it (mostly more recent) is given here: Rose-Ackermann (1978, 1997, 1999); Shleifer and Vishny (1993); Tanzi (1994, 1997, 1998); Johnson, Kaufmann, and Zoido-Lobatón (1998a, 1998b); and Kaufmann and Sachs (1998). For the latest survey, see Bardhan (1997); Jain (1998); and Rose-Ackermann (1999).

- control over decision making regarding procurement of public investment contracts;

- control over the provision of tax incentives; and

- control over hiring and promotion within the public sector.

The effect of corruption on the official economy can be seen from different sides: Romer (1994) has suggested that corruption, as a tax on ex-post profits, may in general stimulate the entry of new goods or technologies, which require an initial fixed-cost investment. Mauro (1995) finds a significant negative correlation between the corruption index and the investment rate or rate of GDP growth. A one-standard-deviation improvement in the corruption index is estimated by Mauro to increase the investment rate by about 3 percent. Johnson et al. (1998b, p. 39) find a significant relationship between corruption and GDP growth (an increase in corruption on an indexed scale from 0 to 6 by only 1 point decreases 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 supported by Rose-Ackermann (1997), who further argues that any reform that increases the competitiveness of the economy will help 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-Ackermann (1997, p. 21) concludes that "going underground is a *substitute* for bribery, although sometimes firms bribe officials in order to avoid the official states."

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[26] See, e.g., Rose-Ackermann (1997, 1999); Jain (1998); Tanzi (1998); and Bardhan (1997).

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.[27] Johnson et al. (1998, p. 21) find, in their empirical investigation of 49 countries of Latin America, the OECD, and the post-communist countries of Eastern Europe and the former Soviet Union, a statistically highly significant relationship between the various measures of bribery or corruption and the shadow economy; a 1 point improvement (= less corruption) in the corruption index ICRG[28] leads to about an 8–11 percentage point decline in the shadow economy, ceteris paribus. Using another measure for corruption, the transparency International Corruption Index,[29] Johnson et al. found that a 1 point increase in this index (= less corruption) decreases the shadow economy by 5.1 percentage points, ceteris paribus. Friedman, Johnson, Kaufmann, and Zoido-Lobatón (1999, p.27) conclude: "... In summary, the relationship between the share of the unofficial economy and rule of law (including corruption) is strong and consistent across eight measures provided by six distinct organizations. All eight of the indices suggest that countries with more corruption have a higher share of the unofficial economy ." In their investigation, they show that a one point increase in the index of corruption increased the share of the unofficial economy by 7.6 percentage points in the year 1997.

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

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

[28] This index ranks between 1 and 6 (best = no corruption), and was averaged by Johnson et al. (1998, p. 21) for the 1990s.

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

going underground is a *substitute* for corruption (bribery), the empirical results of Johnson et al. point more to a complementary process: c*ountries with more corruption, ceteris paribus, have higher shares of the shadow economy.*

7. Summary and conclusions

There are many obstacles to be overcome in measuring the size of the shadow economy and analyzing its consequences for the official economy. In this paper, it is shown that although it is difficult to estimate the size of the shadow economy, it is not impossible. I have demonstrated that with various methods (e.g., the currency demand, the physical input measure, and the model approach), some insights can be provided into the size and development of the shadow economy of developing, transition, and the OECD countries. The general impression from the results of these methods is that, for all countries investigated, the shadow economy has reached a remarkably large size. There is another common finding that the size of the shadow economy in most transition and all investigated OECD countries has been growing over the recent decade. Furthermore, the results in this essay show that an increasing burden of taxation and social security payments, combined with rising state regulatory activities, are the major driving forces behind the size and growth of the shadow economy. According to some studies, a growing shadow economy has a negative impact on official GDP growth and is linked to the amount of corruption.

To conclude: shadow economies are a complex phenomenon, present to an important extent even in the most industrialized and developed economies. People engage in shadow economic activity for a variety of reasons; among the most important, as far as I can tell, are government actions, most notably taxation and regulation. Along with these considerations goes a third, no less important one: a government aiming to reduce shadow economic activity has to

first and foremost analyze the complex and frequently contradictory relationships that are among the consequences of its own policy decisions.

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