Shadow Economies and Corruption all over the World: Empirical Results for 1999 to 2003

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Biopic

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Abstract

Purpose: The article aims to investigate the size and development of the shadow economy for 145 countries, including developing, transitional and highly developed OECD economies, over the period 1999 to 2003. The relation between the shadow and official economies, with particular attention to the burden of taxation and social security, together with corruption, is explored.

Design/methodology/approach: The article reviews econometric surveys of the size and nature of the informal economy, together with surveys of citizen views.

Findings: The average size of the shadow economy (as a percent of "official" GDP) in 2002/03 in 96 developing countries is 38.7%, in 25 transition countries 40.1%, in 21 OECD countries 16.3% and in 3 Communist countries 22.3%. An increased burden of taxation and social security contributions, combined with a labor market regulation are the driving forces of the shadow economy. Furthermore, the results show that the shadow economy reduces corruption in high income countries, but increases corruption in low income countries.

Research limitations/implications: The research only covers shadow economic activities which result from evading governmental regulation and does not include classical criminal activity (drug dealing etc.), household or do-it-yourself activities, or tax evasion/avoidance. Implications are multiple, but include the need for governments to focus on enforcement, rather than creation of regulation and to pay attention to citizens' moral views on the shadow economy.

Originality/value: This is the first study which includes developing, transitional and highly developed countries for this period.

Keywords: shadow economy of 145 countries, tax burden, tax moral, quality of state institutions, regulation

Paper type: Review and research paper.

1 Introduction

As corruption and shadow economic activities are a fact of life around the world, most societies attempt to control these activities through various measures such as punishment, prosecution, economic growth or education. Gathering information about the extent of corruption and the shadow economy and their relationship, who is engaged in corrupt and/or underground activities, the frequencies with which these activities are occurring and their magnitude, is crucial for making effective and efficient decisions regarding the allocations of a country's resources in this area. Unfortunately, it is very difficult to obtain accurate information about the relationship between corruption and shadow economy activities and the goods and labor market, because all individuals engaged in these activities wish not to be identified. Hence, doing research in these two areas can be considered as a scientific passion for knowing the unknown.

Although quite a large literature[1)] on individual aspects of the hidden or shadow economy exists, the subject is still quite controversial[2)] as there are disagreements about the definition of shadow economy activities, estimation procedures and the use of estimates in economic analysis and policy initiatives.[3)] Nevertheless, around the world, there are some indications for an increase in the size of the shadow economy but little is known about the development of the shadow economies in transition, development and developed countries over the latest period 1999/2000 to 2002/2003.

Hence, the goal of this paper is threefold: to undertake the challenging task of estimating the size of the shadow economy for 145 countries[4)] all over the world and then to provide some insights about the main causes of the shadow economy and to explore the relationship between the shadow economy and corruption. In section 2 an attempt is made to define the shadow economy and some theoretical considerations about the reasons why the shadow

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[1)] The literature about the "shadow", "underground", "informal", "second", "cash-" or "parallel" economy is increasing. See for example, surveys by Frey and Pommerehne (1984); Thomas (1992); Loayza (1996); Pozo (1996); Lippert and Walker (1997); Schneider (1994a; 1994b; 1997, 1998a); Johnson et al. (1997; 1998a; 1998b); Belev (2003); Gerxhani (2003) and Pedersen (2003). For overall surveys of the global evidence of the size of the shadow economy see Schneider and Enste (2000; 2002), Schneider (2003; 2005);Alm et al. (2004), and Kazemier (2005).

[2)] See e.g. the *Economic Journal*, vol. 109, no. 456, June 1999 the feature "Controversy: on the Hidden Economy".

[3)] Compare the different opinions of Tanzi (1999), Thomas (1999), Giles (1999a; b); Pedersen (2003) and Janisch and Brümmerhoff (2005).

[4)] This paper focuses on the size and development of the shadow economy for countries and does not show any disaggregated values for specific regions. Recently, some studies have been undertaken to measure the size of the shadow economy as well as the "grey" or "shadow" labor force for urban regions or states (e.g. California). Compare e.g. Marcelli et al. (1999); Marcelli (2004); Chen (2004); Williams (2004a; b; 2005a; b; 2006), Williams and Windebank (1999; 2001a; b), Flaming et al. (2005); Alderslade et al. (2006), and Brueck et al. (2006).

economy is increasing are discussed. Section 3 presents the econometric estimation results on the calculation of the size of the shadow economy for 145 countries over the period 1999/2000 to 2002/03. In section 4 two hypotheses about the relationship between the shadow and corruption are derived and some empirical results are shown. Finally, in section 5 a summary is given and some policy conclusions are drawn.

2 Some Theoretical Considerations about the Shadow Economy

2.1 Defining the Shadow Economy

Most authors trying to measure the shadow economy face the difficulty of how to define it. One commonly used working definition is all currently unregistered economic activities that contribute to the officially calculated (or observed) Gross National Product.[5)] 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." Or to put it in another way, one of the broadest definitions of it includes "those economic activities and the income derived from them that circumvent or otherwise evade government regulation, taxation or observation".[6)]

In this paper the following more narrow definition of the shadow economy is used:[7)] "The shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities for the following reasons:

(1) to avoid payment of income, value added or other taxes;

(2) to avoid payment of social security contributions;

(3) to avoid having to meet certain legal labor market standards, such as minimum wages, maximum working hours, safety standards, etc.; or

(4) to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms."

Hence, in this paper, I will not deal with typical underground, economic (classical crime) activities, which are all illegal actions that fit the characteristics of classical crimes such as burglary, robbery, drug dealing, etc. I also do not include the informal household economy

[5)] This definition is used for example, by Feige (1989; 1994), Schneider (1994a, 2003; 2005) and Frey and Pommerehne (1984). Do-it-yourself activities are not included. For estimates of the shadow economy and the do-it-yourself activities for Germany see Karmann (1986;1990).

[6)] This definition is taken from Del'Anno (2003), Del'Anno and Schneider (2004) and Feige (1989); see also Thomas (1999), Fleming et al. (2000).

[7)] Compare also the excellent discussion of the definition of the shadow economy in Pedersen (2003, pp.13-19)

which consists of all household services and production, nor on tax evasion or tax compliance, a rather different subject.[8)]

2.2 The Main Causes of the Shadow Economy

2.2.1 Tax and Social Security Contribution Burdens

In almost all studies[9)] it has been found that tax and social security contribution burdens are one of the main causes for the existence of the shadow economy. Since taxes affect labor-leisure choices, and also stimulate labor supply in the shadow economy, the distortion of the overall tax burden is a major concern for economists. The bigger the difference between the total cost of labor in the official economy and after-tax earnings (from work), the greater is the incentive to avoid this difference and to work in the shadow economy.

But even major tax reforms with major tax rate deductions will not lead to a substantial decrease in the shadow economy.[10)] Such reforms will only be able to stabilize the size of the shadow economy and avoid further increases. Social networks and personal relationships, high profits from irregular activities and associated investments in real and human capital are strong ties which prevent people from transferring to the official economy. For Canada, Spiro (1993) found similar reactions of people facing an increase in indirect taxes (VAT, GST). This fact makes it even more difficult for politicians to carry out major reforms because they may not gain a lot from them.

Empirical results on the influence of the tax burden on the shadow economy are provided by Schneider (1994b; 2000; 2004; 2005) and Johnson et al. (1998a; 1998b), who all found statistically significant evidence for the influence of taxation on the shadow economy. In Austria the driving force for the shadow economy activities was the direct tax burden (including social security payments), followed by the intensity of regulation and the 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

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and Kazemier (2005) who uses a similar one.

8) Compare, e.g. the survey of Andreoni et al. (1998) and the paper by Kirchler et al. (2002).

9) See, e.g. the recent studies of Thomas (1992); Lippert and Walker (1997); Schneider (1994a; b; 1997; 1998a; b; 2000; 2003; 2005); Johnson et al. (1998a; 1998b); Tanzi (1999); Giles (1999a); Mummert and Schneider (2001); Giles and Tedds (2002) and Dell'Anno (2003).

10) See Schneider (1994b, 1998b) 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, for a considerable proportion of tax payers the actual tax and regulation burden remained unchanged.

marginal tax rates had the expected positive sign (on currency demand) and were highly statistically significant. These findings are supported by Kirchgaessner (1983; 1984) for Germany and by Klovland (1984) for Norway and Sweden.

In this study an attempt will be made to investigate the influence of direct and indirect tax burdens as well as social security payments on the shadow economy for developing, transition and highly developed countries..

2.2.2 Intensity of Regulation

An increase in the intensity of regulation (often measured by the numbers of laws and regulations, like license requirements) is another important factor, which reduces the freedom (of choice) of individuals engaged in the official economy.[11)] One can think of labor market regulations, trade barriers, and labor restrictions for foreigners. Johnson et al. (1998b) found an overall significant effect of the influence of (labor) regulations on the shadow economy, the impact of which 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 onto employees, these costs provide another incentive to work in the shadow economy, where they can be avoided. Johnson et al. (1997) also provide empirical support for their model, 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. A one-point increase in the regulation index (ranging from 1 to 5, with 5 being the most regulation in a country), was 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: 18). They conclude that the key factor for the burden levied on firms and individuals is the extent of enforcement of regulations, not the overall extent of regulation - mostly not enforced. Friedman et al. (2000) reach a similar result. In their study every available measure of regulation was significantly correlated with the share of the unofficial economy and the sign of the relationship was unambiguous: more regulation was correlated with a larger shadow economy. A one point increase in an index of regulation (ranging from 1-5) was associated with a 10 % increase in the shadow economy for 76 developing, transition and developed countries.

These findings demonstrate that governments should put more emphasis on improving the enforcement of laws and regulations, rather than increasing their number. Some governments, however, prefer to create more regulation, when trying to reduce the shadow economy, mostly

[11)]See for a (social) psychological, theoretical foundation for this feature, Brehm (1966; 1972), and for a (first)

because that leads to an increase in power for bureaucrats and to a higher rate of employment in the public sector. In this study the effect of government regulation on the development of the shadow economy will be investigated for developing, transition and highly developed countries.

2.2.3 Public Sector Services

An increase in the shadow economy can lead to reduced state revenues which in turn reduce the quality and quantity of publicly provided goods and services. Ultimately, this can lead to an increase in tax rates for firms and individuals in the official sector, quite often combined with a deterioration in the quality of 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 et al. (1998a; b) present a simple model of this relationship, showing 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 adherence to the rule of 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 and a large discretionary framework of regulations and consequently a larger shadow economy. Their 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 [a 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 et al. 1998a: I).

2.2.4 Public Opinion about the Shadow Economy

The perception of citizens/voters about the shadow economy and their (moral) reactions to this phenomenon are also important factors governing whether people decide to work in the shadow economy[12]. In this short section some results for Germany are shown which clearly demonstrate that there people have no bad (moral) feeling when working in the shadow economy. In Table 2.1 for the year 2003, asked whether they regularly work in the shadow

application to the shadow economy, Pelzmann (1988).

[12] See Halla and Schneider (2005); Torgler (2002); Torgler and Schneider (2005); Feld and Frey (2005); Feld and Larsen (2005).

economy or not, 25% of the German respondents said “yes”, and 46% of the respondents regularly requested shadow economy activities. Table 2.2 explores some reasons why shadow economy activities were requested. The most important factor was that “one saves money” – shadow economy activities are much cheaper than official ones. The second most important reason was that the tax and social security burden is too high (73% of respondents) and the third the much higher labour costs in the official economy. This third answer is interesting, because it clearly demonstrates that only 23% of requested shadow economy activities have a substitutive character (i.e. they would be requested in the official economy if there would be no shadow economy) and only 9% of the respondents said they would carry out the activity themselves. From this survey result one can conclude that roughly 70% of these activities would not take place if there were no shadow economy. In Table 2.3, examples of some hourly wage rates for shadow economy activities in Germany are shown. The surprising element is the large disparity in wage rates in the shadow economy, for example varying for an hour’s work for a painter between €9 and €17. Table 2.3 clearly demonstrates also the large difference (a multiplicative factor between 4 and 5) between wage rates in the shadow economy and in the official one.

---Tables 2.1 to 2.3 about here ---

In Table 2.4 important attitudes of the German population are shown in relation to what is called “Kavaliersdelikte”(minor offence). These results convincingly demonstrate that, for the period 1996 to 2003 roughly two thirds of the German population treated shadow economy activities as a “Kavalierdelikt”, whilst for small thefts such as “Stealing a newspaper from a box”, only a third treated them as a “Kavaliersdelikt”. Table 2.5 shows value statements of the German population with respect to the shadow economy. Again two thirds said that without earnings from the shadow economy one can not keep up standards of living. This implies that shadow economy activities lead to great losses in tax revenues and social security payments to the state. The most surprising element of Table 2.5 is the attitudes of the German population with respect to sanctions against shadow economy activities: only between 3% and 9% of respondents were convinced that shadow economy workers should be reported to the authorities and prosecuted. A similar very low figure occurred when they were asked whether, if a shadow economy worker is detected, he should severely be punished: only between 3% and 7% agreed. This clearly shows that there is no bad (moral) feeling about working in the shadow economy among the German population. The results are quite similar for Austria.

--- Tables 2.4 to 2.5 about here ---

2.2.5 Summary of the Main Causes of the Shadow Economy

In Table 2.6 an overview of a number of empirical studies is given which summarizes the empirical results of the various factors influencing the shadow economy. There are two columns showing the various factors influencing the shadow economy with and without the independent variable, "tax morals". This table clearly demonstrates that an increase in tax and social security contribution burdens is by far most important single influence on the increase in the shadow economy. Between 35 - 38% or 45 - 52% of the variance of the shadow economy is explained by this factor, depending upon whether or not "tax morals" are included. Tax morals then account for between 22 – 25% of the variance, [13] followed by a third factor, "intensity of state regulation "(mostly in relation to the labour market).

--- Table 2.6 about here ---

3 The Size of the Shadow Economy in 145 Countries

3.1 Econometric Results

In Tables 3.1 to 3.3 econometric estimations using the MIMIC approach (latent estimation approach) are presented for the 96 developing countries, the 28 (25) transition and three communist countries and the 21 industrialized (highly developed) OECD-countries.[14)] This grouping was necessary because the available data situation is different for these countries. For the 96 developing countries and the 28 transition and communist countries the estimation was done for three different points of time 1999/2000, 2001/02 and 2002/03 and for the 21 OECD countries there are six time data points 1990/91, 1994/95, 1997/98, 1999/2000, 2001/02 and 2002/03. For the developing and transition countries the causal variables used were: share of direct and indirect taxation (in % of GDP) as the two tax burden variables; burden of state regulation (Index of regulation, Heritage Foundation, 2005); and unemployment quota and GDP per capita as two causal variables for the status of the "official" economy. The indicator variables used were the employment quota (in % of the population between 18 and 64), annual rate of GDP, and annual rate of local currency per capita.[15)] For the OECD countries additional cause variables were the burden of social

[13] The importance of this variable, both theoretically and empirically, is also shown in Feld and Frey (2002a; 2002b; 2005), Frey (1997), and Torgler and Schneider (2005).

[14)] The classification of which country is a developing country follows that of the World Bank (2002) using a benchmark of a per capita income of 9,265 USD or less. Those countries with a higher income are either transition or industrialized countries (here 21 OECD countries). The grouping of the transition countries is done following the grouping in the OECD country studies (Paris, various years).

[15)] There is the problem that in some developing and transition countries the US-$ (or Euro) are also widely used currencies, which is not considered here, because I have no reliable figures for the amount of US-$ (Euro) in

security payments, tax morale, the quality of state institutions and an index of the regulation of the labor market.

The estimation results for the 96 developing countries in Middle and South America, Africa, Asia and South West Pacific Islands are shown in Table 3.1. All estimated coefficients of the independent causal variables are statistically significant and have the theoretically expected signs. If one first considers the two tax burden variables, one realizes that the share of direct taxation is just statistically significant (90% confidence level) and the size of the estimated coefficient has half the size of the value of the share of indirect taxation and custom duties, which is itself highly statistically significant, with an estimated coefficient of a much larger size. One can interpret this result as showing that direct taxation is less important for the development of the shadow economy in developing countries, compared to indirect taxation and custom duties. If one turns to the burden of state regulation, the Heritage Foundation index, this variable is highly statistically significant, like the two variables measuring the official economy, unemployment quota and GDP per capita. As a single independent variable, the burden of state regulation has, quantitatively, the largest impact on the size of the shadow economy, showing that state regulation is the most important factor for the size of the shadow economy in developing countries. However, the official labor market is also quite important, with unemployment quota having the second largest estimated coefficient and influence on the shadow economy in the 96 developing countries in Middle and South America, Africa, Asia and the South West Pacific Islands. If we turn to the indicator variables, we see that the employment quota as well as the change of local currency per capita have the expected negative and positive influences and are highly statistically significant.[16)]

--- Table 3.1 about here ---

In Table 3.2 the estimation results are presented for the 25 transition countries in Central and East Europe, including former Soviet Union countries, and three communist countries [17]. Again all estimated coefficients of the cause variables are statistically significant. Ass in the case of the developing countries, the two tax burden variables provide, together, the quantitatively largest impact on the size of the shadow economy. In contrast to the results of the 96 developing countries, the causal variable, “share of direct taxation” (including social

these developing and transition countries.

[16)] The estimation results are in general robust, if other indicator variables are used as a residual; e.g. if the variable currency per capita is used as a residual the share of direct taxation becomes insignificant as well as the variable GPD per capita.

[17] How useful it is to draw generalizations from the three communist countries in this estimation is an open and debatable question, as these countries have only a somewhat limited market system. Hence they may not fit in this sample, which may be a point of criticism.

security payments) is highly statistically significant, with the expected positive sign on the shadow economy. The independent variable "share of indirect taxation" also has a highly statistically significant influence, but the estimated coefficient is somewhat smaller compared to that concerning the share of direct taxation (including social security payments). The variable "unemployment quota" also has the expected positive influence and is highly statistically significant, with the second largest estimated coefficient. The indicator variables, "employment quota" and "the annual rate of currency per capita" have the theoretically expected signs and are statistically highly significant.

--- Table 3.2 about here ---

Finally, in Table 3.3 the results for 21 highly developed OECD countries are shown. For these countries the availability of data is somewhat better: Not only are there more data points over time but also there are three additional causal variables, tax morale (an index), quality of state institutions and, as a separate variable, the burden of social security payments (in % of GDP). The additional indicator variable is the average working time (per week).[18)] The estimated coefficients of all eight causal variables are statistically significant and have the theoretically expected signs. The tax and social security burden variables are quantitatively the most important ones followed by the tax morale variable which has the single biggest influence; hence taxpayers' attitudes to state institutions/government is quite important in determining whether one is engaged in shadow economy activities or not. The development of the official economy, measured by unemployment and GDP per capita, has a quantitatively important influence on the shadow economy. The four indicator variables also all have a statistically significant influence, in the expected direction. The quantitatively most important independent variables are employment quota and change of currency per capita.[19)]

---Table 3.3 about here ---

Summarizing, the econometric results demonstrate that for all three groups of countries the theoretical postulates of the causes of the shadow economy set out above can be confirmed: Direct tax (and social security) payments and indirect tax burden variables are the driving forces of the growth of the shadow economy for all three types of countries (developing, transition and highly developed OECD countries), followed by the measure of state regulation and, as measures of the official economy, unemployment quota and GDP per capita. In

[18)] Using this indicator variable one has the problem that, of course, this variable is influenced by state regulation, so that it is not really exogenous; hence the estimation may be biased.

[19)] The variable currency per capita or annual change of currency per capita is heavily influenced by banking innovation; hence this variable is rather unstable in the estimations with respect to the length of the estimation period. Similar problems were mentioned by Giles (1999a) and Giles et al. (2002).

developing countries the largest influence stems from the burden of state regulation, followed by unemployment quota and share of indirect taxation. In the transition countries direct taxation (including social security payments) has the largest influence, followed by unemployment quota and share of indirect taxation. In the highly developed OECD countries, social security contributions and share of direct taxation have the biggest influence, followed by tax morale and quality of state institutions. Space unfortunately does not permit discussion of these differences here.

In order to calculate the size and development of the shadow economies of the 145 countries, it is necessary to overcome the disadvantage of the MIMIC approach, which is that it is only possible to obtain relative estimated sizes of the shadow economy and one has to use another approach to get absolute figures. In order to calculate absolute figures of the size of the shadow economies from these MIMIC estimation results the already available estimations from the currency demand approach have been used for Australia, Austria, Germany, Hungary, Italy, India, Peru, Russia and the United States (from Chatterjee et al. (2006), Del'Anno and Schneider (2004), Bajada and Schneider (2003; 2005), Alexeev and Pyle (2003), Schneider and Enste (2002) and Lacko (2000)). A benchmark procedure can then be used to move from the values of the shadow economy (in % of GDP) for various years for the above mentioned countries, with the help of the currency demand estimation, to create cardinal values from the MIMIC estimations.[20)]

3.2 The Size of the Shadow Economies for 145 Countries for 1999/2000, 2001/2002 and 2002/2003

When showing the size of the shadow economies over the three periods of time (1999/2000, 2001/2002 and 2002/2003) for these 145 countries which are quite different in location and stage of development, it is important to be aware that such comparisons give only a rough picture of the ranking of the size of the shadow economy over time, because the MIMIC and currency demand methods have shortcomings, discussed in detail in Schneider (2005)[21)]. It is hence not possible to discuss the relative rankings in detail.

[20)] This procedure is described in detail in Del'Anno and Schneider (2005).

[21)] See also Thomas (1992; 1999), Tanzi (1999), Pedersen (2003); Ahumada et al. (2004), Janisch and Brümmerhoff (2005).

3.2.1 Developing Countries [22]

The results in relation to the shadow economies for developing countries are divided by continent into Africa, Asia, and Central and South America (Tables 3.4-3.6). The results for thirty-seven African countries are shown in Table 3.4. If we first consider the development of the shadow economies in these thirty-seven African countries from 1999-2000, we realize that shadow economy in these African nations has increased. On average, the size of these thirty-seven African shadow economies was 41.3% of official GDP in 1999/2000, and increased to 43.2% in 2002/2003. This is an average increase of 0.9 percentage points over four years. Turning to the latest results for 2002/2003, Zimbabwe, Tanzania, and Nigeria (with 63.2, 60.2 and 59.4% respectively) have by far the largest shadow economies, and the country in the median position is Mozambique with 42.4%. South Africa has the lowest shadow economy, with 29.5%, followed by Lesotho with 33.3%, and Namibia with 33.4%.

The large shadow economy in Africa (and in other developing countries) is only to some extent an issue of tax burdens. The more important, and simple factor is that the limited local economy means that citizens are often unable to earn a living wage in a legitimate manner. Working in the shadow economy is often the only way of achieving a minimal standard of living.

--- Table 3.4 about here ---

Table 3.5 shows the results of a similar analysis for twenty-eight Asian countries. It is somewhat difficult to treat all Asian countries equally because some, such as Israel, Singapore, and Hong Kong, are highly developed, while others such as Thailand and Nepal, are still developing. The average shadow economy in the region increased from 28.9% in 1999/2000, to 30.8% of official GDP in 2002/2003, which is an increase of 1.9 percentage points over four years. Looking at individual countries[23)] for the year 2002/2003, with 54.1% Thailand has by far the largest shadow economy, followed by Cambodia with 52.4%, and Sri Lanka with 47.2% of official GDP. The median country is the Republic of Korea with 28.2% of official GDP, with the Yemen at 29.1% and the United Arab Emirates at 27.8% close by. Singapore, Hong Kong, and Saudi Arabia have the lowest shadow economies with 13.7%, 17.2%, and 19.7% of official GDP, respectively.

--- Table 3.5 about here ---

[22)] For an extensive and excellent literature survey of research on the shadow economy in developing countries see Gerxhani (2003),who stresses thoroughout her paper that distinguishing between developed and developing countries with respect to the shadow economy is of great importance. Compare Schneider and Enste (2000).

It is clear that the average size of the Asian shadow economies is considerably smaller than the shadow economies of African and Latin American states. This is partly due to the fact that there are a greater number of developed countries in Asia, which have smaller shadow economies. It should be noted, however, that the average increase of the shadow economies in the region is slightly more rapid than in Africa. This is not surprising given that the size of the average African shadow economy is already more then eleven percentage points higher than its Asian counterpart. There is simply more room for growth in Asia.

In Table 3.6, the sizes of the shadow economies of twenty-one Central and South American countries are shown. Averaging the figures across all twenty-one Central and South American countries, the shadow economy increased from 41.1% in the year 1999/2000 to 43.4% of official GDP in 2002/2003; an increase of 2.3 percentage points over these four years. Looking at the size of the shadow economy for single countries for 2002/2003, Bolivia has the largest shadow economy with 68.3%, followed by Panama with 65.3%. and Peru with 60.9% of official GDP. The median country is Brazil with 42.3% and at the lower end are Chile with 20.9%, Costa Rica with 27.8%, and Argentina with 28.9% of official GDP.

--- Table 3.6 about here ---

The sizes of the shadow economies of African and Central and South American countries are generally similar. This is partly due to the factors mentioned earlier; for the majority of citizens in many of these countries, the only way to ensure a decent standard of living is to turn to the black market. As income inequality is much more pronounced in most Central and South American countries, compared to Africa, the rate of increase of shadow economy activity in Central and South America is higher.

3.2.2 Transition Countries

The measurement of the size and development of the shadow economy in transition countries has been undertaken since the late 1980s starting with the work of Kaufmann and Kaliberda (1996), Johnson et.al. (1997) and Lacko (2000). They all used the physical input (electricity) method and came up with quite large figures. In the work of Alexeev and Pyle (2003) and Belev (2003), previous studies were critically evaluated, arguing that the estimated sizes of the unofficial economies are to a large content a historical phenomenon and partly determined by institutional factors.

[23)] The case of India has been extensively investigated by Chatterjee et al. (2006).

In Table 3.7 the size and development of the shadow economy of 25 East and Central European and Former Soviet Union countries are presented. Turning first to the development of the size of the shadow economy over time, the average size of the shadow economy of these 25 East and Central European countries was 38.1% of official GDP in 1999/2000 and increased to 40.1% in 2002/2003, which is an increase of 2 percentage points over these four years. The highest shadow economies are to be found in Georgia, Azerbaijan and the Ukraine with 68.0%, 61.3% and 54.7% respectively. The median country is Bulgaria, surrounded by Serbia and Montenegro with 39.1% and Romania with 37.4%. At the lower end are the Czech Republic with 20.1%, the Slovak Republic with 20.2% and Hungary with 26.2% of official GDP.

--- Table 3.7 about here ---

3.2.3 Highly developed OECD-Countries

The size and development of the shadow economy in 21 highly developed OECD countries is shown in Table 3.8. If we first consider the development of the size and development of the shadow economies of these 21 OECD countries, it is important to note that, in contrast to countries considered above, the size of the shadow economy of these 21 OECD countries has decreased over the period 1999/2000 to 2002/2003. The average size of the shadow economy in 1999/2000 of these 21 OECD countries was 16.8% of official GDP, but decreased to 16.3% in 2002/2003, a decrease of 0.5 percentage points. If we consider single countries, Greece, Italy and Spain have by far the largest size of the shadow economy in 2002/2003 with 28.2%, 25.7% and 22.0% of official GDP respectively. The median country is Ireland with 15.3%, surrounded by Germany with 16.8%[24)] and Canada with 15.2% of official GDP. At the lower end are the United States, Switzerland and Japan with shadow economies of 8.4%, 9.4% and 10.8% of official GDP respectively.

--- Table 3.8 about here ---

3.2.4 South West Pacific Islands

The size and development of the shadow economies of 10 South West Pacific islands is presented in Table 3.9. If we again consider first development over time, the average size of the shadow economy of these ten South West Pacific islands countries increased from 31.7% in the year 1999/2000 to 33.4% in the year 2002/2003, which means an increase of 1.7

[24)] Pickhardt and Sarda-Pous (2006) reach very similar values for the shadow economy for Germany using a combination of a MIMIC and Currency Demand Method.

percentage points over these four years. The largest size of the shadow economy (for the latest estimation period 2002/2003) has Tonga with 37.4%, followed by the Solomon Islands with 35.3% and Kiribati with 35.3%. In the middle are Micronesia and Samoa with a shadow economy of 33.2% and 33.5% of official GDP respectively. The lowest shadow economies can be found in the Marshall Islands and Palau with shadow economies of 29.6% and 30.0% respectively.

--- Table 3.9 about here ---

3.2.5 Communist Countries

In this last section the size and development of the shadow economy of three communist countries (China, Laos and Vietnam) are presented. The results are shown in Table 3.10. If we again first consider the average development of the size of the shadow economy of these three communist countries over time, the average size of the shadow economy in 1999/2000 was 19.8% and increased to 22.3% in 2002/2003. This is an increase of 2.5 percentage points. Laos has the largest shadow economy with 33.4% and China the lowest with 15.6%. However, the shadow economy in these countries, especially in China, which is partly a market economy but still a planned socialist economy, is difficult to interpret. It should perhaps more be cast as a parallel economy, where farmers, in particular, produce additional products to earn some extra money. It is an open question whether the impact of these shadow economies can be compared in size to those of countries in the other categories.

--- Table 3.10 about here ---

4 Corruption and the Shadow Economy: Substitute or Complimentary?[25)]

Theoretically, corruption and the shadow economy can be either be seen as complementary to each other or as substitutes. Choi and Thum (2004) present a model where the option entrepreneurs have to go underground constrains a corrupt official's ability to ask for bribes. Dreher et al. (2005a; b) extend the model to the explicit specification of institutional quality. Their model shows that corruption and the shadow economy are substitutes in the sense that the existence of the shadow economy reduces the propensity of officials to demand grafts.

Johnson et al. (1998b), on the contrary, model corruption and the shadow economy as complements. In their full-employment model, labour can be either employed in the official sector or in the underground economy. Consequently, an increase in the shadow economy

[25)] This section is taken from Dreher and Schneider (2006), pages 4, 5 and 14 as well as table 4.1.

always decreases the size of the official market. In their model, corruption increases the extent of the shadow economy, as corruption can be viewed as one particular form of taxation and regulation (driving entrepreneurs underground). Hindriks et al. (1999) also show that the shadow economy is complementary to corruption. This is because, in this case, the tax payer colludes with the inspector so the inspector under-reports the tax liability of the tax payer in exchange for a bribe.[26)]

Theoretically, the relationship between corruption and the shadow economy is thus unsettled. There is, however, reason to believe that the relationship might differ among high and low income countries. In high income countries, the official sector provides public goods like the rule of law, enforcement of contracts, and protection by an efficient police. Usually, only craftsmen or very small firms have (or take) the option of going underground. In this case, the shadow economy is hidden from tax inspectors and other officials. In other words, there are no bribes necessary or possible to buy one's way out of the official sector. In high income countries – typically showing relatively small levels of corruption – individuals confronted with a corrupt official always have the choice of bringing the official to court. Moreover, in high income countries corruption quite often takes place, for example, to bribe officials to get a (large) contract from the public sector (e.g. in the construction sector). This contract is then handled in the official economy and not in the shadow economy. Hence, corruption in high income countries can be a means to achieve certain benefits which make work in the official economy easier, e.g., winning a contract from a public authority, getting a licence (e.g. for operating taxes or providing other services or obtaining permission to convert land into "construction ready" land, etc.). In high income countries people thus bribe in order to be able to engage in more official economic activities. As Schneider and Enste (2000) point out, at least two thirds of the income earned in the shadow economy is immediately spent in the official sector. The shadow economy and the official sector might thus be complements. The corresponding increase in government revenue and strengthened institutional quality is likely to decrease corruption. The prediction of a negative (substitutive) relation between corruption and the shadow economy is in line with the models of Choi and Thum (2004) and Dreher et al. (2005a).[27)]

In low income countries, on the contrary, we expect different mechanisms to prevail. Instead of working partly in the official sector and offering additional services underground as in high-income countries, enterprises completely engage in underground activity. Examples for enterprises operating completely underground are restaurants, bars, or hairdressers – and even

[26)] See Dreher and Siemers (2005) for a formalization of this argument.

larger production companies. As one reason for this, the public goods provided by the official sector are in many developing countries less efficient as compared to high income countries. Big companies, however, are comparably easy to detect and – in order to escape taxation and punishment – they have to bribe officials, thereby increasing corruption. Corruption often takes place in order to pay for activities in the shadow economy, so that the shadow economy entrepreneur can be sure not to be detected by public authorities. Here, the shadow economy and corruption are likely to reinforce each other, as corruption is needed to expand shadow economy activities and – at the same time – underground activities require bribes and corruption. To obtain some additional income from the shadow economy entrepreneur, it is natural for public officials to ask for bribes and thus benefit from the shadow market. In low income countries, we therefore expect a positive (complementary) relation between corruption and the shadow economy. This corresponds to the predictions of the models of Hindriks et al. (1999) and Johnson et al. (1997).

In summary, following Dreher and Schneider (2006), one would expect:

Hypothesis 1: In low income countries, shadow economy activities and corruption are complementary.

Hypothesis 2: In high income countries, shadow economy activities and corruption are substitutes.

These two hypotheses are tested for a cross-section of 120 countries and a panel of 70 countries for the period 1994 to 2002.[28)] Table 4.1 summarizes the empirical results of Dreher and Schneider (2006): Overall, they show that an increase in perceived corruption over time also increases the shadow economy. This confirms the models of Johnson et al. (1998) and Hindriks et al. (1999). Across countries, however, greater perceived corruption does not lead to a larger shadow economy. To some extent this also supports the results of Méon and Sekkat (2004) showing within-country variation to be important in their analysis of corruption on foreign direct investment and exports.

Regarding the impact of the shadow economy on perceived corruption, these results for the overall sample are similar to those for perceived corruption on the shadow economy. In the cross-country regressions, all coefficients are completely non-significant. An increase in the shadow economy over time increases corruption according to the fixed and random effects

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[27)] Consequently, Dreher et al. (2005a) test their model employing data for OECD countries only.

[28)] For the description of the data, the estimation techniques used, and the various specification see Dreher and Schneider (2006, chapters 3 and 4).

estimator, but not when the endogeneity of the shadow economy is controlled for. Turning to the sub-samples, the results show that higher perceived corruption significantly reduces the shadow economy in high income countries, confirming the models of Choi and Thum (2004) and Dreher et al. (2005a). In low income countries, on the contrary, corruption tends to increase with a higher shadow economy, again confirming the models of Johnson et al. (1998) and Hindriks et al. (1999). This is true for the impact of perceived corruption in the within-groups specification and actual corruption in all specifications.

---Table 4.1 about here ---

5 Summary and Conclusions

There have been many obstacles to overcome to measure the size of the shadow economy, and to analyze its consequences for the official economy and the interaction between corruption and the shadow economy, but as this paper shows some progress has been made. Estimates have been provided of the size of the shadow economies for 145 countries for three periods of time (1999/2000, 2001/2002 and 2002/2003) using the MIMIC and the currency demand approach. Coming back to the question at the start of this paper, some (new) knowledge/insights have been gained with respect to the size and development of the shadow economy of developing, transition, highly developed OECD, Pacific Islands and Communist countries,[29)] and to the relationship between the shadow economy and corruption leading to five conclusions:

The first conclusion from these results is that for all countries investigated the shadow economy has reached a remarkably large size; the summarized results are shown in Table 5.1.

The second conclusion is that shadow economies are a complex phenomenon, present to an important extent in all type of economies (developing, transition and highly developed). People engage in shadow economic activity for a variety of reasons, among which are the effects of governmental actions (particularly taxation and regulation). With these two insights goes a **third conclusion**, a no less important one: a government aiming to decrease shadow economic activity has to first and foremost analyze the complex relationships between the official and shadow economy – and even more importantly – the relationships between the consequences of its own policy decisions.

---Table 5.1 about here ---

[29)] A critical discussion of these two methods is given by Pedersen (2003).

Considering a public choice perspective a **fourth conclusion** for highly developed countries is that a government may not have great interest in reducing the shadow economy due to the facts, that

(i) tax losses may be moderate, as at least two thirds of the income earned in the shadow economy is immediately spent in the official economy,

(ii) income earned in the shadow economy increases the standard of living of at least one third of the working population, and

(iii) people who work in the shadow economy have less time for other things, such as going on demonstrations, etc.

From these, it is obvious that one of the big challenges for every government is to undertake efficient incentive-orientated policy measures in order to make work less attractive in the shadow economy and hence to make work in the official economy more attractive. In a number of OECD countries this policy direction has been successfully implemented and this has lead to a reduction in the shadow economy.

A final and **fifth conclusion** is that the results of the empirical analysis of Dreher and Schneider (2006) suggest that corruption and the shadow economy tend to be substitutes in high income countries, but complementary in low income countries. There is thus some support for their hypotheses (1 and 2). The analysis also shows, however, that the results do to some extent depend on the method of estimation.

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Table 2.1: Work in the Shadow Economy – Survey Results for 2003

(1) Do you work regularly in the shadow economy? (in order to earn 300 Euro or more per month)	Percentages
No	72
Yes	25
	(17% male)
No answer	2
(2) Do you regularly request shadow economy activities?	
No	54
Yes	46
Representative questionnaire, Germany, May 2003 (Schneider 2004)	

Table 2.2 Reasons Given for Shadow Economy Activities – Survey Results for Germany, May 2003

Reasons why shadow economy activities are requested	Percentages
(1) One saves money – or they are much cheaper than in the official one	90%
(2) The tax and social security burden is much too high	73%
(3) Due to the high labour costs in the official economy one would not ask for these activities (extreme assumption no shadow economy: 23% request these activities in the official economy, 9% do it themselves)	68%
(4) The firms offer them themselves	52%
(5) It‘s so easy to acquire quick and reliable persons	31%
Representative questionnaire, Germany, May 2003, Source: Schneider(2004)	

Table 2.3: Hourly Wage Rates for Shadow Economy Activities – Survey Results for Germany, 2004

Activity/Type of Worker	Town/Area	Wage rate in the shadow economy (€)	Wage rate in the official economy (€)
Painter	Berlin München Rhein/Rhur	10 – 17 9 – 15 10 – 12	42
Mechanics	Hamburg Berlin München	13 – 23 15 – 19 15 – 23	58
Cost of a household moving (distance 300km)	Berlin München Rhein/Rhur	300 – 380 400 – 450 350 – 420	1,800
Representative questionnaire, May 2003 (Schneider 2004)			

Table 2.4: Values/attitudes of the German Population Regarding the Shadow Economy Question: What are „Kavaliersdelikte“ (negligible delicts)?

Statement	German Population (% Yes)				
	May 1996	May 1998	May 2001	Nov./Dec. 2002	Nov./Dec. 2003
To request activities in the shadow economy	55	64	60	68	67
To drive too quickly in a car	42	43	44	45	46
To undertake oneself shadow economy activities	36	41	33	36	38
Stealing a newspaper from a box	28	29	31	30	28
Not to send children to school	25	27	24	18	16
Not to be honest with tax declarations	22	22	18	-	18
Not to go to work (make “blue“ on a Monday)	18	17	16	13	12
To drink drive	9	4	7	3	4
Source: Schneider (2004)					

Table 2.5: Values/attitudes of the German Population Regarding the Shadow Economy

Statement	German Population (% Yes)				
	May 1996	May 1998	May 2001	Nov./Dec. 2002	Nov./Dec. 2003
Without shadow economy earnings one cannot keep up the standard of living	62	69	69	70	71
It‘s the state/government own fault that the shadow economy is so popular and large, because the tax and social security burden is too high	63	67	57	66	67
In the last 2-3 years I have requested shadow economy activities	26	38	34	36	39
Due to shadow economy activities the state loses a great amount of tax revenues and social security payments	29	25	30	28	26
In the neighbourhood one observes a lot of shadow economy activities	-	-	24	28	32
I think shadow economy workers should be reported to the authorities and prosecuted	9	4	6	3	3
If a shadow economy worker is detected he should be punished severely (high financial fines)	7	4	5	7	3
Source: Schneider (2004)					

Table 2.6: Main Causes of the Increase in the Shadow Economy

The most important driving forces are:	Influence on the shadow economy (%)*	
(1) Increase in the tax and social security contribution burdens	35-38%	45-52%
(2) Intensity of state regulation	8-10%	10-15%
(3) Social transfers	5-7%	5-8%
(4) Specific labor market regulations	5-7%	5-8%
(5) Public sector services	5-7%	5-8%
(6) Tax morale**	22-25%	-
Overall influence	76-94%	70-90%
* Average values of empirical results of 28 studies. ** Average values of "only" 15 studies		
Source: Schneider (2004)		

Table 3.1: MIMIC Estimations of the size of the shadow economy of 96 developing countries in Middle and South America, Africa, Asia and South West Pacific Islands in 1999/2000, 2001/02 and 2002/03

Causal Variables	**Estimated Coefficients**
Share of direct taxation (in % of GDP)	$\lambda 1 = 0.16^{(*)}$
	(1.77)
Share of indirect taxation and custom duties (in % of GDP)	$\lambda 2 = 0.256^{**}$
	(3.34)
Burden of state regulation (index, Heritage Found., score 1 most economic freedom, 5 least economic freedom)	$\lambda 3 = 0.309^{**}$ (2.84)
Unemployment quota (%)	$\lambda 4 = 0.296^{**}$
	(3.96)
GDP per capita (in US$)	$\lambda 5 = -0.151^{*}$
	(-2.56)
Indicator Variables	
Employment quota (% of population 18-64)	$\lambda 6 = -0.651^{**}$
	(-3.45)
Annual rate of GDP	$\lambda 7 = -1$ (Residual)
Change of local currency per capita	$\lambda 8 = 0.412^{**}$
	(4.99)
Test-statistics	RMSEA[1)] = 0.0004[(*)] (p = 0.952) Chi-square[2)] = 7.53 (p = 0.904) TMNCV[3)] = 0.042 AGFI[4)] = 0.774 N = 288 D.F.[5)] = 34

Notes:
t-statistics are given in parentheses; *; ** ; *** means that t is statistically significant at the 90%, 95%, or 99% confidence level.
1) Steigers Root Mean Square Error of Approximation (RMSEA) for test of close fit; RMSEA < 0.05; the RMSEA-value varies between 0.0 and 1.0.
2) If the structural equation model is asymptotically correct, then the matrix S (sample covariance matrix) will be equal to $\Sigma(\theta)$ (model implied covariance matrix). This test has a statistical validity with a large sample ($N \geq 100$) and multinomial distributions; both are given for all three equations in Tables 3.1-3.3 using a test of multi normal distributions.
3) Test of Multivariate Normality for Continuous Variables (TMNCV); p-values of skewness and kurtosis.
4) Test of Adjusted Goodness of Fit Index (AGFI), varying between 0 and 1; 1 = perfect fit.
5) The degrees of freedom are determined by $0.5 (p + q) (p + q + 1) – t$; with p = number of indicators; q = number of causes; t = the number for free parameters.

Table 3.2: MIMIC Estimation of the Shadow Economy of 25 Central and East European and Former Soviet Union Countries and 3 Communist Countries, for years 1999/2000, 2001/02 and 2002/03	
Causal Variables	**Estimated Coefficients**
Share of direct taxation + share of social security payments (in % of GDP)	λ1 = 0.461**
	(3.71)
Share of indirect taxation + custom duties (in % of GDP)	λ2 = 0.361**
	(3.31)
Burden of state regulation (index, Heritage Found., score 1 most economic freedom, 5 least economic freedom)	λ3 = 0.192*
	(2.48)
Unemployment quota (%)	λ4 = 0.391**
	(3.91)
GDP per capita (in US-$)	λ5 = -0.221**
	(-3.77)
Indicator Variables	
Employment quota (as % of population 18-64)	λ6 = -0.729**
	(-5.49)
Annual rate of GDP	λ7 = -1.00 (Residual)
Change of local currency per capita	λ8 = 0.432**
	(3.88)
Test-statistics	RMSEA[1)] = 0.0003[(*)] (p = 0.914) Chi-square [2)] = 403.41 (p = 0.762) TMCV[3)] = 0.091 AGFI[4)] = 0.661 N = 84 D.F.[5)] = 33
Notes as per Table 3.1:	

Table 3.3: MIMIC Estimation of the Shadow Economy of 21 Highly Developed OECD Countries for the years 1990/91, 1994/95, 1997/98, 1999/2000, 2001/02 and 2002/03	
Causal Variables	**Estimated Coefficients**
Share of direct taxation (in % of GDP)	λ1 = 0.410* (3.41)
Share of indirect taxation (in % of GDP)	λ2 = 0.213(*) (1.92)
Share of social security contribution (in % of GDP)	λ3 = 0.523** (4.59)
Burden of state regulation (index of labour market regulation, Heritage Found., score 1 least reg., score 5 most reg.)	λ4 = 0.203(*) (1.84)
Quality of state institutions (rule of law, World Bank, score -3 worst and +3 best case)	λ5 = -0.346** (-2.76)
Tax morale (WUS and EUS, Index, Scale tax cheating always justified =1, never justified =10)	λ6 = -0.614** (-4.06)
Unemployment quota (%)	λ7 = 0.399** (3.41)
GDP per capita (in US$)	λ8 = -0.134** (-3.64)
Indicator Variables	
Employment quota (% of population 18-64)	λ9= -0.713** (-3.49)
Average working time (per week)	λ10 = -1.00 (Residual)
Annual rate of GDP (adjusted for the mean of all 22 OECD countries)	λ11 = -0.345** (-3.513)
Change of local currency per capita	λ13 = 0.384** (4.71)
Test-statistics	RMSE[1)] = 0.0002* (p = 0.981) Chi-square[2)] = 6.54 (p = 0.921) TMNCV[3)] = 0.038 AGFI[4)] = 0.814 N = 126 D.F.[5)] = 61
Notes as per Table 3.1	

Table 3.4: The Size of the Shadow Economy in Thirty-Seven African Countries

No.	Country	Shadow Economy (in % of official GDP) using the MIMIC and Currency Demand Method		
		1999/00	2001/02	2002/03
1	Algeria	34.1	35.0	35.6
2	Angola	43.2	44.1	45.2
3	Benin	47.3	48.2	49.1
4	Botswana	33.4	33.9	34.6
5	Burkina Faso	41.4	42.6	43.3
6	Burundi	36.9	37.6	38.7
7	Cameroon	32.8	33.7	34.9
8	Central African Republic	44.3	45.4	46.1
9	Chad	46.2	47.1	48.0
10	Congo, Dem. Rep.	48.0	48.8	49.7
11	Congo, Rep.	48.2	49.1	50.1
12	Cote d'Ivoire	43.2	44.3	45.2
13	Egypt, Arab Rep.	35.1	36.0	36.9
14	Ethiopia	40.3	41.4	42.1
15	Ghana	41.9	42.7	43.6
16	Guinea	39.6	40.8	41.3
17	Kenya	34.3	35.1	36.0
18	Lesotho	31.3	32.4	33.3
19	Madagascar	39.6	40.4	41.6
20	Malawi	40.3	41.2	42.1
21	Mali	42.3	43.9	44.7
22	Mauritania	36.1	37.2	38.0
23	Morocco	36.4	37.1	37.9
24	Mozambique	40.3	41.3	42.4
25	Namibia	31.4	32.6	33.4
26	Niger	41.9	42.6	43.8
27	Nigeria	57.9	58.6	59.4
28	Rwanda	40.3	41.4	42.2
29	Senegal	45.1	46.8	47.5
30	Sierra Leone	41.7	42.8	43.9
31	South Africa	28.4	29.1	29.5
32	Tanzania	58.3	59.4	60.2
33	Togo	35.1	39.2	40.4
34	Tunisia	38.4	39.1	39.9
35	Uganda	43.1	44.6	45.4
36	Zambia	48.9	49.7	50.8
37	Zimbabwe	59.4	61.0	63.2
Unweighted Average		**41.3**	**42.3**	**43.2**

Table 3.5: The Size of the Shadow Economy in Twenty-Eight Asian Countries

No.	Country	Shadow Economy (in % of official GDP) using the MIMIC and Currency Demand Method		
		1999/2000	2001/02	2002/03
1	Bangladesh	35.6	36.5	37.7
2	Bhutan	29.4	30.5	31.7
3	Cambodia	50.1	51.3	52.4
4	Hong Kong, China	16.6	17.1	17.2
5	India	23.1	24.2	25.6
6	Indonesia	19.4	21.8	22.9
7	Iran, Islamic Rep.	18.9	19.4	19.9
8	Israel	21.9	22.8	23.9
9	Jordan	19.4	20.5	21.6
10	Korea, Rep.	27.5	28.1	28.8
11	Kuwait	20.1	20.7	21.6
12	Lebanon	34.1	35.6	36.2
13	Malaysia	31.1	31.6	32.2
14	Mongolia	18.4	19.6	20.4
15	Nepal	38.4	39.7	40.8
16	Oman	18.9	19.4	19.8
17	Pakistan	36.8	37.9	38.7
18	Papua New Guinea	36.1	37.3	38.6
19	Philippines	43.4	44.5	45.6
20	Saudi Arabia	18.4	19.1	19.7
21	Singapore	13.1	13.4	13.7
22	Sri Lanka	44.6	45.9	47.2
23	Syrian Arab Republic	19.3	20.4	21.6
24	Taiwan, China	25.4	26.6	27.7
25	Thailand	52.6	53.4	54.1
26	Turkey	32.1	33.2	34.3
27	United Arab Emirates	26.4	27.1	27.8
28	Yemen, Rep.	27.4	28.4	29.1
Unweighted Average		**28.5**	**29.5**	**30.4**

Table 3.6: The Size of the Shadow Economy in Twenty-One Central and South American Countries

No.	Country	Shadow Economy (in % of official GDP) using the MIMIC and Currency Demand Method		
		1999/2000	2001/02	2002/03
1	Argentina	25.4	27.1	28.9
2	Bolivia	67.1	68.1	68.3
3	Brazil	39.8	40.9	42.3
4	Chile	19.8	20.3	20.9
5	Colombia	39.1	41.3	43.4
6	Costa Rica	26.2	27.0	27.8
7	Dominican Republic	32.1	33.4	34.1
8	Ecuador	34.4	35.1	36.7
9	El Salvador	46.3	47.1	48.3
10	Guatemala	51.5	51.9	52.4
11	Haiti	55.4	57.1	58.6
12	Honduras	49.6	50.8	51.6
13	Jamaica	36.4	37.8	38.9
14	Mexico	30.1	31.8	33.2
15	Nicaragua	45.2	46.9	48.2
16	Panama	64.1	65.1	65.3
17	Paraguay	27.4	29.2	31.4
18	Peru	59.9	60.3	60.9
19	Puerto Rico	28.4	29.4	30.7
20	Uruguay	51.1	51.4	51.9
21	Venezuela, RB	33.6	35.1	36.7
Unweighted Average		**41.1**	**42.2**	**43.4**

Table 3.7: The Size of the Shadow Economy in 25 East and Central European and Former Soviet Union Countries

No.	Country	Shadow Economy (in % of official GDP) using the MIMIC and Currency Demand Method		
		1999/2000	2001/02	2002/03
1	Albania	33.4	34.6	35.3
2	Armenia	46.3	47.8	49.1
3	Azerbaijan	60.6	61.1	61.3
4	Belarus	48.1	49.3	50.4
5	Bosnia and Herzegovina	34.1	35.4	36.7
6	Bulgaria	36.9	37.1	38.3
7	Croatia	33.4	34.2	35.4
8	Czech Republic	19.1	19.6	20.1
9	Estonia	38.4	39.2	40.1
10	Georgia	67.3	67.6	68.0
11	Hungary	25.1	25.7	26.2
12	Kazakhstan	43.2	44.1	45.2
13	Kyrgyz Republic	39.8	40.3	41.2
14	Latvia	39.9	40.7	41.3
15	Lithuania	30.3	31.4	32.6
16	Macedonia, FYR	34.1	35.1	36.3
17	Moldova	45.1	47.3	49.4
18	Poland	27.6	28.2	28.9
19	Romania	34.4	36.1	37.4
20	Russian Federation	46.1	47.5	48.7
21	Serbia and Montenegro	36.4	37.3	39.1
22	Slovak Republic	18.9	19.3	20.2
23	Slovenia	27.1	28.3	29.4
24	Ukraine	52.2	53.6	54.7
25	Uzbekistan	34.1	35.7	37.2
Unweighted Average		**38.1**	**39.1**	**40.1**

Table 3.8: The Size of the Shadow Economy in 21 OECD Countries

	Country	Shadow Economy (in % of off. GDP) using the MIMIC and Currency Demand Method		
		1999/2000	2001/02	2002/03
1	Australia	14.3	14.1	13.5
2	Austria	9.8	10.6	10.9
3	Belgium	22.2	22.0	21.0
4	Canada	16.0	15.8	15.2
5	Denmark	18.0	17.9	17.3
6	Finland	18.1	18.0	17.4
7	France	15.2	15.0	14.5
8	Germany	16.0	16.3	16.8
9	Greece	28.7	28.5	28.2
10	Ireland	15.9	15.7	15.3
11	Italy	27.1	27.0	25.7
12	Japan	11.2	11.1	10.8
13	Netherlands	13.1	13.0	12.6
14	New Zealand	12.8	12.6	12.3
15	Norway	19.1	19.0	18.4
16	Portugal	22.7	22.5	21.9
17	Spain	22.7	22.5	22.0
18	Sweden	19.2	19.1	18.3
19	Switzerland	8.6	9.4	9.4
20	United Kingdom	12.7	12.5	12.2
21	United States	8.7	8.7	8.4
Unweighted Average		**16.8**	**16.7**	**16.3**

Table 3.9: The Size of the Shadow Economy in 10 South West Pacific Islands

		Shadow Economy (in % of official GDP) using the MIMIC and Currency Demand Method		
	Country	**1999/2000**	**2001/02**	**2002/03**
1	Fiji	33.6	34.3	35.1
2	Kiribati	34.1	35.0	35.3
3	Maldives	30.3	31.4	32.0
4	Marshall Islands	28.1	29.0	29.6
5	Micronesia, Fed. Sts.	31.3	32.1	33.2
6	Palau	28.4	29.2	30.0
7	Samoa	31.4	32.6	33.5
8	Solomon Islands	33.4	34.5	35.3
9	Tonga	35.1	36.3	37.4
10	Vanuatu	30.9	31.7	32.5
Unweighted Average		**31.7**	**32.6**	**33.4**

Table 3.10: The Size of the Shadow Economy in 3 Communist Countries

No.	Country	Shadow Economy (in % of official GDP) using the MIMIC and Currency Demand Method		
		1999/2000	**2001/02**	**2002/03**
1	China	13.1	14.4	15.6
2	Lao PDR	30.6	31.9	33.4
3	Vietnam	15.6	16.9	17.9
Unweighted Average		**19.8**	**21.1**	**22.3**

Table 4.1: Empirical Results of the Relationship between the Shadow Economy and Corruption

Dependent Variable:	**Shadow Economy**			**Corruption**		
Independent Variable:	**Corruption**			**Shadow Economy**		
Estimation technique	**All**	**Low**	**High**	**All**	**Low**	**High**
ICRG index of corruption						
OLS	1.88 (1.20)	3.57 (1.34)	-0,84 (0.97)	0.00 (0.41)	0.01 (1.14)	-0.07 (3.57***)
Robust regression	1.32 (0.82)	-	-	0.00 (0.43)	-	-
IV, set 1	3.72 (1.17)	3.12 (0.86)	5.41 (1.40)	-0.03 (1.28)	-0.01 (0.42)	-0.09 (1.57)
IV, set 2	-4.04 (1.33)	5.14 (0.78)	-1.85 (1.91*)	-0.02 (0.66)	-0.02 (0.46)	-0.11 (1.45)
Panel, fixed effects	1.34 (2.63**)	1.36 (1.42)	0.69 (1.98**)	0.09 (2.88***)	0.10 (2.77***)	0.09 (0.76)
Panel, random effects	1.59 (4.81***)	-	-	0.02 (2.64***)	-	-
Panel IV	3.46 (3.48***)	-	-	0.01 (0.12)	-	-
TI index of corruption						
OLS	-	-	-	-	-	-0.06 (2.35**)
World Bank Index of corruption						
OLS	-	-	-	-	-	-0.01 (2.76**)
DKM index of corruption						
OLS	-	-	-	0.04 (1.77*)	0.06 (2.49**)	-0.10 (1.50)
Robust regression	-	-	-	0.04 (1.69*)	-	-
IV, set 1	-	-	-	0.14 (2.59**)	0.10 (2.65**)	-0.32 (1.22)
IV, set 2	-	-	-	0.12 (2.45**)	0.12 (2.50**)	0.04 (0.19)

Notes:

Higher values represent more corruption; corruption indices used: ICRG International Country Risk Guide; TI=Transparency International; World Bank Index of Corruption; and DKM-Index of Dreher, Kotsogiannis and McCorriston.

Instruments for the shadow economy are: (1) Credit Market Regulations (Fraser), Minimum Wage Regulation (Fraser), Government Effectiveness (World Bank); (2) Starting a Business (Duration), Starting a Business (Costs), Flexibility to Hire, Flexibility to Fire.

Instruments for corruption are: (1) Fiscal Burden (Heritage), Regulation of Prices (Fraser), Rule of Law (World Bank), Democracy; (2) Ethnic Fractionalization, Religious Fractionalization, Latitude, French Legacy, Socialist Legacy, German Legacy, Scandinavian Legacy.

* denotes significant at 10% level; ** significant at 5% level; *** significant at 1% level

Source: Dreher and Schneider (2006, table 12).

Table 5.1: Average Size of the Shadow Economy for Developing, Transition and OECD-Countries in % of official GDP

Countries	Average Size of the Shadow Economy – Value added in % of official GDP using MIMIC and Currency Demand method *(Number of Countries)*		
Mostly developing countries:	1999/2000	2000/2001	2002/2003
Africa	41.3 *(37)*	42.3 *(37)*	43.2 *(37)*
Central and South America	41.1 *(21)*	42.1 *(21)*	43.4 *(21)*
Asia	28.5 *(28)*	29.5 *(28)*	30.4 *(28)*
Transition countries	38.1 *(25)*	39.1 *(25)*	40.1 *(25)*
Highly developed OECD countries	16.8 *(21)*	16.7 *(21)*	16.3 *(21)*
South Pacific islands	31.7 *(10)*	32.6 *(10)*	33.4 *(10)*
Communist countries	19.8 *(3)*	21.1 *(3)*	22.3 *(3)*
Unweighted average over 145 Countries	33.6	34.5	35.2

Source: Author's calculations.