Chapter 4

Out of the Shadows: Measuring Informal Economic Activity

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As policymakers worldwide struggle with ways to improve economic freedom, a shockingly large number of people have taken matters into their own hands, operating in the informal shadow economy without regulations, taxes, or the benefits of the rule of law. Calculations of informal economic activity in 162 countries from 1999 to 2006–2007 reveal a shadow economy that, on average, is one-third the size of those countries' formal economies. According to these calculations, the estimated average size of the shadow economies as a percentage of "official" gross domestic product (GDP) is 37.6 percent in Sub-Saharan Africa; 36.4 percent in Europe and Central Asia (mostly transition countries); and 13.4 percent in high-income Organisation for Economic Co-operation and Development (OECD) countries. The tax burden, combined with labor market regulations and the quantity and quality of public goods and services, is the driving force of the shadow economy.

Why do people work in the shadow economy in countries around the world? In the official labor market, the costs that firms (and individuals) have to pay when "officially" hiring someone have been increased tremendously by the burden of tax and social contributions on wages, as well as by the legal administrative regulations that control economic activities. In various OECD countries, these costs are much greater than the effective wages that workers earn, and this provides a strong incentive to work in the shadow economy.

Information about the size of the shadow economy is crucial for making effective and efficient decisions regarding the allocations of a country's resources, but getting accurate information about shadow economic activity in the goods and labor markets is very difficult because individuals engaged in these activities do not wish to be identified. The goal of this chapter is both to undertake the challenging task of estimating the shadow economy for 162 countries around the world and to provide some insights into the main causes of the shadow economy.

DEFINING THE SHADOW ECONOMY

A number of issues make it difficult to arrive at a precise definition of the shadow economy. According to one commonly used definition, it comprises all currently unregistered economic activities that would contribute to the officially calculated gross national product (GNP) if the activities were recorded.[1] Philip Smith defines it as "market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP."[2] Put differently, one of the broadest definitions is "those economic activities and the income derived from them that circumvent or otherwise avoid government regulation, taxation or observation."[3]

For the calculations in this chapter, a narrower definition is used.[4] The shadow economy, according to this definition, 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, and safety standards; and
4. To avoid complying with certain administrative obligations, such as completing statistical questionnaires or other administrative forms.

MEASURING THE SHADOW ECONOMY[5]

The definition of the shadow economy plays an important role in assessing its size. Having a clear definition makes it possible to avoid a number of ambiguities and controversies.

In general, there are two types of shadow economic activities: illicit employment and goods and services produced in the household that are mostly consumed within the household.[6] The following analysis focuses on both types but tries to exclude illegal activities such as drug production, crime, and human trafficking.

The produced-in-the-household goods and services not normally counted in national income accounts (for example, schooling and child care) are not part of this analysis. Thus, it focuses only on productive economic activities that would normally be included in the national accounts but remain underground as a result of tax or regulatory burdens.[7] Such legal activities contribute to the country's value added but are not captured in the national accounts because they are produced in illicit ways (for example, by people without proper qualification or without a master craftsman's certificate).

Although the issue of the shadow economy has been investigated for a long time, the discussion regarding the "appropriate" methodology to assess its scope is ongoing.[8] There are three methods of assessment:

1. Direct procedures at a micro level, such as the survey method, that aim at determining the size of the shadow economy at one particular point in time;
2. Indirect procedures that make use of macroeconomic indicators in order to proxy the development of the shadow economy over time; and
3. Statistical models that use statistical tools to estimate the shadow economy as an "unobserved" variable.

Today, estimation of the shadow economy is based in many cases on a Multiple Indicator-Multiple Causes (MIMIC) procedure, often in combination with measurements of the demand for currency beyond that required for the formal economy, or the use of only the currency demand method.[9] The MIMIC procedure assumes that the shadow economy remains an unobserved phenomenon (latent variable) that can be estimated using quantitatively measurable causes of illicit employment, such as tax burden and regulation intensity, and indicators reflecting illicit activities, such as currency demand, official GDP, and official working time. A disadvantage of the MIMIC procedure is that it produces only relative estimates of the size and development of the shadow economy. Thus, the currency

demand method[10] is used to convert the relative into absolute estimates (for example, in percent of GDP) by using two or three indicators of the absolute size of the economy.

DRIVING FACTORS OF THE SHADOW ECONOMY

Given this method, the following are assumed to be important determinants of the shadow economy.

Tax and Social Security Contribution Burdens. A number of studies show that the overall tax and social security contribution burdens are among the main causes for the existence of the shadow economy.[11] 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 by working in the shadow economy.

The concrete measurement of the tax and social security contribution burdens is not easy to define, because the tax and social security systems differ significantly from country to country. In order to have some general comparable proxies, the following variables are used:

- Indirect taxes as a proportion of total overall taxation (positive sign expected).
- Share of direct taxes (direct taxes as proportion of overall taxation; positive sign expected).
- Size of government (general government final consumption expenditures in percent of GDP, which includes all government current expenditures for purchases of goods and services; positive sign expected).
- The fiscal freedom subcomponent of this *Index*, which measures the overall fiscal burden on an economy and the top tax rates on individual and corporate income. The index ranges from 0 to 100, where 0 is the least fiscal freedom and 100 is the maximum (negative sign expected).

Intensity of Regulations. Increased intensity of regulations is another important factor that reduces the freedom of choice for individuals engaged in the official economy. One can think of labor market regulations such as minimum wages or dismissal protections, trade barriers such as import quotas, and labor market restrictions for foreigners such as restrictions regarding the free movement of foreign workers. Studies by Simon Johnson, Daniel Kaufmann, Andrei Shleifer, and Pablo Zoido-Lobatón have found significant overall empirical evidence of the influence of (labor) regulations on the shadow economy.[12]

To measure the intensity of regulation or the impact of regulation on the decision of whether to work in the official or unofficial economy is a difficult task, and the following variables are used:

- The business freedom subcomponent of this *Index*, which measures the time and effort required to pursue business activity. Scores range from 0 to 100, where 0 is the least business freedom and 100 is the maximum (negative sign expected).
- The comprehensive economic freedom scores in this *Index*, which range from 0 to 100, where 0 is the least economic freedom and 100 is the maximum (negative sign expected).
- Regulatory quality, based on the World Bank's regulatory quality index, which includes measures of the incidents of market-unfriendly policies, such as price controls or inadequate bank supervision, and perceptions of the burdens imposed by excessive regulation in such areas as foreign trade and business development. Scores range between −2.5 and +2.5, with higher scores corresponding to better outcomes (negative sign expected).

Public-Sector Services. An increase of the shadow economy can lead to reduced public revenue, 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 public goods (such as the public infrastructure) and of public administration, with the consequence of even stronger incentives to participate in the shadow economy.

To capture this effect, the following variable is used:

MIMIC Model Estimation Results

Independent Variables	Specification 1 98 Developing Countries (1994–2006)	Specification 2 21 Transition Countries (1994–2006)	Specification 3 25 High-Income OECD Countries (1996–2006)	Specification 4 151 Countries (1996–2007)	Specification 5 120 Countries (1996–2006)
Causal Variables					
Size of government	0.14 (5.97)***	0.18 (3.49)***		0.05 (2.64)***	0.10 (3.77)***
Share of direct taxation					0.05 (2.39)**
Total tax burden			0.05 (2.05)**		
Fiscal freedom	-0.06 (2.90)***	-0.08 (1.68)*	-0.07 (2.84)***		-0.04 (2.08)**
Business freedom	-0.05 (2.18)**		-0.23 (5.93)***		-0.04 (1.84)*
Economic freedom		-0.09 (1.91)*			
Unemployment rate	0.01 (0.67)	0.08 (1.84)*	0.05 (1.89)*	0.04 (2.08)**	0.02 (0.89)
GDP per capita	-0.27 (8.79)***			-0.38 (15.89)***	-0.33 (9.15)***
Regulatory quality			-0.21 (5.45)***		
Government effectiveness		-0.15 (2.47)**		-0.05 (2.64)***	-0.04 (2.11)**
Openness					
Inflation rate		0.22 (2.83)***			
Indicator Variables					
Growth rate of GDP per capita	-1.01 (7.88)***	-0.76 (4.41)***	-1.52 (6.71)***	-0.79 (10.93)***	-0.99 (8.42)***
GDP per capita	0.05 (0.59)				
Labor force participation rate			-1.11 (5.45)***	-0.19 (3.15)***	
Growth rate of labor force		-0.83 (3.90)***			-0.16 (1.76)*
Currency	1	1	1	1	1
Statistical Tests					
RMSEA (p-value)	0.03 (0.99)	0.00 (1.00)	0.00 (0.88)	0.03 (1.00)	0.02 (1.00)
Chi-square (p-value)	38.70 (0.00)	17.75 (0.91)	17.74 (0.60)	29.95 (0.00)	51.82 (0.03)
AGFI	0.98	0.97	0.95	0.99	0.98
Degrees of freedom	20	27	20	13	35
Number of observations	1045	213	145	1563	942

Significance level: *** 1 percent   ** 5 percent   * 10 percent

Notes: Absolute z-statistics are in parentheses. All variables are used as their standardized deviations from mean. According to the MIMIC models identification rule, one indicator has to be fixed to an a prior value; we have consistently chosen the currency variable. The degrees of freedom are determined by $0.5(p + q)(p + q + 1) - t$; where p = number of indicators, q = number of causes, and t = the number for free parameters.

Source: Friedrich Schneider, Andreas Buehn, and Claudio E. Montenegro, "Shadow Economies All over the World: New Estimates for 162 Countries from 1999 to 2007," World Bank *Policy Research Working Paper No. 5356,* July 2010, https://openknowledge.worldbank.org/bitstream/handle/10986/3928/WPS5356.pdf (accessed December 15, 2015).

Table 1 🏛 heritage.org

- Government effectiveness from the World Bank´s Worldwide Governance Indicators, which captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of government's commitment to such policies. The scores of this index lie between –2.5 and +2.5, with higher scores corresponding to better outcomes (negative sign expected).

Official Economy. As has been shown in a number of studies, the vitality of the official economy also plays a crucial role in the decision to work or not to work in the shadow economy.[13] In a booming official economy, people have a lot of opportunities to earn a good salary and "extra money" in the official economy. This is not the case in an economy facing a recession, and more people try to compensate for their losses of income from the official economy through additional shadow economic activities. In order to capture this, the following variables are used:

- GPD per capita, based on Purchasing Power Parity (PPP) measured in constant 2005 US$ (negative sign expected).
- Unemployment rate, defined as total unemployment in percent of the total labor force (positive sign expected).
- Inflation rate, with inflation measured by the annual growth rate of the GDP implicit deflator, showing the rate of price changes in the economy as a whole (positive sign expected).
- Openness, which corresponds to trade in percent of GDP. Trade is the sum of exports and imports of goods and services, measured as a share of GDP (negative sign expected).

Because the shadow economy cannot be measured directly, indicators that reflect shadow economic activities are used.

Monetary Indicators. Given that people who engage in shadow economy transactions do not want to leave traces, they conduct these activities in cash. Hence, most shadow economic activities are reflected in an additional use of cash (or currency). To take this into account, the following indicator is used:

- Currency / M1 or M2, which corresponds to the currency outside the banks as a proportion of M1 or M2.

Labor Market Indicators. Shadow economic activities are also reflected in labor market indicators. Two indicators are used:

- Labor force participation rate, which is a proportion of the population that is economically active.
- Growth rate of the total labor force, defined as people 15 years old and older who meet the International Labour Organization´s definition of the economically active population.[14]

State of the Official Economy. Finally, shadow economic activities are reflected in the state of the official economy. For this reason, two indicators are included:

- GDP per capita, which is gross domestic product converted to international dollars using Purchasing Power Parity rates, divided by the population.
- Growth rate of GDP per capita.

SIZE OF THE SHADOW ECONOMY FOR 162 COUNTRIES[15]

Econometric Analysis. The ideal situation for econometric analysis of the shadow economy would be to have a large data set available for all countries over the total period from 1996 through 2007. Unfortunately, that is not the case. Table 1 presents five different estimates for different groups of countries using a variety of the variables listed above in order to investigate which variables turn out to be significant. Particular emphasis was placed on the use of subsamples of countries for which more and different causal variables are available.

The estimation results for the 98 developing countries over the period 1994 to 2006 are shown in Specification 1. All estimated coefficients of the causal variables have the theoretically

expected signs. Except for the unemployment rate, all other causal variables are statistically significant, at least at the 90 percent confidence level. The share of direct taxation and the size of government are highly statistically significant, as are the fiscal freedom and business freedom variables. GDP per capita is highly statistically significant in both equations with the expected negative sign. If one turns to the indicator variables, the labor force participation rate and the growth rate of GDP per capita are highly statistically significant in both equations.

In Specification 2, the MIMIC estimation result is shown for the 21 Eastern European and Central Asian (mostly former transition) countries over the period 1994 to 2006. The size of government and fiscal freedom variables (both capturing the overall state burden on the economy) are highly statistically significant and have the expected signs. Turning to regulation, the economic freedom variable has the expected negative significant sign. As these countries experienced periods of high inflation, the inflation rate is included and has the expected positive, highly significant sign. The openness variable, modelling in a certain way the transition process, is also statistically significant. Considering the indicator variables, the growth rate of the total labor force is statistically significant, as is the growth rate of GDP per capita.

In Specification 3, the estimation results for the 25 high-income OECD countries are shown over the period 1996 to 2006. The two variables capturing government burden (total tax burden and fiscal freedom) are highly statistically significant and have the expected sign. The unemployment rate has the expected sign and is, at the 95 percent confidence level, statistically significant. The two variables capturing the regulatory burden (business freedom and regulatory quality) have the expected signs and are highly statistically significant. Turning to the indicator variables, the labor force participation rate and currency (ratio of M0 over M2) are both highly statistically significant.

Specifications 4 and 5 present two estimations of 151 and 120 countries. In Specification 4, the results of 151 countries estimated over the period 1996 to 2007 are presented. Turning first to the causal variables, the size of government has the expected positive sign and is highly statistically significant. The same holds for the two variables that describe the state of the economy: the unemployment variable, statistically significant with a positive sign, and GDP per capita, which is highly statistically significant with the expected negative sign. Turning to the indicator variables, the growth rate of GDP per capita and the labor force participation rate have the expected signs and are highly statistically significant.

If one reduces this sample to 120 countries, one can include more causal variables, and the results are presented in Specification 5. Three variables capture the burden of taxation (in a wide sense): the size of government, fiscal freedom, and share of direct taxation. All three have the expected signs and are statistically significant. For the regulatory variables, business freedom and government effectiveness again have the expected negative signs and are statistically significant. For the state of the economy, the unemployment rate is not statistically significant, but GDP per capita is statistically significant with the expected negative sign. For the indicators, the currency (M0 over M1), the labor force participation rate, and GDP per capita are statistically significant and show the expected signs.

Size of the Shadow Economies for 162 Countries from 1999 through 2007. The estimated MIMIC coefficients can only be used to determine relative estimated sizes of the shadow economy, which describe the pattern of the shadow economy in a particular country over time. In order to calculate the size and trend of the shadow economy in currency units or in percent of GDP, the MIMIC index has to be converted into "real world" figures. This final step requires an additional benchmarking or calibration procedure.[16]

When showing the size of the shadow economies for countries that are quite different in location and state of development, one should be aware that such country comparisons give only a rough picture of the ranking of the size of the shadow economy in these countries and over time, because both the MIMIC procedure

Average Informality by World Bank's Regions					
Region (Abbreviation)	Mean	Median	Minimum	Maximum	Standard Deviation
East Asia and Pacific (EAP)	32.3	32.4	12.7	50.6	13.3
Europe and Central Asia (ECA)	38.9	39.0	18.1	65.8	10.9
Latin America and the Caribbean (LAC)	41.1	38.8	19.3	66.1	12.3
Middle East and North Africa (MENA)	28.0	32.5	18.3	37.2	7.8
High-Income OECD (OECD)	17.1	15.8	8.5	28.0	6.1
Other High Income (OHIE)	23.0	25.0	12.4	33.4	7.0
South Asia (SAS)	33.2	35.3	22.2	43.9	7.0
Sub-Saharan Africa (SSA)	40.2	40.6	18.4	61.8	8.3
World	33.0	33.5	8.5	66.1	12.8

Source: Friedrich Schneider, Andreas Buehn, and Claudio E. Montenegro, "Shadow Economies All over the World: New Estimates for 162 Countries from 1999 to 2007," World Bank *Policy Research Working Paper No. 5356*, July 2010, https://openknowledge.worldbank.org/bitstream/handle/10986/3928/WPS5356.pdf (accessed December 15, 2015).

Table 2 ☎ heritage.org

and the currency demand methods have short-comings.[17] The Appendix (on pp. 43–46) shows the development of the shadow economy in 162 countries from 1999 through 2007.

In Table 2, the average informality in different regions is shown using the regions defined by the World Bank over the period from 1999 through 2007. The World Bank distinguishes eight world regions: East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, High Income OECD, Other High Income, South Asia, and Sub-Saharan Africa. If we consider Table 2, where the average informality is shown, we see that Latin America and the Caribbean have the highest value of the shadow economies (41.1 percent), followed by Sub-Saharan Africa (40.2 percent) and then Europe and Central Asia (38.9 percent). The lowest value is found among the High Income OECD countries (17.1 percent).
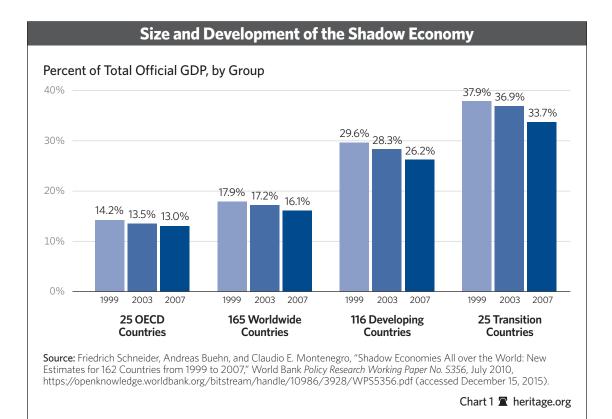
One of the most interesting trends in the data is the overall reduction in the size of the shadow economy over time. Chart 1 shows the size and development of the shadow economy of various country groups (averages by the official GDP of 2005) over 1999, 2003, and 2007. One sees clearly that for all country groups (25 OECD countries, 112 developing counties, 25 transition countries), there is a decrease in the size of the shadow economy. The average size of the shadow economies of the 162 countries was 34.0 percent of official GDP (unweighted measure) in 1999 and decreased to 31.2 percent of official GDP in 2007. This is a decrease of almost 3.0 percentage points over nine years.

Interestingly, over this same period, average economic freedom for the world as a whole, as measured by this *Index*, grew almost 3 points. The regional results for the size of the shadow economy also track closely with the regional breakdown of economic freedom scores. Africa has the lowest economic freedom scores and the largest shadow economy. Economic freedom is highest in the OECD countries, which have the smallest shadow economies. The growth of economic freedom, with its positive impact on the growth rate of the official economy and formal employment opportunities, would seem to be the most efficient means to reduce the shadow economy.

SUMMARY AND CONCLUSIONS

This chapter provides estimates of the size of the shadow economies for 162 countries over the period 1999 through 2007 using the MIMIC procedure for the econometric estimation and

Size and Development of the Shadow Economy

Percent of Total Official GDP, by Group

	1999	2003	2007
25 OECD Countries	14.2%	13.5%	13.0%
165 Worldwide Countries	17.9%	17.2%	16.1%
116 Developing Countries	29.6%	28.3%	26.2%
25 Transition Countries	37.9%	36.9%	33.7%

Chart 1 ☎ heritage.org

a benchmarking procedure for calibrating the estimated MIMIC into absolute values of the size of the shadow economy. The new knowledge and insights gained with respect to the size and trend of the shadow economy of 162 countries lead to three conclusions:

- For all countries investigated, the shadow economy has reached a large size, with an unweighted average value of 33.0 percent of official GDP for the 162 countries from 1999 through 2007. Equally important, however, is the clear negative trend of the size of the shadow economy over time. The unweighted average size of the shadow economies of all 162 countries (developing, Eastern European, and Central Asian and high-income OECD countries) decreased from 34.0 percent of official GDP in 1999 to 31.2 percent of official GDP in 2007.
- Shadow economies are a complex phenomenon that is present to an important extent in all types of economies (developing, transition, and highly developed). People engage in shadow economic activities for a variety of reasons. Among the most important are government actions, most notably taxation and regulation.
- There are regional disparities in the level of informality but obvious regional clusters. At the top level of informality, we find Sub-Saharan Africa; at the lowest level of informality, we find the OECD countries.

Considering these three conclusions, it is obvious that one of the big challenges for every government is to undertake efficient incentive-oriented policy measures to make work in the shadow economy less attractive and work in the official economy more attractive. Successful implementation of such policies, including those highlighted in this *Index* as likely to increase economic freedom, could lead to stabilization or even reduction of the size of the shadow economy.

APPENDIX

Size of the Shadow Economy (% of GDP)

Countries are listed alphabetically

No.	Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg.
1	Albania	35.7	35.3	34.9	34.7	34.4	33.9	33.7	33.3	32.9	**34.3**
2	Algeria	34.2	34.1	33.8	33.3	32.5	31.7	31.1	31.0	31.2	**32.5**
3	Angola	48.8	48.8	48.4	47.4	47.3	47.1	45.0	44.0	42.1	**46.5**
4	Argentina	25.2	25.4	26.1	27.6	26.4	25.5	24.7	23.8	23.0	**25.3**
5	Armenia	46.6	46.3	45.4	44.5	43.9	43.6	42.7	42.1	41.1	**44.0**
6	Australia	14.4	14.3	14.3	14.1	13.9	13.7	13.7	13.7	13.5	**14.0**
7	Austria	10.0	9.8	9.7	9.8	9.8	9.8	9.8	9.6	9.5	**9.8**
8	Azerbaijan	61.0	60.6	60.3	60.0	59.1	58.6	56.7	54.0	52.0	**58.0**
9	The Bahamas	26.3	26.2	26.4	26.5	27.0	27.4	26.7	26.2	26.2	**26.5**
10	Bahrain	18.6	18.4	18.2	18.0	17.8	17.4	17.1	—	—	**17.9**
11	Bangladesh	36.0	35.6	35.5	35.7	35.6	35.5	35.1	34.5	34.1	**35.3**
12	Belarus	48.3	48.1	47.9	47.6	47.0	46.1	45.2	44.2	43.3	**46.4**
13	Belgium	22.7	22.2	22.1	22.0	22.0	21.8	21.8	21.4	21.3	**21.9**
14	Belize	45.2	43.8	43.3	43.4	42.3	42.0	42.1	41.7	42.0	**42.9**
15	Benin	51.2	50.2	49.8	49.6	49.3	49.5	49.8	49.6	49.1	**49.8**
16	Bhutan	29.6	29.4	29.2	29.1	28.7	28.7	28.3	28.2	27.7	**28.8**
17	Bolivia	67.0	67.1	67.6	67.7	67.7	66.9	64.3	62.8	63.5	**66.1**
18	Bosnia & Herzegovina	34.3	34.1	34.0	33.9	33.5	33.6	33.2	32.9	32.8	**33.6**
19	Botswana	33.9	33.4	33.2	33.3	33.0	32.8	32.7	32.3	31.9	**32.9**
20	Brazil	40.8	39.8	39.9	39.9	39.6	38.6	38.4	37.8	36.6	**39.0**
21	Brunei Darussalam	31.3	31.1	31.0	30.2	29.9	31.2	31.8	30.8	31.2	**30.9**
22	Bulgaria	37.3	36.9	36.6	36.1	35.6	34.9	34.1	33.5	32.7	**35.3**
23	Burkina Faso	41.3	41.4	41.3	41.4	40.3	40.1	39.7	39.7	39.6	**40.5**
24	Burundi	39.1	39.5	39.6	39.4	39.6	39.6	39.7	39.6	39.6	**39.5**
25	Cambodia	50.4	50.1	49.6	50.0	49.2	48.8	47.8	46.8	46.0	**48.7**
26	Cameroon	33.3	32.8	32.4	32.1	31.7	31.6	31.6	31.4	31.4	**32.0**
27	Canada	16.3	16.0	15.9	15.8	15.7	15.6	15.5	15.3	15.3	**15.7**
28	Cape Verde	36.5	36.1	35.9	35.9	35.7	35.8	35.4	34.1	33.4	**35.4**
29	Central African Republic	42.8	42.6	43.1	44.0	46.9	47.3	46.9	45.9	45.1	**45.0**
30	Chad	45.8	46.2	45.5	45.1	44.2	41.5	41.1	41.7	42.2	**43.7**
31	Chile	19.9	19.8	19.6	19.6	19.4	19.1	18.9	18.7	18.5	**19.3**
32	China	13.2	13.1	13.0	12.9	12.8	12.6	12.5	12.2	11.9	**12.7**
33	Colombia	39.4	39.1	38.9	38.9	37.9	37.1	36.1	35.1	33.5	**37.3**
34	Comoros	39.3	39.6	39.0	37.7	37.6	39.0	38.0	38.4	39.4	**38.7**
35	Congo, Dem. Rep.	47.2	48.0	48.2	48.1	47.1	46.9	46.8	46.8	46.7	**47.3**
36	Congo, Rep.	49.5	48.2	47.2	46.8	46.8	46.2	44.7	43.3	44.6	**46.4**
37	Costa Rica	26.1	26.2	26.4	26.4	26.1	25.9	25.6	25.0	24.0	**25.7**
38	Côte d'Ivoire	41.4	43.2	44.3	45.5	46.0	46.1	46.3	46.8	47.0	**45.2**
39	Croatia	33.8	33.4	33.2	32.6	32.1	31.7	31.3	30.8	30.4	**32.1**
40	Cyprus	29.2	28.7	28.2	27.8	28.2	28.1	27.7	27.3	26.5	**28.0**
41	Czech Republic	19.3	19.1	18.9	18.8	18.7	18.4	17.8	17.3	17.0	**18.4**
42	Denmark	18.4	18.0	18.0	18.0	18.0	17.8	17.6	17.0	16.9	**17.7**
43	Dominican Republic	32.4	32.1	32.4	32.1	32.1	32.4	31.7	31.0	30.5	**31.9**
44	Ecuador	34.2	34.4	33.7	33.3	32.8	31.6	30.8	30.4	30.4	**32.4**
45	Egypt	35.5	35.1	35.2	35.7	35.4	35.0	34.8	34.1	33.1	**34.9**

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Size of the Shadow Economy (% of GDP)

Countries are listed alphabetically

No.	Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg.
46	El Salvador	46.5	46.3	46.2	45.6	45.2	44.9	44.5	43.8	43.0	**45.1**
47	Equatorial Guinea	32.7	32.8	32.0	31.5	31.2	30.8	30.5	30.6	30.1	**31.4**
48	Eritrea	38.1	40.3	39.4	39.4	40.3	40.6	40.5	41.2	41.4	**40.1**
49	Estonia	—	32.7	32.4	32.0	31.4	31.1	30.5	29.8	29.5	**31.2**
50	Ethiopia	40.6	40.3	39.5	39.6	40.1	38.6	37.7	36.3	35.1	**38.6**
51	Fiji	32.9	33.6	33.3	32.6	32.5	31.9	31.4	31.0	32.6	**32.4**
52	Finland	18.4	18.1	17.9	17.8	17.7	17.6	17.4	17.1	17.0	**17.7**
53	France	15.7	15.2	15.0	15.1	15.0	14.9	14.8	14.8	14.7	**15.0**
54	Gabon	46.2	48.0	47.4	47.6	47.5	48.0	47.7	48.0	47.3	**47.5**
55	The Gambia	46.1	45.1	44.7	47.1	45.4	43.8	43.6	42.4	40.9	**44.3**
56	Georgia	68.3	67.3	67.2	67.2	65.9	65.5	65.1	63.6	62.1	**65.8**
57	Germany	16.4	16.0	15.9	16.1	16.3	16.1	16.0	15.6	15.3	**16.0**
58	Ghana	42.0	41.9	41.8	41.6	41.3	40.9	39.5	38.6	38.3	**40.7**
59	Greece	28.5	28.7	28.2	28.0	27.4	27.1	26.9	26.4	26.5	**27.5**
60	Guatemala	51.6	51.5	51.6	51.2	50.7	50.5	50.2	49.0	47.9	**50.5**
61	Guinea	39.7	39.6	39.3	38.7	38.8	38.5	38.4	38.9	39.2	**39.0**
62	Guinea-Bissau	40.4	39.6	39.6	40.7	41.5	41.9	41.7	41.5	41.6	**40.9**
63	Guyana	33.4	33.6	33.3	33.7	33.9	33.4	34.3	33.8	34.0	**33.7**
64	Haiti	54.8	55.4	56.1	56.5	56.4	57.4	57.1	57.0	57.1	**56.4**
65	Honduras	50.3	49.6	49.7	49.6	48.9	48.3	47.3	46.1	45.1	**48.3**
66	Hong Kong	17.0	16.6	16.6	16.6	16.4	15.9	15.5	15.0	14.7	**16.0**
67	Hungary	25.4	25.1	24.8	24.5	24.4	24.1	24.0	23.7	23.7	**24.4**
68	Iceland	16.0	15.9	15.8	16.0	15.9	15.5	15.1	15.0	15.0	**15.6**
69	India	23.2	23.1	22.8	22.6	22.3	22.0	21.7	21.2	20.7	**22.2**
70	Indonesia	19.7	19.4	19.4	19.3	19.1	18.8	18.6	18.3	17.9	**18.9**
71	Iran	19.1	18.9	19.0	18.7	18.2	17.9	18.1	17.7	17.3	**18.3**
72	Ireland	16.1	15.9	15.9	15.9	16.0	15.8	15.6	15.5	15.4	**15.8**
73	Israel	22.7	21.9	22.3	22.7	22.7	22.1	21.8	21.2	20.7	**22.0**
74	Italy	27.8	27.1	26.7	26.8	27.0	27.0	27.1	26.9	26.8	**27.0**
75	Jamaica	36.4	36.4	36.2	36.2	34.4	33.9	34.0	32.9	32.5	**34.8**
76	Japan	11.4	11.2	11.2	11.3	11.2	10.9	10.7	10.4	10.3	**11.0**
77	Jordan	19.4	19.4	19.2	18.9	18.7	18.3	18.0	17.5	17.2	**18.5**
78	Kazakhstan	43.8	43.2	42.5	42.0	41.1	40.6	39.8	38.9	38.4	**41.1**
79	Kenya	33.7	34.3	34.0	34.8	34.6	33.7	32.7	31.1	29.5	**33.2**
80	Korea, Rep.	28.3	27.5	27.3	26.9	26.8	26.5	26.3	25.9	25.6	**26.8**
81	Kuwait	20.1	20.1	20.2	20.3	19.3	18.8	18.1	17.9	—	**19.4**
82	Kyrgyz Republic	41.4	41.2	40.8	41.4	40.5	39.8	40.1	39.8	38.8	**40.4**
83	Laos	30.9	30.6	30.2	30.0	29.8	29.4	28.9	28.4	28.0	**29.6**
84	Latvia	30.8	30.5	30.1	29.8	29.4	29.0	28.4	27.7	27.2	**29.2**
85	Lebanon	34.1	34.1	33.7	33.5	33.2	32.4	32.4	32.8	32.0	**33.1**
86	Lesotho	31.7	31.3	31.1	31.0	30.7	30.1	30.2	29.3	28.8	**30.5**
87	Liberia	44.2	43.2	43.2	43.1	45.0	45.4	44.9	44.5	44.2	**44.2**
88	Libya	34.7	35.1	34.5	33.8	34.9	33.9	33.1	32.0	30.9	**33.7**
89	Lithuania	33.8	33.7	33.3	32.8	32.0	31.7	31.0	30.4	29.7	**32.0**
90	Luxembourg	10.0	9.8	9.8	9.8	9.8	9.8	9.7	9.6	9.4	**9.7**
91	Macao	13.3	13.1	13.0	12.9	12.5	12.1	11.9	11.7	11.1	**12.4**
92	Macedonia	39.0	38.2	39.1	38.9	38.4	37.4	36.9	36.0	34.9	**37.6**
93	Madagascar	40.1	39.6	38.7	44.8	43.4	41.6	40.8	39.8	38.5	**40.8**
94	Malawi	39.9	40.3	42.5	44.4	43.4	42.5	42.6	41.3	39.4	**41.8**
95	Malaysia	32.2	31.1	31.6	31.5	31.2	30.7	30.4	30.0	29.6	**30.9**

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Size of the Shadow Economy (% of GDP)

Countries are listed alphabetically

No.	Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg.
96	Maldives	30.3	30.3	30.0	29.4	29.2	28.9	29.6	29.3	28.6	**29.5**
97	Mali	42.5	42.3	40.8	40.2	39.9	40.6	40.1	39.9	39.9	**40.7**
98	Malta	27.4	27.1	27.3	27.3	27.5	27.6	27.3	27.0	26.5	**27.2**
99	Mauritania	35.5	36.1	36.0	35.8	35.8	35.1	34.4	31.7	—	**35.1**
100	Mauritius	23.3	23.1	22.9	23.0	22.7	22.4	22.4	22.2	21.9	**22.7**
101	Mexico	30.8	30.1	30.3	30.4	30.5	30.1	29.9	29.2	28.8	**30.0**
102	Moldova	45.6	45.1	44.1	44.5	44.6	44.0	43.4	44.3	—	**44.5**
103	Mongolia	18.4	18.4	18.3	18.0	17.7	17.4	17.1	16.7	16.4	**17.6**
104	Morocco	36.5	36.4	35.7	35.5	35.0	34.2	34.9	33.1	33.1	**34.9**
105	Mozambique	41.1	40.3	40.4	39.8	39.8	39.7	38.9	38.6	—	**39.8**
106	Myanmar	51.6	52.6	51.5	50.7	49.0	49.1	47.8	—	—	**50.3**
107	Namibia	31.4	31.4	31.2	31.3	30.7	29.7	29.6	28.8	28.5	**30.3**
108	Nepal	37.2	36.8	36.7	37.1	36.9	36.8	36.7	36.3	36.0	**36.7**
109	Netherlands	13.3	13.1	13.1	13.2	13.3	13.2	13.2	13.2	13.0	**13.2**
110	New Zealand	13.0	12.8	12.6	12.4	12.2	12.0	12.1	12.1	12.0	**12.4**
111	Nicaragua	45.7	45.2	45.3	45.5	45.0	44.2	43.8	43.5	43.1	**44.6**
112	Niger	41.7	41.9	40.9	40.3	39.7	40.7	39.7	38.6	—	**40.4**
113	Nigeria	58.0	57.9	57.8	57.6	56.3	55.1	53.8	53.0	—	**56.2**
114	Norway	19.2	19.1	19.0	19.0	19.0	18.5	18.5	18.2	18.0	**18.7**
115	Oman	19.1	18.9	18.5	18.5	18.4	18.3	18.0	17.6	—	**18.4**
116	Pakistan	37.0	36.8	37.0	36.8	36.2	35.3	34.9	33.8	33.6	**35.7**
117	Panama	64.8	64.1	64.7	65.1	64.4	63.5	61.7	60.0	—	**63.5**
118	Papua New Guinea	35.5	36.1	36.8	37.1	37.1	37.0	37.2	37.1	36.5	**36.7**
119	Paraguay	38.0	39.8	39.7	40.1	39.1	38.3	38.2	37.4	—	**38.8**
120	Peru	60.1	59.9	60.2	59.1	58.6	57.9	57.2	55.7	53.7	**58.0**
121	Philippines	43.8	43.3	43.0	42.5	42.0	41.6	40.1	39.5	38.3	**41.6**
122	Poland	27.7	27.6	27.7	27.7	27.5	27.3	26.9	26.4	26.0	**27.2**
123	Portugal	23.0	22.7	22.6	22.7	23.0	23.1	23.3	23.2	23.0	**23.0**
124	Quatar	—	19.0	19.3	19.0	19.6	17.4	18.4	—	—	**14.1**
125	Romania	34.3	34.4	33.7	33.5	32.8	32.0	31.7	30.7	30.2	**32.6**
126	Russia	47.0	46.1	45.3	44.5	43.6	43.0	42.4	41.7	40.6	**43.8**
127	Rwanda	40.5	40.3	40.6	39.9	40.7	40.2	39.3	39.1	—	**40.1**
128	Saudi Arabia	18.7	18.4	18.7	19.2	18.3	17.7	17.4	17.4	16.8	**18.1**
129	Senegal	45.0	45.1	44.5	45.1	44.4	43.2	42.3	42.4	41.7	**43.7**
130	Sierra Leone	48.6	48.6	47.6	45.4	44.8	44.4	44.3	43.6	42.9	**45.6**
131	Singapore	13.3	13.1	13.3	13.3	13.1	12.8	12.7	12.4	12.2	**12.9**
132	Slovak Republic	18.9	18.9	18.8	18.6	18.3	18.1	17.6	17.2	16.8	**18.1**
133	Slovenia	27.3	27.1	26.7	26.6	26.4	26.2	25.8	25.3	24.7	**26.2**
134	Solomon Islands	31.7	33.4	34.5	34.8	34.7	33.8	33.4	33.2	32.7	**33.6**
135	South Africa	28.4	28.4	28.4	28.0	27.8	27.1	26.5	26.0	25.2	**27.3**
136	Spain	23.0	22.7	22.4	22.4	22.4	22.5	22.4	22.4	22.2	**22.5**
137	Sri Lanka	45.2	44.6	44.6	44.1	43.8	43.9	43.4	42.9	42.2	**43.9**
138	Sudan	34.1	—	—	—	—	—	—	—	—	**34.1**
139	Suriname	39.7	39.8	39.3	38.9	38.1	36.9	36.5	35.9	35.1	**37.8**
140	Swaziland	43.5	41.4	41.3	40.9	40.2	40.1	39.3	38.9	—	**40.7**
141	Sweden	19.6	19.2	19.1	19.0	18.7	18.5	18.6	18.2	17.9	**18.8**
142	Switzerland	8.8	8.6	8.6	8.6	8.8	8.6	8.5	8.3	8.1	**8.5**
143	Syria	19.3	19.3	19.2	19.1	19.3	19.1	19.0	18.7	18.5	**19.1**
144	Taiwan	25.7	25.4	25.7	25.4	25.2	24.7	24.5	24.2	23.9	**25.0**
145	Tajikistan	43.5	43.2	42.9	42.7	42.1	41.7	41.5	41.2	41.0	**42.2**

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Size of the Shadow Economy (% of GDP)

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No.	Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg.
146	Tanzania	58.6	58.3	57.7	56.9	56.6	56.0	55.4	54.7	53.7	**56.4**
147	Thailand	53.4	52.6	52.4	51.5	50.2	49.6	49.0	48.5	48.2	**50.6**
148	Togo	34.4	35.1	35.4	34.5	34.9	35.0	35.0	34.6	—	**34.9**
149	Trinidad and Tobago	34.7	34.4	34.3	34.4	33.4	33.1	32.9	31.9	31.5	**33.4**
150	Tunisia	38.7	38.4	37.8	37.8	37.4	36.9	36.7	35.9	35.4	**37.2**
151	Turkey	32.7	32.1	32.8	32.4	31.8	31.0	30.0	29.5	29.1	**31.3**
152	Uganda	43.5	43.1	42.9	42.9	42.5	42.4	42.2	41.0	40.3	**42.3**
153	Ukraine	52.7	52.2	51.4	50.8	49.7	48.8	47.8	47.3	46.8	**49.7**
154	United Arab Emirates	26.3	26.4	27.0	27.4	26.3	25.4	24.8	23.5	—	**25.9**
155	United Kingdom	12.8	12.7	12.6	12.6	12.5	12.4	12.4	12.3	12.2	**12.5**
156	United States	8.8	8.7	8.8	8.8	8.7	8.6	8.5	8.4	8.4	**8.6**
157	Uruguay	50.5	51.1	51.7	54.0	53.6	51.1	49.2	48.5	46.1	**50.6**
158	Venezuela	33.8	33.6	33.5	35.5	36.9	34.9	33.5	32.0	30.9	**33.8**
159	Vietnam	15.8	15.6	15.5	15.3	15.2	15.1	14.7	14.6	14.4	**15.1**
160	Yemen	27.7	27.4	27.3	27.2	27.0	27.0	26.6	26.8	26.8	**27.1**
161	Zambia	49.3	48.9	48.3	48.1	47.5	46.8	46.3	45.0	43.9	**47.1**
162	Zimbabwe	59.6	59.4	61.5	62.8	63.7	62.3	62.0	62.3	62.7	**61.8**
	Time Average	34.0	33.7	33.6	33.6	33.3	32.9	32.5	32.1	31.2	

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ENDNOTES

1. This definition is used, for example, in Edward. L. Feige, *The Underground Economies: Tax Evasion and Information Distortion* (Cambridge, UK: Cambridge University Press, 1989); Edward. L. Feige, "The Underground Economy and the Currency Enigma," Proceedings of the 49th Congress of the International Institute of Public Finance/Institut International de Finances Publiques, Berlin, 1993, Supplement to *Public Finance/Finances Publiques*, Vol. 49 (1994), pp. 119–136; Friedrich Schneider, "Measuring the Size and Development of the Shadow Economy: Can the Causes Be Found and the Obstacles Be Overcome?" in Hermann Brandstaetter and Werner Güth, eds., *Essays on Economic Psychology* (Berlin and Heidelberg: Springer-Verlag, 1994), pp. 193–212; Friedrich Schneider, "The Shadow Economy," in Charles K. Rowley and Friedrich Schneider, eds., *The Encyclopedia of Public Choice* (Dordrecht: Kluwer Academic Publishers, 2003); Friedrich Schneider, "Shadow Economies Around the World: What Do We Really Know?" *European Journal of Political Economy*, Vol. 21, No. 3 (2005), pp. 598–642; and Bruno S. Frey and Werner W. Pommerehne, "The Hidden Economy: State and Prospects for Measurement," *Review of Income and Wealth*, Vol. 30, No. 1 (1984), pp. 1–23. Do-it-yourself activities are not included. For estimates of the shadow economy and the do-it-yourself activities for Germany, see Andreas Buehn, Alexander Karmann, and Friedrich Schneider, "Shadow Economy and Do-It-Yourself Activities: The German Case," *Journal of Institutional and Theoretical Economics*, Vol. 164, No. 4 (2009), pp. 701–722; Alexander Karmann, "Monetäre Ansätze zur Erfassung der Schattenwirtschaft: Ein Vergleich verschiedener Messansätze," *Kredit und Kapitel*, Vol. 19 (1986), pp. 233–247; and Alexander Karmann, "Schattenwirtschaft und ihre Ursachen: Eine empirische Analyse zur Schwarzwirtschaft und Selbstversorgung in der Bundesrepublik Deutschland," *Zeitschrift für Wirtschafts- und Sozialwissenschaften (ZWS)*, Vol. 110 (1990), pp. 185–206.

2. Philip Smith, "Assessing the Size of the Underground Economy: The Statistics Canada Perspective," *Canadian Economic Observer*, Vol. 7, No. 7 (1994), p. 18.

3. This definition is taken from Roberto Dell'Anno, "Estimating the Shadow Economy in Italy: A Structural Equation Approach," University of Arhaus, Department of Economics, Working Paper 2003-7, 2003; Roberto Dell'Anno and Friedrich Schneider, "The Shadow Economy of Italy and Other OECD Countries: What Do We Know?" University of Linz, Department of Economics, Discussion Paper, 2004; and Feige, *The Underground Economies: Tax Evasion and Information Distortion*. See also Jim Thomas, "Quantifying the Black Economy: 'Measurement Without Theory' Yet Again?" *The Economic Journal*, Vol. 109, No. 456 (1999), pp. 381–389; Matthew H. Fleming, John Roman, and Graham Farrell, "The Shadow Economy," *Journal of International Affairs*, Vol. 53, No. 2 (2000), pp. 64–89; or Lars P. Feld and Claus Larsen, *Black Activities in Germany in 2001 and 2004: A Comparison Based on Survey Data*, Rockwool Foundation Research Unit, Study No. 12, 2005, p. 25.

4. See also the excellent discussion of the definition of the shadow economy in Søren Pedersen, *The Shadow Economy in Germany, Great Britain and Scandinavia: A Measurement Based on Questionnaire Surveys*, Rockwool Foundation Research Unit, Study No. 10, 2003, pp. 13–19, and Bonne Kazemier, "The Underground Economy: A Survey of Methods and Estimates," Statistics Netherlands, Discussion Paper, 2005.

5. Compare also Lars P. Feld and Friedrich Schneider, "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries," *German Economic Review*, Vol. 11, No. 2 (2010), pp. 109–149; Friedrich Schneider, ed. *Handbook on the Shadow Economy* (Cheltenham, UK: Edward Elgar Publishing Company, 2011); Friedrich Schneider, "The Shadow Economy and Shadow Labor Force: Results, Problems and Open Questions," University of Linz, Department of Economics, Discussion Paper, June 2014; and Friedrich Schneider and Colin C. Williams, *The Shadow Economy* (London: Institute of Economic Affairs, 2013).

6. For a broader discussion of the definition issue, see James J. Thomas, *Informal Economic Activity*, LSE Handbooks in Economics (London: Harvester Wheatsheaf, 1992); Friedrich Schneider, J. Volkert, and S. Caspar, *Schattenwirtschaft und Schwarzarbeit: Beliebt bei vielen—Ein Problem für alle?: Eine Analyse der schattenwirtschaftlichen Aktivitäten in Deutschland (am Beispiel Baden-Württemberg) und mögliche politische Konsequenzen* (Baden-Baden: Nomos, 2002); Friedrich Schneider and Dominik Enste, *The Shadow Economy: Theoretical Approaches, Empirical Studies, and Political Implications* (Cambridge, UK: Cambridge University Press, 2002); Friedrich Schneider and Dominik Enste, *Jahrbuch Schattenwirtschaft 2006/07. Zum Spannungsfeld von Politik und Ökonomie* (Berlin: LIT Verlag, 2006); Bonne Kazemier, "The Underground Economy: A Survey of Methods and Estimates"; Bonne Kazemier, "Monitoring the Underground Labor Market: What Surveys Can Do," Statistics Netherlands, Discussion Paper, 2005; and Buehn, Karmann, and Schneider, "Shadow Economy and Do-It-Yourself Activities: The German Case."

7. With this definition, the problem of having classical crime activities included could be avoided, because neither the MIMIC procedure nor the currency demand approach captures these activities. For example, drug dealing is independent of increasing taxes, especially as the included causal variables are not linked (or causal) to classical crime activities. See Thomas, *Informal Economic Activity*; Kazemier, "The Underground Economy: A Survey of Methods and Estimates"; Kazemier, "Monitoring the Underground Labor Market: What Surveys Can Do"; and Schneider, "Shadow Economies Around the World: What Do We Really Know?"

8. For the strengths and weaknesses of the various methods, see D. K. Bhattacharyya, "On the Economic Rationale of Estimating the Hidden Economy," *The Economic Journal*, Vol. 109, No. 456 (1999), pp. 348–359; Trevor Breusch, "The Canadian Underground Economy: An Examination of Giles and Tedds," *Canadian Tax Journal*, Vol. 53 (2005), pp. 367–391; Trevor Breusch, "Estimating the Underground Economy Using MIMIC Models," Working Paper, revised November 2005, http://econwpa.repec.org/eps/em/papers/0507/0507003.pdf; Roberto Dell'Anno and Friedrich Schneider "A Complex Approach to Estimate Shadow Economy: The Structural Equation Modelling," in Marisa Faggnini and Thomas Lux, eds., *Coping with the Complexity of Economics* (Berlin: Springer, 2009), pp. 110–130; Huw Dixon, Editorial Introduction, "Controversy: On the Use of the 'Hidden Economy' Estimates," *The Economic Journal,* Vol. 109, No. 456 (1999), pp. 335–337; Feige, *The Underground Economies: Tax Evasion and Information Distortion*; Feld and Larsen, *Black Activities in Germany in 2001 and 2004: A Comparison Based on Survey Data*; Feld and Schneider, "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries"; David E. A. Giles, "Measuring the Hidden Economy: Implications for Econometric Modelling," *The Economic Journal*, Vol. 109, No. 456 (1999), pp. 370–380; David E. A. Giles, "Modelling the Hidden Economy in the Tax-Gap in New Zealand," *Empirical Economics*, Vol. 24, No. 4 (1999), pp. 621–640; David E. A. Giles, "The Rise and Fall of the New Zealand Underground Economy: Are the Reasons Symmetric?" *Applied Economics Letters*, Vol. 6, Issue 3 (1999), pp. 185–189; Friedrich Schneider, "Estimating the Size of the Danish Shadow Economy Using the Currency Demand Approach: An Attempt," *The Scandinavian Journal of Economics*, Vol. 88, No. 4 (1986), pp. 643–668; Schneider, "The Shadow Economy," in Rowley and Schneider, eds., *The Encyclopedia of Public Choice*; Friedrich Schneider, "Shadow Economies Around the World: What Do We Really Know?" *European Journal of Political Economy*, Vol. 21, Issue 3 (2005), pp. 598–642; Friedrich Schneider, "Shadow Economies and Corruption All Over the World: New Estimates for 145 Countries," *Economics*, No. 2007–9 (July 2007); Schneider, ed. *Handbook on the Shadow Economy*; Schneider, "The Shadow Economy and Shadow Labor Force: Results, Problems and Open Questions"; Friedrich Schneider and Dominik Enste, *Schattenwirtschaft und Schwarzarbeit—Umfang, Ursachen, Wirkungen und wirtschaftspolitische Empfehlungen* (München: Oldenbourg, 2000); Friedrich Schneider and Dominik Enste, "Shadow Economies: Size, Causes and Consequences," *Journal of Economic Literature*, Vol. 38, No. 1 (2000), pp. 73–110; Friedrich Schneider and Dominik Enste, *The Shadow Economy: Theoretical Approaches, Empirical Studies, and Political Implications* (Cambridge, UK: Cambridge University Press, 2002); Schneider and Enste, *Jahrbuch Schattenwirtschaft 2006/07. Zum Spannungsfeld von Politik und Ökonomie*; Vito Tanzi, "Uses and Abuses of Estimates of the Underground Economy," *The Economic Journal*, Vol. 109, No. 456 (1999), pp. 338–340; Thomas, *Informal Economic Activity*; and Thomas, "Quantifying the Black Economy: 'Measurement Without Theory' Yet Again?"

9. These methods are presented in detail in Schneider, "Measuring the Size and Development of the Shadow Economy: Can the Causes Be Found and the Obstacles Be Overcome?"; Friedrich Schneider, "Determinanten der Steuerhinterziehung der Schwarzarbeit im internationalen Vergleich," in Christian Smekal, Clemens-August Andreae, and Engelbert Theurl, eds., *Stand und Entwicklung der Finanzpsychologie* (Baden-Baden: Nomos, 1994), pp. 247–288; Friedrich Schneider, "Can the Shadow Economy Be Reduced Through Major Tax Reforms? An Empirical Investigation for Austria," Proceedings of the 49th Congress of the International Institute of Public Finance/Institut International de Finances Publiques, Berlin, 1993, Supplement to *Public Finance/Finances Publiques*, Vol. 49 (1994), pp. 137–152; Friedrich Schneider, "Shadow Economies Around the World: What Do We Really Know?"; Schneider, *Handbook on the Shadow Economy*; Schneider and Williams, *The Shadow Economy*; Feld and Schneider, "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries"; Schneider and Enste, "Shadow Economies: Size, Causes and Consequences"; Schneider and Enste, *The Shadow Economy: Theoretical Approaches, Empirical Studies, and Political Implications*; and Schneider and Enste, *Jahrbuch Schattenwirtschaft 2006/07. Zum Spannungsfeld von Politik und Ökonomie*. These studies also discuss advantages and disadvantages of the MIMIC and the currency demand methods as well as other estimation methods for assessing the size of illicit employment. For a detailed discussion, see also Feld and Larsen, *Black Activities in Germany in 2001 and 2004: A Comparison Based on Survey Data*.

10. This indirect approach is based on the assumption that cash is used to make transactions within the shadow economy. By using this method, one econometrically estimates a currency demand function including independent variables like tax burden, regulation, etc., which "drive" the shadow economy. This equation is used to make simulations of the amount of money that would be necessary to generate the official GDP. This amount is then compared with the actual money demand, and the difference is treated as an indicator for the development of the shadow economy. On this basis, the calculated difference is multiplied by the velocity of money of the official economy, and one gets a value-added figure for the shadow economy. See Feld and Schneider, "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries," as well as Schneider and Williams, *The Shadow Economy*, discussing critically this and other methods.

11. See Schneider, "Estimating the Size of the Danish Shadow Economy Using the Currency Demand Approach: An Attempt"; Schneider, "Shadow Economies Around the World: What Do We Really Know?"; Schneider, "Shadow Economies and Corruption All Over the World: New Estimates for 145 Countries"; Friedrich Schneider, "The Influence of Public Institutions on the Shadow Economy: An Empirical Investigation for OECD Countries," *European Journal of Law and Economics*, Vol. 6, Issue 3 (2010), pp. 441-461; Simon Johnson, Daniel Kaufmann, and Andrei Shleifer, "Regulatory Discretion and the Unofficial Economy," *The American Economic Review*, Vol. 88, No. 2 (1998), pp. 387–392; Simon Johnson, Daniel Kaufmann, and Pablo Zoido-Lobatón, "Corruption, Public Finances, and the Unofficial Economy," World Bank *Policy Research Working Paper* No. 2169, August 1999; Tanzi, "Uses and Abuses of Estimates of the Underground Economy"; Giles, "Measuring the Hidden Economy: Implications for Econometric Modelling"; David E. A. Giles and Lindsay M. Tedds, *Taxes and the Canadian Underground Economy* (Toronto/Ontario: Canadian Tax Foundation, 2002); Feld and Schneider, "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries"; and Schneider and Williams, *The Shadow Economy*.

12. Simon Johnson, Daniel Kaufmann, and Andrei Shleifer, "The Unofficial Economy in Transition," Brookings Institution, *Brookings Papers on Economic Activity* No. 2, 1997, pp. 159–221; Johnson, Kaufmann, and Zoido-Lobatón, "Corruption, Public Finances, and the Unofficial Economy."

13. Schneider, "The Influence of Public Institutions on the Shadow Economy: An Empirical Investigation for OECD Countries"; Schneider, ed., *Handbook on the Shadow Economy*; Friedrich Schneider, "Schattenwirtschaft und Schattenarbeitsmärkte: Die Entwicklung der letzten 20 Jahre," *Perspektiven der Wirtschaftspolitik (PWP)*, Vol. 16, No. 1 (2015), pp. 3–25; Feld and Schneider, "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries."

14. See also Colin C. Williams, "Evaluating Cross National Variations in the Extent and Nature of Informal Employment in the European Union," *Industrial Relations Journal*, Vol. 44, Issues 5–6 (2013), pp. 479–494; Colin C. Williams and Mark A. Lansky, "Informal Employment in Developed and Developing Countries: Perspectives and Policy Responses," *International Labor Review*, Vol. 152, Issues 3–4 (2013), pp. 355–380.

15. This chapter closely follows Friedrich Schneider, Andreas Buehn, and Claudio E. Montenegro, "New Estimates for the Shadow Economies All over the World," *International Economic Journal*, Vol. 24, No. 4 (2010), pp. 448–459.

16. Space does not permit a detailed description of the calibration method used for the values in Table 3.2. Compare with Schneider, Buehn, and Montenegro, "New Estimates for the Shadow Economies All over the World," which shows this calibration procedure using the currency demand approach for the benchmark values for most of these 162 countries.

17. See, for example, Breusch, "The Canadian Underground Economy: An Examination of Giles and Tedds"; Breusch, "Estimating the Underground Economy Using MIMIC Models"; Hildegart Ahumada, Facundo Alvaredo, and Alfredo Canavese, "The Monetary Method and the Size of the Shadow Economy: A Critical Assessment," *Review of Income and Wealth*, Series 53, No. 2 (2007), pp. 363–371.