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Dimensions of the Shadow Economy

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FRIEDRICH SCHNEIDER

Shadow economic activities—employment, production, and exchange unreported to government authorities—constitute a large and growing part of all economic activity throughout the world. Although these activities, by their very nature, cannot be measured with precision, attempts have been made to estimate their magnitudes and to relate those magnitudes to tax rates and other determinants. This article summarizes the findings of some recent quantitative studies.

As table 1 shows, the shadow economy in seventeen member countries of the Organization for Economic Cooperation and Development (OECD) was large and growing between 1994 and 1998. In 1998, the year with the latest figures for these countries, Greece had the largest shadow economy, equivalent to 29 percent of its official gross domestic product (GDP), followed by Italy with 27.8 percent, Spain with 23.4 percent, and Belgium with 22.6 percent. In the middle range were Ireland with 16.3 percent, Canada with 15 percent, France with 14.9 percent, and Germany with 14.7 percent. At the lower end appeared Austria with 9.1 percent, the United States with 8.9 percent, and Switzerland with 8 percent. Between 1994 and 1998, the shadow economy increased by at least 1.6 percentage points in Greece, Italy, Sweden, Norway, Germany, and Austria and by smaller amounts in all but two of the other OECD countries listed in table 1.

The figures in table 1 were calculated using the currency demand approach, which assumes that shadow (or hidden) transactions are undertaken in the form of

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cash payments, so as to leave no observable traces for the tax (or other) authorities. An increase in the size of the shadow economy will therefore increase the demand for currency. To isolate the resulting “excess” demand for currency to be used in the shadow economy, a currency demand equation is econometrically estimated over time, controlling for all conventional factors such as the growth of income, changes of payment habits, and so forth. In addition, variables such as the direct and indirect tax burden, government regulation, and the social security burden, which are assumed to be the major factors causing people to operate in the shadow economy, are included in the estimation equation. The “excess” increase in currency, which is the amount unexplained by the conventional factors, is then attributed to the rising tax and social security burdens and other factors inducing people to work in the shadow economy. From the excess increase in currency, the size of the shadow economy over time can be calculated by assuming that the expenditure velocity of money is equal in the shadow economy and the official economy.¹

To facilitate consideration of a preliminary explanation of the differing sizes of the shadow economies in the OECD countries, table 2 presents data on the size of the shadow economy and the various tax burdens in those countries in 1996. With the exception of Spain (shadow economy 22.9 percent, tax and social security burden 67.2 percent), the countries that had the largest shadow economy in 1996—Greece, Italy, Belgium, and Sweden (28.5, 27, 21.9, and 19.2 percent, respectively)—also had the highest tax and social security burden (72.3, 72.9, 76, and 78.6 percent, respectively), whereas the countries with the lowest overall tax and social security burden—Switzerland and the United States (39.7 and 41.4 percent, respectively)—also had the smallest shadow economies, 7.5 and 8.8 percent, respectively. Of course, the pattern was not perfect. The United Kingdom and Austria each had a fairly high overall tax and social security burden (54.9 and 70.4 percent, respectively) and a relatively small shadow economy (13.1 and 8.3 percent, respectively). But overall, the pattern fits the data well: the higher the social security and tax burden, the larger the shadow economy.

Table 3 presents estimates of the relative size of the labor force in the shadow economy in some OECD countries during the period from 1974 to 1998. For example, the results for Denmark indicate that the population engaged in the shadow economy ranged from 8.3 percent of the total labor force in 1980 to 15.4 percent in 1994. In Germany this figure rose from 8–12 percent in 1974–82 to 22 percent in 1997–98. In other countries as well, the shadow economy labor force is quite large: in Italy, between 30 and 48 percent (1997), in Sweden, 19.8 percent (1997), in France, 6–12 percent (1997–98).

In the European Union in the late 1990s, at least 20 million people were engaged in shadow economic activities, and in all OECD countries about 35 million worked off

1. For a detailed description and critique of this approach, see Schneider 1986, 1997.

the official records. These figures demonstrate that the shadow-economy labor market is substantial and may help to explain why several OECD countries, such as Germany, have recently had high and persistent unemployment in the official labor market.

Tables 4, 5, and 6 present estimates of the size of the shadow economy for a number of developing, transitional, and OECD countries—seventy-six countries in all—between 1989 and 1993. The estimates have been made by using the physical-input (electricity) method, the currency demand approach, and the model (MIMIC) approach, as indicated in the tables.

The physical-input (electricity consumption) method assumes that a part of the electricity supply is used for shadow-economy activities and that it is possible to isolate that part and, with the help of another method, to calculate value-added figures for the shadow economy. The MIMIC approach considers multiple causes leading to the existence and growth, as well as multiple effects, of the shadow economy over time. This method is based on the statistical theory of unobserved variables. For the estimation, a factor-analytic approach is used to measure the shadow economy as an unobserved variable.²

Table 4 presents the findings for eight African countries. Of those, Nigeria and Egypt had the largest shadow economies, with 76 percent and 68 percent of GDP, respectively, off the official record in 1989–90. At 20 percent, Mauritius's shadow economy was the smallest in the group. Use of the currency demand approach indicates that Tanzania had a shadow economy equivalent to 31 percent of GDP, and South Africa, a Western-type industrial country, had a shadow economy of 9 percent during the same years.

For a group of Latin American countries, table 4 presents two estimates, one based on the physical-input method (Lackó 1996) and one based on the MIMIC approach (Loyaza 1996). For some countries, such as Venezuela, Brazil, and Guatemala, the estimates of the size of the shadow economy are similar. For others, such as Panama, Peru, and Mexico, there are large differences. Using the MIMIC approach to rank the Latin American countries, the biggest shadow economies appear to have been those in Bolivia, where off-the-record output was equivalent to 65.6 percent of GDP, Panama (62.1 percent), Peru (57.4 percent), and Guatemala (50.4 percent). The smallest shadow economies appear to have been those in Costa Rica (23.2 percent), Argentina (21.8 percent), and Chile (18.2 percent). All the foregoing Latin American estimates are for the period 1990–93.³

2. For detailed descriptions of the physical-input (electricity) method and the MIMIC approach, see Schneider and Enste 2000.

3. For Mexico, the results of all three methods are shown. Although the MIMIC approach and the currency demand method produce estimates in a similar range (27.1 percent for MIMIC and 35.1 percent for the currency demand method), the physical-input method produces an estimate of 49 percent, far above the other two.

For a group of eleven Asian countries, table 4 shows that Thailand ranked number one, at 71 percent, followed by the Philippines with 50 percent and Sri Lanka with 40 percent of GDP in the shadow economy. Hong Kong and Singapore ranked lowest, each with a shadow economy equivalent to 13 percent of GDP. In general, the relative sizes of the shadow economy of some developing countries are quite large, and one may wonder what is really being measured. In my view, it is more a parallel or second economy, which has not been adequately captured by official statistics, than a black market.

The physical-input (electricity) method has been employed to create estimates for the transition countries of central and eastern Europe and the states of the former Soviet Union. The results, shown in table 5, cover the periods 1989–90, 1990–93, and 1994–95.⁴

According to the estimates produced by Simon Johnson, Daniel Kaufmann, and Andrei Shleifer (and the Lackó values shown in parentheses) for the countries of the former Soviet Union from 1990 to 1993,⁵ Georgia had the largest shadow economy, at 43.6 (50.8) percent of GDP, followed by Azerbaijan with 33.8 (41) percent and Moldova with 29.1 percent. In this group, Russia occupied a middle ground with a shadow economy of 27 (36.9) percent. Belarus with 14 percent and Uzbekistan with 10.3 percent had proportionally the smallest shadow economies. Except Estonia, Lithuania, and Uzbekistan (only for the estimates of Johnson, Kaufmann, and Shleifer), all other former USSR countries experienced a large increase in the shadow economy. On average, the twelve countries of the former Soviet Union shown in the table increased the size of their shadow economies from 25.7 (34.9) percent during 1990–93 to 35.3 (43.6) percent during 1994–95.

For nine transition countries of central and eastern Europe during the period 1990–93, the estimates of Johnson, Kaufmann, and Shleifer indicate that Hungary had the largest shadow economy, at 30.7 percent of GDP, followed by Bulgaria with 26.3 percent. The lowest two were the Czech Republic with 13.4 percent and Slovakia with 14.2 percent. As shown by the Lackó figures, Macedonia had the largest shadow economy, at 40.4 percent, followed by Croatia with 39 percent. According to Lackó, the smallest two were Slovenia with 28.5 percent and the Czech Republic with 28.7 percent.

Whereas for the countries of the former Soviet Union a substantial increase took place between the periods of 1990–93 and 1994–95, the average size of the shadow economy of central and eastern European transition states remained stable between those two periods. The Johnson-Kaufmann-Shleifer figures show an average shadow

4. For the first period, 1989–90, the results can be viewed only as very crude, because of the collapse of the communist regimes that took place in 1989 and 1990.

5. The period 1989–90 is not discussed here because the Soviet Union was beginning to break up during those years.

economy of the central and eastern European states of 20.6 (Lackó 32.4) percent for the earlier period and 20.9 (Lackó 31.6) percent for the later period.

For the twenty-one OECD Western-type countries, either the currency demand method or the physical-input (electricity) method was used to generate estimates of the size of the shadow economy between 1989 and 1993. The results appear in table 6. Considering the period 1990–93, the southern European countries had the largest shadow economies: Greece, 27.2 percent; Italy, 24 percent; Spain, 17.3 percent; and Portugal, 15.6 percent (although Belgium, at 20.8 percent, occupied the same range). At the lower end of the ranking stood the United States (8.2 percent), Switzerland (6.9 percent), and Austria (6.1 percent).

In general, the foregoing estimates indicate that the shadow economy all over the world has grown recently and has now reached considerable size. At least for the OECD countries, the overall tax and social security burden is positively associated with the size of the shadow economy. Unless policy makers are prepared to accept continued growth of the shadow economy, they will have to consider reducing the burden of taxes and social security contributions.

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Table 1: Size of the Shadow Economy in OECD Countries, 1994–1998

Country	Percentage of GDP Attributable to Shadow Economy (based on currency demand method)					
	1994	1995	1996	1997	1998	1999
Greece	26.0	26.6	28.5	28.7	29.0	
Italy	25.8	26.2	27.0	27.3	27.8	
Spain	22.3	22.6	22.9	23.1	23.4	
Belgium	21.4	21.6	21.9	22.4	22.6	
Sweden	18.3	18.9	19.2	19.8	20.0	
Norway	17.9	18.5	18.9	19.4	19.7	
Denmark	17.6	18.1	18.3	18.1	18.4	
Ireland	15.3	15.6	15.9	16.1	16.3	
Canada	14.6	15.0	15.1	14.8	15.0	
France	14.3	14.8	14.9	14.7	14.9	
Germany	13.1	13.9	14.5	15.0	14.7	15.9
Netherlands	13.6	14.1	14.0	13.5	13.5	
Australia	13.0	13.2	14.0	13.9	14.1	
Great Britain	12.4	12.6	13.1	13.0	13.0	
United States	9.4	9.0	8.8	8.8	8.9	
Austria	6.7	7.3	8.3	8.9	9.1	9.6
Switzerland	6.6	6.9	7.5	8.1	8.0	8.3

Source: Author's calculations.

Table 2: Size of the Shadow Economy and Burden of Taxes and Social Security Contributions in OECD Countries, 1996

Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Greece	28.5	18.0	11.0	15.8	27.5	43.3	54.3	72.3
Italy	27.0	19.0	12.0	9.9	32.0	41.9	53.9	72.9
Spain	22.9	16.0	13.0	6.6	31.6	38.2	51.2	67.2
Belgium	21.9	21.0	19.0	10.0	26.0	36.0	55.0	76.0
Sweden	19.2	25.0	20.0	4.0	29.6	33.6	53.6	78.6
Norway	18.9	23.0	19.0	7.0	12.8	19.8	38.8	61.8
Denmark	18.3	25.0	36.0	9.0	0.0	9.0	45.0	70.0
Ireland	15.9	21.0	20.0	7.2	12.3	19.5	39.5	60.5
Canada	14.6	7.0	21.0	7.0	8.0	13.0	34.0	43.0
Germany	14.5	15.0	18.0	16.1	16.1	32.2	50.2	65.2
France	14.3	20.6	6.0	13.0	31.0	44.0	50.0	70.6
Netherlands	14.0	17.5	10.0	31.0	8.8	39.8	49.8	67.3
United Kingdom	13.1	17.5	16.0	10.7	10.2	21.4	37.4	54.9
United States	8.8	3.0	17.0	7.6	13.8	21.4	38.4	41.4
Austria	8.3	20.0	8.0	18.2	24.2	42.4	50.4	70.4
Switzerland	7.5	6.5	10.0	11.6	11.6	23.2	33.2	39.7

Note: All figures are percentages. Column headings are as follows: (1) Size of the shadow economy as percentage of GDP; (2) Value-added tax rate (for United States, average sales tax rate); (3) Average direct tax rate; (4) Social security contributions by employees' rate; (5) Social security contributions by employers' rate; (6) Total social security contributions rate (sum of columns 4 and 5); (7) Total social security contributions plus direct tax burden (sum of columns 3, 4, and 5); (8) Total tax and social security contributions burden (sum of columns 2, 3, 4, and 5). Average direct tax rate is calculated as the sum of all income taxes (plus payroll and manpower taxes) paid on wages and salaries (including income of self-employed) divided by gross labor costs of an average income earner. Social security contributions rates are calculated on the basis of the annual gross earnings of an average income earner.

Source: Author's calculations and Leebtritz, Thornton, and Bibbee 1997.

Table 3: Estimated Size of the Shadow-Economy Labor Force in Some OECD Countries, 1974–1998

Country or Group	Year	Participants	Participants	Size of
		(thousands of people) ^a	(% of labor force) ^b	Shadow Economy (% of GDP) ^c
Austria	1990–91	300	9.6	5.47
	1997–98	500	16.0	8.93
Denmark	1980	—	8.3	8.6
	1986	—	13.0	—
	1991	—	14.3	11.2
	1994	—	15.4	17.6
France	1975–82	800–1,500	3.0–6.0	6.9
	1997–98	1,400–3,200	6.0–12.0	14.7
Germany	1974–82	2000–3000	8.0–12.0	10.6
	1997–98	5,000	22.0	14.7
Italy	1979	4,000–7,000	20.0–35.0	16.7
	1997	6,600–11,400	30.0–48.0	27.3
Spain	1979–80	1,250–3,500	9.6–26.5	19.0
	1997–98	1,500–4,200	11.5–32.3	23.1
Sweden	1978	750	13.0–14.0	13.0
	1997	1,150	19.8	19.8
European Union	1978	10,000	—	14.5
	1997–98	20,000	—	—
OECD	1978	16,000	—	15.0
	1997–98	35,000	—	—

^aEstimated full-time jobs, including unregistered workers, illegal immigrants, and second jobs. The estimations are based either on surveys (e.g., in Denmark) or on a calculation using the value-added values of the shadow economies (subtracting all material supplies) and assuming certain average values of earnings per hour in the shadow economy.

^bPercentage of the population aged 20–69. In Denmark, percentage of the population aged 20–69, using survey method (percentage heavily engaged in shadow-economy activities).

^cCalculated using the currency demand approach.

Source: Schneider and Enste 2000.

Table 4: Size of the Shadow Economy as Percentage of GDP in Developing Countries

Country	Physical-Input (Electricity) Method Average 1989–90	Currency Demand Approach Average 1989–90	MIMIC Approach Average 1990–93
Africa			
Botswana	27.0	—	—
Egypt	68.0	—	—
Mauritius	20.0	—	—
Morocco	39.0	—	—
Nigeria	76.0	—	—
South Africa	—	9.0	—
Tanzania	—	31.0	—
Tunisia	45.0	—	—
Central and South America			
Argentina	—	—	21.8
Bolivia	—	—	65.6
Brazil	29.0	—	37.8
Chile	37.0	—	18.2
Colombia	25.0	—	35.1
Costa Rica	34.0	—	23.2
Ecuador	—	—	31.2
Guatemala	61.0	—	50.4
Honduras	—	—	46.7
Mexico	49.0	33.0	27.1 (35.1) ^a
Panama	40.0	—	62.1
Paraguay	27.0	—	—
Peru	44.0	—	57.4
Uruguay	35.2	—	—
Venezuela	30.0	—	30.8
Asia			
Cyprus	21.0	—	—
Hong Kong	13.0	—	—
India	—	22.4	—
Israel	29.0	—	—
Malaysia	39.0	—	—
Philippines	50.0	—	—
Singapore	13.0	—	—
South Korea	38.0	—	20.3
Sri Lanka	40.0	—	16.5
Taiwan	—	—	—
Thailand	71.0	—	—

^aThe figure of 35.1% for 1990–93 is calculated using the currency demand approach.

Source: Schneider and Enste 2000.

**Table 5: Size of the Shadow Economy
in Transition Countries, 1989–1995**

Country	Percentage of GDP Attributable to Shadow Economy, Calculated Using Physical-Input (Electricity) Method ^a					
	Average 1989–90 ^b		Average 1990–93		Average 1994–95	
Former Soviet Union						
Azerbaijan	21.9	(—)	33.8	(41.0)	59.3	(49.1)
Belarus	15.4	(—)	14.0	(31.7)	19.1	(45.4)
Estonia	19.9	(19.5)	23.9	(35.9)	18.5	(37.0)
Georgia	24.9	(—)	43.6	(50.8)	63.0	(62.1)
Kazakstan	17.0	(13.0)	22.2	(29.8)	34.2	(38.2)
Kyrgyzstan	—	(13.9)	—	(27.1)	—	(35.7)
Latvia	12.8	(18.4)	24.3	(32.2)	34.8	(43.4)
Lithuania	11.3	(19.0)	26.0	(38.1)	25.2	(47.0)
Moldova	18.1	(—)	29.1	(—)	37.7	(—)
Russia	14.7	(—)	27.0	(36.9)	41.0	(39.2)
Ukraine	16.3	(—)	28.4	(37.5)	47.3	(53.7)
Uzbekistan	11.4	(13.9)	10.3	(23.3)	8.0	(29.5)
<i>Average</i>	16.7	(16.2)	25.7	(34.9)	35.3	(43.6)
Central and Eastern Europe						
Bulgaria	24.0	(26.1)	26.3	(32.7)	32.7	(35.0)
Croatia	22.8	(—)	23.5	(39.0)	28.5	(38.2)
Czech Republic	6.4	(23.0)	13.4	(28.7)	14.5	(23.2)
Hungary	27.5	(25.1)	30.7	(30.9)	28.4	(30.5)
Macedonia	—	(—)	—	(40.4)	—	(46.5)
Poland	17.7	(27.2)	20.3	(31.8)	13.9	(25.9)
Romania	18.0	(20.9)	16.0	(29.0)	18.3	(31.3)
Slovakia	6.9	(23.0)	14.2	(30.6)	10.2	(30.2)
Slovenia	—	(26.8)	—	(28.5)	—	(24.0)
<i>Average</i>	17.6	(17.6)	20.6	(32.4)	20.9	(31.6)

^aValues are from Johnson, Kaufmann, and Shleifer 1997 and (in parentheses) from Lackó 1999.

^bFor the former Soviet Union states this column contains data for 1990 only.

Source: Schneider and Enste 2000.

**Table 6: Size of the Shadow Economy
as Percentage of GDP in OECD Countries**

Country	Physical-Input (Electricity) Method 1990	Currency Demand Method Average 1989–90	Currency Demand Method Average 1990–93
Australia	15.3	10.1	13.0
Austria	15.5	5.1	6.1
Belgium	19.8	19.3	20.8
Canada	11.7	12.8	13.5
Denmark	16.9	10.8	15.0
Finland	13.3	—	—
France	12.3	9.0	13.8
Germany	14.6	11.8	12.5
Great Britain	13.1	9.6	11.2
Greece	21.8	—	27.2
Ireland	20.6	11.0	14.2
Italy	19.6	22.8	24.0
Japan	13.2	—	8.5
Netherlands	13.4	11.9	12.7
New Zealand	—	9.2	9.0
Norway	9.3	14.8	16.7
Portugal	16.8	—	15.6
Spain	22.9	16.1	17.3
Sweden	11.0	15.8	17.0
Switzerland	10.2	6.7	6.9
United States	10.5	6.7	8.2
<i>Average</i>	15.1	11.9	13.5

Source: Schneider and Enste 2000.

Acknowledgments: This article draws on findings discussed at much greater length in Schneider and Enste 2000.