

**Size and Development of the Shadow  
Economy in Germany and Austria:  
Some preliminary findings**

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# **Size and Development of the Shadow Economy in Germany and Austria: Some preliminary findings<sup>\*)</sup>**

by

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## **Abstract:**

The size and development of the shadow economy of Germany and Austria is estimated, using various estimation procedures. An increased burden of taxation and social security payments, combined with intensive labor market regulation, quality of state institutions and the tax morale are the driving forces for the shadow economy. Moreover, the results of recent surveys for Germany and Austria demonstrate, that the readiness to undertake illicit employment as well as its acceptance are high in both countries. Finally, conclusions are made about the effect of the shadow economy on the official one and incentive oriented policy means are presented, so that the “black” value added can be transformed into official value added.

JEL class: O17, O5, D78, H2, H26.

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# 1. Introduction

The intensive discussion about the development of the shadow economy and illicit employment, that has been taking place over the last ten years, has been far from conclusive. On the one hand, it has been argued that illicit employment is partially responsible for such problems as increasing unemployment in the official sector, growing public debt and national pension deficit. On the other hand, it has been claimed that illicit employment is the individual's escape from unjust and burdensome restraints imposed by the government. Thus, the migration into the shadow employment is seen as a reaction to excessive constraints created by public institutions and bureaucracy.<sup>1</sup> Furthermore, as argued by sociologists and economists, the shadow economy generates a considerable share of social welfare in many countries. For example, the shadow economy is estimated to account for well above 25% of Italy's official GDP.

This study has two major goals: The first is to show the development and the size of the shadow economy of Austria and Germany, using different estimation procedures and to elaborate on the driving forces of the shadow economy. The second is to discuss policy measures to reduce the shadow economy. Section 2 contains some theoretical considerations about the shadow economy and section 3 describes the public opinion about the shadow economy, as well as first estimates using the survey method. Section 4 presents an econometric estimation of the shadow economy in OECD countries. Section 5 shows the size and development of the German and Austrian shadow economy in terms of value added but also the shadow economy labour force is presented. Section 6 contains policy measures for reducing the shadow economy in Germany and Austria. Finally, section 7 provides three policy conclusions.

## 2. Some Theoretical Considerations about the Shadow Economy

### 2.1. Defining the Shadow Economy

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<sup>1</sup> See Schneider and Badekow (2006).

Most authors trying to measure the shadow economy face the difficulty of how to define it<sup>2</sup>. One commonly used working definition is all currently unregistered economic activities that contribute to the officially calculated (or observed) Gross National Product<sup>3</sup>. 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 avoid government regulation, taxation or observation"<sup>4</sup>. As these definitions still leave open a lot of questions, table 2.1 is helpful for developing a better feeling for what could be a reasonable consensus definition of the underground (or shadow) economy.

From table 2.1, it becomes clear that a broad definition of the shadow economy includes unreported income from the production of legal goods and services, either from monetary or barter transactions – and so includes all economic activities that would generally be taxable were they reported to the state (tax) authorities. In this paper the following more narrow definition of the shadow economy is used<sup>5</sup>. 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 labour market standards, such as minimum wages, maximum working hours, safety standards, etc., and
- (4) to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms.

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<sup>2</sup> This paper focuses on the size and development of the shadow economy for countries as one unit and does not show any disaggregated values for specific regions. Lately some first studies were undertaken to measure the size of the shadow economy as well as the "grey" or "shadow" labour force for urban regions or states (e.g. California). Compare e.g. Marcelli, Pastor and Joassart (1999), Marcelli (2004), Chen (2004), Williams (2004a, b, 2005a, b, 2006), Williams and Windebank (1998, 2001a, b), Fleming, Hayolamak, and Jossart (2005) and Alderslade, Talmage and Freeman (2006), and Brueck, Haisten-DeNew and Zimmermann (2006).

<sup>3</sup> 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 Buehn, Karmann und Schneider (2007) and Karmann (1986, 1990).

<sup>4</sup> This definition is taken from Del'Anno (2003), Del'Anno and Schneider (2004) and Feige (1989); see also Thomas (1999), Fleming, Roman and Farrell (2000).

<sup>5</sup> Compare also the excellent discussion of the definition of the shadow economy in Pedersen (2003, pp.13-19) and Kazemier (2005a) who use a similar one.

Hence, I will not deal with typical underground, economic (classical crime) activities, which are all illegal actions that fit the characteristics of classical crimes like burglary, robbery, drug dealing, etc. I also exclude the informal household economy which consists of all household services and production. I also do not focus on tax evasion or tax compliance, where already a lot of research has been undertaken<sup>6</sup>.

**Table 2.1: A Taxonomy of Types of Underground Economic Activities<sup>1)</sup>**

Type of Activity	Monetary Transactions		Non Monetary Transactions	
<b>Illegal Activities</b>	Trade with stolen goods; drug dealing and manufacturing; prostitution; gambling; smuggling; fraud; etc.		Barter of drugs, stolen goods, smuggling etc. Produce or growing drugs for own use. Theft for own use.	
	<b>Tax Evasion</b>	<b>Tax Avoidance</b>	<b>Tax Evasion</b>	<b>Tax Avoidance</b>
<b>Legal Activities</b>	Unreported income from self-employment; wages, salaries and assets from unreported work related to legal services and goods	Employee discounts, fringe benefits	Barter of legal services and goods	All do-it-yourself work and neighbour help

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

## 2.2. Measuring the shadow economy

The definition of the shadow economy plays an important role in assessing its size. By having a clear definition, one can avoid a number of ambiguities and controversies. In general, there are two types of underground economic activity: illicit employment and the production of goods and services consumed within the household.<sup>7</sup> The following analysis focuses on the former type and excludes illegal activities such as drug production, crime and human trafficking. The latter type includes the production of goods and services, consumed within the household or childcare and is not part of this analysis either. Thus, it only focuses on economic activities that would normally be included in national accounts but which due to tax or

<sup>6</sup> Compare, e.g. the survey of Andreoni, Erard and Feinstein (1998) and the paper by Kirchler, Maciejovsky and Schneider (2002).

<sup>7</sup> For a broad discussion of the definition issue see, for example, Thomas (1992); Schneider, Volkert and Caspar (2002), Schneider and Enste (2002, 2006) and Kazemier (2005a,b).

regulatory burden remain underground. Although such legal activities contribute to the country's value creation, they are not captured in the national accounts because they are produced in illicit ways (e.g. by people without proper qualification or without a master craftman's certificate). From the economic and social perspective, soft forms of illicit employment, such as moonlighting (e.g. construction work in private homes) and its contribution to value creation can be assessed rather positively.

Although the issue of the shadow economy has been investigated for a long time, the discussion regarding the "appropriate" methodology to assess its scope has not come to an end yet.<sup>8</sup>

There are three methods of assessment:

- (1) Direct procedures that are carried out at the micro level and aim at determining the size of the shadow economy at one particular point of time. An example of this method are surveys.
- (2) Indirect procedures that make use of macroeconomic indicators proxying the development of the shadow economy over time.
- (3) Statistical models that use statistical tools to estimate the shadow economy as an "unobserved" variable.

The estimation of the shadow economy of Austria and Germany is firstly based on a combination of the currency demand method and the DYMIMIC-procedure and secondly on the survey method<sup>9</sup>. The latter assumes that the shadow economy remains an unobserved phenomenon which can be estimated using quantitatively measurable causes of illicit employment, e.g. tax burden and regulation intensity, and indicators reflecting illicit activities, e.g. currency demand and official work time. A disadvantage of the DYMIMIC procedure is the fact that it produces only relative estimates of the size and the development of the shadow economy. Thus, the currency demand method<sup>10</sup> is used to calibrate the relative estimates into absolute ones by using two or three absolute values of the absolute size of the shadow economy.

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<sup>8</sup> See Bhattacharyya (1999); Dixon (1999); Feige (1989); Giles (1999); Schneider (1986, 2001, 2003, 2005, 2006); Schneider and Enste (2000a; 2000b, 2002, 2006); Tanzi (1999); Thomas (1992; 1999).

<sup>9</sup> These methods are presented in detail in Schneider (1994, 2005) and Schneider and Enste (2000b, 2002, 2006). Furthermore, these studies discuss advantages and disadvantages of the DYMIMIC- and the money demand methods and other estimation methods for assessing the size of illicit employment.

<sup>10</sup> 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

## **2.3. The Main Causes of Determining the Shadow Economy**

### **2.3.1. Tax and Social Security Contribution Burdens**

In almost all studies<sup>11</sup> it has been ascertained that the tax and social security contribution burdens are among the main causes for the existence of the shadow economy. Since taxes affect labour-leisure choices, and also stimulate labour 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 labour in the official economy and the after-tax earnings (from work), the greater is the incentive to avoid this difference and to work in the shadow economy. Since this difference depends broadly on the social security burden/payments and the overall tax burden, they are key features of the existence and the increase of the shadow economy.

But even major tax reforms with major tax rate deductions will not lead to a substantial decrease of the shadow economy<sup>12</sup>. Such reforms will only be able to stabilize the size of the shadow economy and avoid a further increase. Social networks and personal relationships, the high profit 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 of the influence of the tax burden on the shadow economy is provided in the studies of Schneider (1994b, 2000, 2004, 2005) and Johnson, Kaufmann and Zoido-Lobaton (1998a, 1998b); they all found statistically significant evidence for the influence of taxation on the shadow economy. This strong influence of indirect and direct taxation on the shadow economy is further demonstrated by discussing empirical results in the case of Austria and the Scandinavian countries. For Austria the driving force for the shadow economy activities is the direct tax burden (including social security payments); it has the biggest influence, followed by the intensity of regulation and complexity of the tax system. A similar result has been

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shadow economy. Based on this the calculated difference is multiplied by the velocity of money and one gets a value added figure for the shadow economy.

<sup>11</sup> See Thomas (1992); Lippert and Walker (1997); Schneider (1994a,b, 1997, 1998a,b, 2000, 2003, 2005); Johnson, Kaufmann, and Zoido-Lobaton (1998a,1998b); Tanzi (1999); Giles (1999a); Mummert and Schneider (2001); Giles and Tedds (2002) and Dell'Anno (2003), just to quote a few recent ones.

<sup>12</sup> 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; hence for a considerable part of the tax payers the actual tax and regulation burden remained unchanged.

achieved by Schneider (1986) for the Scandinavian countries (Denmark, Norway and Sweden). In all three countries various tax variables: average direct tax rate, average total tax rate (indirect and direct tax rate) and marginal tax rates have the expected positive effect (on currency demand) and are highly statistically significant. These findings are supported by studies of Kirchgassner (1983, 1984) for Germany and by Klovland (1984) for Norway and Sweden, too.

### **2.3.2. Intensity of Regulations**

Increased intensity of regulations is another important factor which reduces the freedom (of choice) for individuals engaged in the official economy<sup>13</sup>. One can think of labour market regulations, trade barriers, and labour restrictions for foreigners. Johnson, Kaufmann, and Zoido-Lobato (1998b) find significant overall empirical evidence of the influence of (labour) regulations on the shadow economy; and the impact is clearly described and theoretically derived in other studies, e.g. for Germany (Deregulation Commission 1990/91). Regulations lead to a substantial increase in labour costs in the official economy. But since most of these costs can be shifted to the employees, these costs provide another incentive to work in the shadow economy, where they can be avoided. Empirical evidence supporting the model of Johnson, Kaufmann, and Shleifer (1997), which predicts, inter alia, that countries with more general regulation of their economies tend to have a higher share of the unofficial economy in total GDP, is found in their empirical analysis. A one-point increase of the regulation index (ranging from 1 to 5, with 5 being/equalling the most regulation in a country), ceteris paribus, is associated with an 8.1 percentage point increase in the share of the shadow economy, when controlled for GDP per capita (Johnson et. al. (1998b), p. 18). They conclude that it is the enforcement of regulation which is the key factor for the burden levied on firms and individuals, and not the overall extent of regulation - mostly not enforced - which drives firms into the shadow economy. Friedman, Johnson, Kaufmann and Zoido-Lobato (1999) reach a similar conclusion. In their study every available measure of regulation is significantly correlated with the share of the unofficial economy and the estimated sign of the relationship is unambiguous: more regulation is correlated with a larger shadow economy. A one point increase in an index of regulation (ranging from 1-5) is associated with a 10% increase in the shadow economy for 76 developing, transition and developed countries.

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<sup>13</sup>See for a (social) psychological, theoretical foundation of this feature, Brehm (1966, 1972), and for a (first) application to the shadow economy, Pelzmann (1988).

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

### **2.3.3. Public Sector Services**

An increase of 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 the tax rates for firms and individuals in the official sector, quite often combined with a deterioration in the quality of the public goods (such as the public infrastructure) and of the administration, with the consequence of even stronger incentives to participate in the shadow economy. Johnson, Kaufmann, and Zoido-Lobaton (1998a/b) present a simple model of this relationship. Their findings show that smaller shadow economies appear in countries with higher tax revenues if achieved by lower tax rates, fewer laws and regulations and less bribery facing enterprises. Countries with a better rule of 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 higher 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, Kaufmann and Zoido-Lobaton 1998a p. I).

### **2.3.4. Summary of the Main Causes of the Shadow Economy**

In table 2.2 an overview of a number of empirical studies summarizes the various factors influencing the shadow economy. In table 2.2 two columns are presented, showing the various factors influencing the shadow economy with and without the independent variable, "tax morale". This table clearly demonstrates that the increase of tax and social security contribution burdens is by far most important single contributor to the increase of the shadow economy.

This factor does explain some 35–38% or 45–52% of the variance of the shadow economy with and without including the variable "tax morale". The variable tax moral accounts for some 22–25% of the variance of the shadow economy<sup>14</sup>, and finally there is a third factor, "intensity of state regulation "(mostly for the labour market). In general table 2.2 shows that the independent variables tax and social security burden, followed by variables tax morale and intensity of state regulations are the three major driving forces of the shadow economy.

**Table 2.2: Main Causes of the Increase of the shadow economy**

Factors influencing the shadow economy	Influence on the shadow economy (in %)	
	(a)	(b)
<b>(1) Increase of the Tax and Social Security Contribution Burdens</b>	<b>35-38%</b>	<b>45-52%</b>
<b>(2) Intensity of State Regulations</b>	<b>8-10%</b>	<b>10-15%</b>
<b>(3) Social Transfers</b>	<b>5-7%</b>	<b>5-8%</b>
<b>(4) Specific Labour Market Regulations</b>	<b>5-7%</b>	<b>5-8%</b>
<b>(5) Public Sector Services</b>	<b>5-7%</b>	<b>5-8%</b>
<b>(6) Tax Morale</b>	<b>22-25%</b>	<b>-</b>
<b>Overall influence</b>	<b>76-94%</b>	<b>70-90%</b>
<b>(a) Average values of 15 studies</b>		
<b>(b) Average values of empirical results of 28 studies.</b>		
Source: Schneider (2004)		

## 3. Public Opinion about the Shadow Economy

### 3.1 Germany

The perception of citizens/voters about the shadow economy and their (moral) reaction to this phenomenon is also an important factor, i.e. under which circumstances people decide to work in the shadow economy. There are a number of empirical studies which investigate the tax morale of people and their attitudes towards the shadow economy<sup>15</sup>. In this section some results for Germany are shown which clearly demonstrate that people have no bad (moral)

<sup>14</sup> The importance of this variable with respect to theory and empirical relevance is also shown in Feld and Frey (2002, 2002a and 2005), Frey (1997), and Torgler and Schneider (2005)

<sup>15</sup> Compare Halla and Schneider (2005), Torgler (2002), Torgler and Schneider (2005), Feld and Frey (2005), and Feld and Larsen (2005).

feeling when working in the shadow economy. In table 3.1 for the year 2007 it is investigated whether people regularly work in the shadow economy or not. 20.7% of the German respondents say "yes", and 30.8% of the respondents regularly demand shadow economy activities. In table 3.2 some reasons are asked for why shadow economy activities are demanded. The most important result is, one saves money – or shadow economy activities are much cheaper than the official ones. The second most important reason is that tax and social security burden is too high (73% of the respondents) and reason number 3 is that due to the much higher labour costs in the official economy one would not demand these activities. Especially the third answer is interesting, because this result clearly demonstrates that only 22% of the demanded shadow economy activities have substitutive character (i.e. they would be demanded in the official economy if there would be no shadow economy) and 30% of the respondents answer that they would do it themselves. From this survey result one can conclude that roughly 48% of these activities would not take place if there were no shadow economy. In table 3.3 examples of some hourly wage rates of shadow economy activities in Germany are shown and what is surprising here is the huge range of wage rates in the shadow economy, for example the varying "price" for an hour of shadow market work by a painter ranges from € 9 to € 17. Table 3.3 clearly demonstrates also the large difference (a multiplicative factor between 4 and 5) between the wage rates in the shadow economy and in the official one.

In table 3.4 important attitudes held by Germans regarding what may be classified as a "Kavaliersdelikt" are shown<sup>16</sup>). These results convincingly demonstrate for the years 1996 to 2003 that roughly two thirds of the German population treat shadow economy activities as a "Kavaliersdelikt", whereas only a third treats a small theft such as "stealing a newspaper from a box", as a "Kavaliersdelikt". In table 3.5 value statements of the German population with respect to the shadow economy are shown, and again, two thirds say that without shadow economy earnings one can not keep the achieved standard of living and only a third of the population asked finds that shadow economy activities lead to great losses of tax revenues and social security payments to the state. What are most amazing in table 3.5 are the attitudes of the German population with respect to punishment of shadow economy activities: only between 9% and 3% of the asked German population questioned are convinced that shadow economy workers should be reported to the authorities and prosecuted! One gets a similarly low figure when asking whether a shadow economy worker is detected, he should be severely punished. Only between 7% and 3% of those asked say, "yes". This clearly shows that there is no bad

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<sup>16</sup> "Kavaliersdelikte": in english: peccadillos

(moral) feeling about working in the shadow economy among the German population. The results are quite similar for Austria.

**Table 3.1: Work in the Shadow Economy – Survey Results for 2007**

(1) Do you work regularly in the shadow economy?	Values in percent
No	77,3
Yes	20,7 (25% male, 16% female)
No answer	2
(2) Do you regularly demand shadow economy activities?	Values in percent
No	69,2
Yes	30,8 (35.4% male, 26.5% female)
Representative questionnaire, Germany, January 2007 Source: IDW Koeln, Germany	

**Table 3.2: Reasons for Shadow Economy Activities – Survey Results for Germany, January 2007**

Reasons why shadow economy activities are demanded	Values in percent
(1) One saves money – or they are much cheaper than the official ones	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 demand these activities (extreme assumption: <i>no shadow economy – 22% demand in the official economy; 30% do-it-themselves; and 48% no demand at all!</i> )	68%
(4) The firms offer them themselves	52%
(5) It's so easy to get quick and reliable workers	31%
Representative questionnaire, Germany, January 2007, Source: IDW Koeln	

**Table 3.3: Hourly wage rates of shadow economy activities – Survey Results for Germany, 2004**

Activity/Type of Worker	Town/Area	Wage rate in the shadow economy (in €)	Wage rate in the official economy (in €)
Painter	Berlin	10 – 17	42
	München	9 – 15	
	Rhein/Rhur	10 – 12	
Mechanics	Hamburg	13 – 23	58
	Berlin	15 – 19	
	München	15 – 23	
Cost of moving household furniture and other goods (distance 300km)	Berlin	300 – 380	1.800
	München	400 – 450	
	Rhein/Rhur	350 – 420	
Representative questionnaire, May 2003, Source: Schneider (2004)			

**Table 3.4: Values/Attitudes of the German population regarding the shadow economy**  
**Question: What are "Kavaliersdelikte" (negligible delicts)?**

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

**Table 3.5: Value Judgements/Attitudes from the German population regarding the Shadow Economy**

Statement	German Population (in % 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's/government's 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 taken advantage of shadow economic activities	26	38	34	36	39
Due to shadow economic activities the state loses a great amount of tax revenues and social security payments	29	25	30	28	26
In the neighbourhood one can observe a significant number of shadow economic 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 3.6: A comparison of the size of the German Shadow Economy using the survey and the DYMIMIC-method, year 2006.**

Various kinds of shadow economy activities/values	Shadow Economy in % of official GDP	Shadow Economy in bill. Euro	Fictive jobs (full time equivalent) millions	% share of the overall shadow economy
(1) Shadow economy activities from labour (hours worked)	5.0 – 6.0	117 – 140	2.1 – 2.4	33 – 40
(2) Material (used)	3.0 – 4.0	70 – 90	1.2 – 1.5	20 – 25
(3) Illegal activities (goods and services)	4.0 – 5.0	90 – 117	1.5 – 2.1	25 – 33
(4) already in the official GDP included illegal activities	1.0 – 2.0	23 – 45	0.4 – 0.8	7 - 13
<b>Sum (1) to (4)</b>	<b>13.0 – 17.0</b>	<b>300 – 392</b>	<b>5.2 – 6.8</b>	<b>85 – 111</b>
<b>Overall (total) shadow economy (estimated by the DYMIMIC and calibrated by the currency demand procedure)</b>	<b>15.0</b>	<b>340</b>	<b>6.0</b>	<b>100</b>

Source: Enste/Schneider 2006 and own calculation.

Finally, in table 3.6, a comparison between the size of the German shadow economy, using the survey and the DYMIMIC method, is undertaken. Also an attempt is made to explain the quite often observed, large differences using a macro (DYMIMIC) and/or currency demand approach to estimate the size of the German shadow economy; e.g. for 2006, we obtain a value of 15% of “official” GDP. Using the survey method, in which the value added of shadow economy from labour activities is captured, one obtains a value between 5 and 6%<sup>17)</sup>. Hence, there is quite a huge difference. The first difference originates from the survey method, where usually not the total overall value added is asked, but only the value added of shadow economy work. If one adds material, one might come up with another 3-4% and one has to add other illegal activities (prostitution, gambling and totally illegal working firms in the construction sector). Hence, one has to add another 4-5% of the size of these activities measured in per cent of official GDP. Finally, official national account authorities (also in Germany) add (or include) already some shadow economy activities in the “official” GDP, so one has to include another 1-2% black activities to official GDP, which sums up roughly to 15%. One also realizes that if one measures these different kinds of shadow activities in per cent of overall shadow economy activities that shadow economy activities from labour (hours worked) has the biggest size with 33-40%, followed by illegal activities in the shadow econ-

<sup>17)</sup> Compare also Figure 5.1, where the values using the survey method by Feld and Larsen (2005) vary between 3–4% of “official” GDP.

omy with a size of 25-35%. Table 3.6 quite nicely demonstrates how the differences between the size of the shadow economy using the survey method and compared with the macro approach DYMIMIC and/or currency demand can be explained.

## 3.2 Austria

In Austria, in November 2002, I undertook a representative questioning of the population to reach two goals: The first is to get some information about the reaction of the Austrian public towards shadow economy and the second is to estimate the size of the shadow economy in the construction and craftsman sector (including repairing) considering three groups.

1. A representative sample of the Austrian population between 16 and 65 years old,
2. 55 self-declared shadow economy workers in the construction and craftsmen sector, and
3. 320 managers (owners) of construction and craftsmen firms.

The following results were gained: (1) Among the Austrian population (potential labour force) are 918,000 Austrians who supplied shadow economy activities in the construction and craftsmen sector. Their average hourly earning in the shadow economy varies between €15.30 and €15.60, and the average yearly income from shadow economy activities varies between €1,117.00 and €1,142.00. This means that 73 hours per year were worked in the shadow economy.

(2) Among the 55 self-declared shadow economy workers I got a wage rate of €11.50 per hour and annual earnings in the shadow economy of €2,480.00 using the fact that these groups worked 245 hours per year in the shadow economy.

(3) Managers (owners) of construction and craftsmanship firms report a wage rate for shadow economy workers of €17 per hour and average earnings per year of €4,590.00, assuming that 270 hours per year were used for shadow economy activities by their employees/workers. The questioned managers also state: 21% of the managers questioned also stated that more than 50% of their employees work in the shadow economy, 41% indicated a figure of less than 50% and 34% reported that no-one in the firm works in the shadow economy. To summarize, 62% of the managers acknowledge that a large percentage of their employees work in the shadow economy. Further results are that 7% of the managers think that their employees work between 0 and 2 hours per week in the shadow economy; 29% assume that they work between 6 and 10 hours, 28% between 3 and 5 hours and 14% think that their employees work more than 10 hours per week in the shadow economy; 22% of all managers have no knowledge of

this fact. In principle 39% of managers are not in favour (do not support) moonlighting by their workers and 61% are in favour (do support) - an amazingly high percentage!

Finally in table 3.7 the aggregate values of the size of the shadow economy in the construction and craftsmen sector in the year 2002 are presented, based on questionnaire findings. Table 3.7 clearly demonstrates that the size of the shadow economy in the construction and craftsmen sector varies considerably from a total value of €2.6 billion up to €4.2 billion. These differences originate from different hourly wages rates, ranging from €11.50 to €17 and from the different amount of hours worked per year in the shadow economy ranging from 245 to 270. Hence the survey method "covers" between 31.2% and 50.9 % of the value obtained by a macro approach (mimic method). These results still leave a considerable leeway, but the rather large differences may be explained by the following facts:

1. Table 3.7 contains earnings and not the value added of the shadow economy.
2. Shadow economy demanders are overwhelmingly households, the whole area of the shadow economy activities between firms (which are especially a problem in the construction and craftsmen sectors) are not considered.
3. All foreign shadow economy activities achieved by foreigners (illegal immigrants) are not considered.
4. The amount earned in the shadow economy (hourly wage rate and hours worked per year), varies considerably.

### **3.3 Summary**

The results for Germany and Austria, shortly discussed in recent surveys, clearly show that the readiness to undertake illicit employment as well as its acceptance are high in both countries. More than one half of the population would demand goods or services produced in the shadow economy if given such an opportunity. In other words, if asked whether he/she "needs a receipt/bill?", every second person would answer "no", saving at least the value-added tax. Around one third of the population is illicitly employed and, as a result, avoids paying high taxes and other contributions and escapes the rigidity of regulations.<sup>18)</sup>

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18) See also Lamnek, Olbrich and Schäfer (2000).

**Table 3.7: Size of the supplied shadow economy in the construction and craftsmen sector, Austria 2002, based on the questionnaire findings**

Variable/Indicator	Worked hours and earning in the shadow economy			
	results from declared moonlighters (1)	results from managers of construction and craftsmen firms (2)	results from declared moonlighters (3)	results from managers of construction and craftsmen firms (4)
Ø hourly shadow economy wage rate	€11.5	€17	€11.5	€17
Ø average yearly earning	€2,814	€4,165	€3,105	€4,590
Ø amount of hours worked in the shadow economy per year per worker	245	245	270	270
Ø aggregated yearly amount of hours worked in the shadow economy 1)	225.1 million	225.1 million	248.1 million	248.1 million
Total earnings of the shadow economy in the year 2002	€2,588.65 million	€3,826.7 million	€2,853.15 million	€4,217.7 million
Total shadow economy earnings in % of the value added of the shadow economy in the construction and craftsmanship sector (including repairing); absolute value €8,284 billion in 2002	31.2	46.1	34.4	50.9

1) Basis of the calculation: 918,864 shadow economy workers in the construction and craftsmen sector. Source: Own calculations.

## 4. Econometric Estimation of the Shadow Economy in OECD-Countries

Using the theoretical considerations in section 2, I develop the following seven hypotheses, which will be empirically tested below:

1. An increase in direct and indirect taxation increases the shadow economy, ceteris paribus
2. An increase in social security contribution increases the shadow economy, ceteris paribus.

3. The more the country is regulated, the greater the incentive is to work in the shadow economy, *ceteris paribus*.
4. The lower the quality of state institutions, the higher the incentive to work in the shadow economy, *ceteris paribus*.
5. The lower the tax morale, the higher the incentive to work in the shadow economy, *ceteris paribus*.
6. The higher the unemployment, the more people engage in shadow economy activities, *ceteris paribus*.
7. The lower the GDP per capita in a country, the higher is the incentive to work in the shadow economy, *ceteris paribus*.

In table 4.1 the econometric estimation using the DYMIMIC approach (latent estimation approach) is presented for 21 OECD-countries. For these countries I have eight data points for 1990/91, 1994/95, 1997/98, 1999/2000, 2001/02, 2002/03, 2003/04 and 2004/05. Besides the usual cause variables like direct and indirect taxation, social security contribution and regulation, I have three additional cause variables, tax morale (an index), quality of state institutions and the burden of social security payments (in % of official GDP). Besides the unemployment quota, annual rate of GDP and change of currency per capita, I use as an additional indicator variable the average working time (per week)<sup>19</sup>. The estimated coefficients of all eight cause 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. Also the independent variable quality of state institutions is statistically significant and quite important to determine whether one is engaged in shadow economy activities or not. Also the development of the official economy measured in unemployment and GDP per capita has a quantitatively important influence on the shadow economy. Turning to the indicator variables they all have a statistically significant influence and the estimated coefficients have the theoretically expected signs. The quantitatively most important independent variables are the employment quota and change of currency per capita<sup>20</sup>. Summarizing, the econometric results demonstrate that in these OECD countries the social security contributions and the share of direct taxation have the biggest influence, followed by tax morale and the quality of state institutions.

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<sup>19</sup> Using this indicator variable one has the problem that, of course, this variable is influenced by state regulation, so that this variable is not really exogenous; hence the estimation may be biased.

<sup>20</sup> The variable currency per capita or annual change of currency per capita is heavily influenced by banking innovations; hence this variable is pretty unstable with respect to the length of the estimation period. Similar problems are already mentioned by Giles (1999a) and Giles and Tedds (2002).

**Table 4.1: DYMIMIC Estimation of the Shadow Economy of 21 highly developed OECD Countries, 1990/91, 1994/95, 1997/98, 1999/2000, 2001/02, 2002/03, 2003/04 and 2004/05.**

<b>Cause Variables</b>	<b>Estimated Coefficients</b>
Share of direct taxation (in % of GDP)	$\lambda_1 = 0.384^{**}$ (3.06)
Share of indirect taxation (in % of GDP)	$\lambda_2 = 0.196^{(*)}$ (1.84)
Share of social security contribution (in % of GDP)	$\lambda_3 = 0.506^{**}$ (3.86)
Burden of state regulation (index of labour market regulation, Heritage Foundation, score 1 least regular, score 5 most regular)	$\lambda_4 = 0.213^{(*)}$ (1.96)
Quality of state institutions (rule of law, World Bank, score -3 worst and +3 best case)	$\lambda_5 = -0.307^*$ (-2.61)
Tax morale (WUS and EUS, Index, Scale tax cheating always justified =1, never justified =10)	$\lambda_6 = -0.582^{**}$ (-3.66)
Unemployment quota (%)	$\lambda_7 = 0.324^{**}$ (2.61)
GDP per capita (in US-\$)	$\lambda_8 = -0.106^{**}$ (-3.04)
Lagged endogenous variable	$\lambda_9 = -0.165^{(*)}$ (-1.66)
<b>Indicator Variables</b>	<b>Estimated Coefficients</b>
Employment quota (in % of population 18-64)	$\lambda_{10} = -0.626^{**}$ (-2.72)
Average working time (per week)	$\lambda_{11} = -1.00$ (Residuum)
Annual rate of GDP (adjusted for the mean of all 22 OECD countries)	$\lambda_{12} = -0.274^{**}$ (-3.03)
Change of local currency per capita	$\lambda_{13} = 0.312^{**}$ (3.74)
<b>Test-statistics</b>	$RMSE^1 = 0.0016^*$ (p-value = 0.903) $Chi-square^2 = 26.43$ (p-value = 0.906) $TMCV^3 = 0.049$ $AGFI^4 = 0.763$ $N = 168$ $D.F.^5 = 67$

Notes:

t-statistics are given in parentheses (\*); \*, \*\* means the t-statistics are 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 3.1.1-3.1.3 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.

In order to calculate the size and development of the shadow economies of Austria and Germany and of the remaining 19 OECD countries, I have to overcome the disadvantage of the DYMIMIC approach, which is that one gets only relatively estimated sizes of the shadow economy and one has to use another approach to get absolute figures. Hence, for the calculation of the absolute size of the shadow economies from these DYMIMIC estimation results, I use the already available estimations from the currency demand approach for Austria, Germany, Italy and the United States (from studies of Del'Anno and Schneider (2004), Bajada and Schneider (2003, 2005), and Schneider and Enste (2002)). As I have values of the shadow economy (in % of GDP) for various years for the above mentioned countries, I can use them in a benchmark procedure to transform the index of the shadow economy from the DYMIMIC estimations into cardinal values.<sup>21</sup>

## **5. The development and size of the shadow economy in German-speaking and other OECD-countries**

### **5.1. Short Literature Review**

Existing estimates of the German shadow economy (measured in percentage of official GDP) are shown in Table 5.1.<sup>22</sup> The oldest estimate uses the survey method of the Institute for Demoscopy (IfD) in Allensbach, Germany and shows that the shadow economy was 3.6% of official GDP in 1974. In a much later study, Feld and Larsen (2005) undertook an extensive research project using the survey method to estimate shadow economic activities in the years

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<sup>21</sup> This procedure is described in great detail in the paper Del'Anno and Schneider (2003).

<sup>22</sup> A similar table can be found in Feld *et al.* (2007).

2001 and 2004.<sup>23</sup> Using the officially paid wage rate, they concluded that these activities reached 4.1% in 2001 and 3.1% in 2004. Using the (much lower) shadow economy wage rate, however, these estimates shrink to 1.3% and 1.0%, respectively. If we look at the discrepancy method, for which we have estimates from 1970 to 1980, the German shadow economy is much larger: using the discrepancy between expenditure and income, we get approximately 11% for the 1970s, and using the discrepancy between official and actual employment, roughly 30%. The physical input methods where estimates for the 1980s are available deliver values of around 15% for the second half of that decade. The (monetary) transaction approach developed by Feige (1996) places the shadow economy at 30% between 1980 and 1985. Yet another monetary approach, the currency demand approach – the first person to undertake an estimation for Germany was Kirchgässner (1983, 1984) – provides values of 3.1% (1970) and 10.1% (1980). Kirchgässner's values are quite similar to the ones obtained by Schneider and Enste (2000, 2002), who also used a currency demand approach to value the size of the shadow economy at 4.5% in 1970 and 14.7% in 2000. Finally, if we look at latent (DY)MIMIC estimation procedures, the first ones being conducted by Frey and Weck-Hannemann (1984), and later, Schneider and others followed for Germany, again, the estimations for the 1970s are quite similar. Furthermore, Schneider's estimates using a DYMIMIC approach (Schneider (2005, 2007)) are close to those of the currency demand approach.

Thus, we can see that different estimation procedures produce different results. It is safe to say that the figures produced by the transaction and the discrepancy approaches are rather unrealistically large: the size of the shadow economy at almost one-third of official GDP in the mid-1980s is most likely an overestimate. The figures obtained using the currency demand and hidden variable (latent) approaches, on the other hand, are relatively close together and much lower than those produced by other methods (i.e. the discrepancy or transaction approaches). This similarity is not surprising given the fact that the estimates of the shadow economy using the latent (MIMIC) approach were measured by taking point estimates from the currency demand approach.

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<sup>23</sup> In our paper there is no extensive discussion about the various methods to estimate the size and development of the shadow economy, also we do not discuss the strength and weaknesses of each method. Compare for this Schneider and Enste (2000), Schneider (2005), Feld and Larsen (2005), Pedersen (2003), and Giles (1999a,b,c).

**Table 5.1** *The Size of the Shadow Economy in Germany According to Different Methods (in Percentage of Official GDP)*

Method	Shadow economy (in percentage of official GDP) in:								Source
	1970	1975	1980	1985	1990	1995	2000	2005	
Survey	-	3.6 <sup>1)</sup>	-	-	-	-	-	-	IfD Allensbach (1975)
	-	-	-	-	-	-	4.1 <sup>2)</sup>	3.1 <sup>2)</sup>	Feld and Larsen (2005)
	-	-	-	-	-	-	1.3 <sup>3)</sup>	1.0 <sup>3)</sup>	
Discrepancy between expenditure and income	11.0	10.2	13.4	-	-	-	-	-	Lippert and Walker (1997)
Discrepancy between official and actual employment	23.0	38.5	34.0	-	-	-	-	-	Langfeldt (1983)
Physical input method	-	-	-	14.5	14.6	-	-	-	Feld and Larsen (2005)
Transactions approach	17.2	22.3	29.3	31.4	-	-	-	-	
Currency demand approach	3.1	6.0	10.3	-	-	-	-	-	Kirchgässner (1983)
	12.1	11.8	12.6	-	-	-	-	-	Langfeldt (1983, 1984)
	4.5	7.8	9.2	11.3	11.8	12.5	14.7	-	Schneider and Enste (2000)
Latent ((DY)MIMIC) approach	5.8	6.1	8.2	-	-	-	-	-	Frey and Weck (1983)
	-	-	9.4	10.1	11.4	15.1	16.3	-	Pickardt and Sarda (2006)
	4.2	5.8	10.8	11.2	12.2	13.9	16.0	15.4	Schneider (2005, 2007)
Soft modelling	-	8.3 <sup>4)</sup>	-	-	-	-	-	-	Weck-Hannemann (1983)

1) 1974.

2) 2001 and 2004; calculated using wages in the official economy.

3) 2001 and 2004; calculated using actual “black” hourly wages paid.

## 5.2 Empirical results

Table 5.2 illustrates the estimated development of the shadow economy in three German-speaking countries between 1975 and 2007. The development for **Germany** indicates that after a continuous growth of the shadow economy (measured as a share of the official sector), its size has been decreasing since 2004. Whereas in 2003 the shadow economy in Germany was estimated at 370.0 billion Euros, in 2004 it was only 356.1 billion Euros and decreased to 346.2 billion Euro in 2005. Also in 2006 the volume of the shadow economy in Germany decreased further by 0.7 billion Euro. However, in 2007 the shadow economy will increase again because of the rise of the value added tax rate from 16 to 19%.

The introduction of the expanded “Mini-Job” regulation, which came into force on 1<sup>st</sup> of April 2003, was an important reason for the decline of the shadow economy since 2004. This legislation led to a reduction of illicit employment in 2004 and 2005 by 9 billion Euros. A further increase in the number of “Mini-Jobs” in 2007 is, however, not expected.

It is quite difficult to estimate to what extent the rather new measures for better coordination and more efficient actions against the shadow economy with the stricter legislation on combating the shadow economy introduced in August 2004 contribute to a successful reduction of illicit employment. According to the performed simulations, the new legislation reduced the shadow economy by 1.0 bn Euro in 2005. Overall, however, it remains ambiguous whether stricter legislation is an effective tool to reduce illicit employment. There are two reasons for that. First, the control effort necessary to eliminate such activities is very high. Second, in many cases citizens are not aware of law infringement. This is particularly true in the case of “black” household goods and services production.

**Table 5.2:**

The shadow economy in Germany, Austria and Switzerland from 1975 to 2007 – estimated by currency demand and DYMIMIC-procedures<sup>1)</sup>

Year	The size of the shadow economy (in % of “official” GDP)					
	Germany		Austria		Switzerland	
	in %	bn €	in %	bn €	in %	bn SFr.
1975	5.75	29.6	2.04	0.9	3.20	12
1980	10.80	80.2	2.69	2.0	4.90	14
1985	11.20	102.3	3.92	3.9	4.60	17
1990	12.20	147.9	5.47	7.2	6.20	22
1995	13.90	241.1 <sup>2)</sup>	7.32	12.4	6.89	25
1996	14.50	257.6 <sup>2)</sup>	8.32	14.6	7.51	27
1997	15.00	274.7 <sup>2)</sup>	8.93	16.0	8.04	29
1998	14.80	280.7 <sup>2)</sup>	9.09	16.9	7.98	30
1999	15.51	301.8 <sup>2)</sup>	9.56	18.2	8.34	32
2000	16.03	322.3 <sup>2)</sup>	10.07	19.8	8.87	35
2001	16.02	329.8 <sup>2)</sup>	10.52	21.1	9.28	37.5
2002	16.59	350.4 <sup>2)</sup>	10.69	21.8	9.48	38.7
2003	17.10	370.0 <sup>2)</sup>	10.86	22.5	9.52	39.4
2004	16.12	356.1 <sup>2)</sup>	11.00	23.0	9.43	39.5
2005	15.41	346.2 <sup>2)</sup>	10.27	22.0	9.05	38.7
2006 <sup>3)</sup>	14.86	345.5 <sup>2)</sup>	9.70	21.2	8.48	37.0
2007 <sup>3)</sup>	14.64	349.0 <sup>2)</sup>	9.37	21.0	8.23	36.8

1) Source: Own calculations (2007).

2) From 1995 on values for East and West Germany are given.

3) Projections.

A number of the policy measures introduced by the German government in the last two years influence the shadow economy in 2006 and 2007. However, as some of them counterbalance others, no drastic changes in the development of the shadow economy can be expected. The simulations gave the following results (see table 5.3):

- (1) The abolition of subsidies for private house builders that came into force as of 1 January 2006 lead to a growth of the shadow economy in 2006 by 0.2 -0.35 bn Euro, because some households will attempt to replace state subsidies through seeking for other “income sources”. However, as this provision applies only to new claims, and not to subsidies already granted, the abolition of the subsidies for private house builders will have a more pronounced effect in the future. The more so, as many households applied for subsidies in 2005. Thus, the positive impact of this action on the shadow economy will amount to 0.2 – 0.35 billion Euros in 2006 and between 0.5 and 0.8 billion Euros in 2007.
- (2) The new measure on the tax deductibility of building maintenance and modernization as well as of child and home care cost as of 1 January 2006 was intensively taken advantage of and in 2006 (2007) it reduced the size of the shadow economy by 0.75 bn – 1.25 (2.50 – 3.80) bn Euro, ceteris paribus.<sup>24)</sup>
- (3) The since 1.7.2006 increased social insurance rate (from 25 to 30%) of the commercial minijobs will lead to an increase of the shadow economy. First and preliminary calculations predict an increase in the volume of the shadow economy by between 400 and 700 Million Euro.

Overall, the above listed measures lead to a decrease in the size of the shadow economy by 150 to 250 Million Euro. There are a number of other measures recently (beginning 2006) taken that are likely to affect the decision to migrate into the shadow economy. Examples include the combination of “Ich-AG” with the bridge-payment scheme, an increase of the threshold (from 350000 € to 500000 €) for the bookkeeping obligation for start-ups or the increase of the actual turnover taxation threshold (from 125000 € to 250000 €) as of the 1 January 2006. Their impact can be estimated the earliest in 2007. One of the positive effects of the above measures will be a better coordination of anti-illicit employment activities between the government and the regional and local administration.

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<sup>24)</sup> Based on the government's economic program for 2006 and 2007.

**Table 5.3: Impact of the economic measures of the Grand Coalition on the shadow economy in 2006 and 2007**

Measure	Increase (+)/decrease (-) of the shadow economy
1) <u>Increase of the VAT from 16 to 19% (since 1.1.2007)</u>	2007: + 3000 to + 5000 million €
2) <u>Increase of insurance fees for commercial “Mini-Jobs” from 25 to 30 % (since 1.7.2006)</u>	2006: +400 to +700 million € 2007: + 2500 to + 3500 million €
3) <u>“Rich tax “ at 45% on private income above € 250000/€ 500000 p.a. (since 1.1.2007)</u>	2007: + 600 to + 900 million €
4) <u>Abolition of the subsidies for private house builders (since 1.1.2006)</u>	2006: + 200 to + 350 million € 2007: + 500 to + 800 million €
5) <u>Health insurance fees increase by 0.5% since 1.1.2007</u>	2007: + 600 to + 900 million €
6) <u>Decrease in non-wage labour cost (unemployment insurance from 6.5 to 4.2%) since 1.1. 2007</u>	2007: - 1200 to – 2700 million €
7) <u>Tax deductibility of building maintenance and modernization as well as of child and home care cost, retroactive since 1.1.2006</u>	2006: - 750 to -1250 million € 2007: - 2500 to – 3800 million €
<b>Net Effect for 2006</b>	<b>- 150 to - 250 million €</b>
<b>Net Effect for 2007</b>	<b>+ 3300 to + 4800 million €</b>

**Source: Own calculations.**

Apart from the above discussed measures such as the abolition of subsidies for private house builders and the new regulations on the tax deductibility of maintenance cost and child and home care, which are expected to reduce the size of the shadow economy by 2 to 3 bn Euro in 2007, there are other measures that will reinforce the economic activity in the underground sector. These include an increase of the value-added tax rate, an increase in the tax rate for individuals with high income, and an increase of the health insurance contributions by 0.5% as well as the decrease of the unemployment insurance contribution. The impact of these actions on the development of the shadow economy in 2007 is estimated as follows (see table 5.3):

- (1) Due to the increase of the value-added tax in 2007, the shadow economy is estimated to grow by between 3.0 and 5.0 bn Euro.

- (2) The planned increase of the private income tax on individuals/families with income above 250000/500000 Euro p.a. to 45% will cause the shadow economy to grow by 0.6 to 0.9 bn Euro.
- (3) Due to the increase of social insurance contributions levied on “Mini-Jobs” in the commercial sector from 25% to 30% coming since 1.7.2006, illicit employment will increase by 2500 to 3500 million Euro.
- (4) Due to the increase of health insurance contributions by 0.5% as of 1 January 2007, the shadow economy will grow by 600 to 900 million Euro.
- (5) At the same time, the reduction of the unemployment insurance fees from 6.5 % to 4.2 % coming into force as of 1 January 2007, will reduce the size of the shadow economy by 1.2 to 2.7 bn Euro, where the increase of the increase social insurance contributions was already taken into account.

Whereas the decisions taken by the government in 2006 lead to a slight decrease of the shadow economy, it is expected that the shadow economy will grow in 2007 by between 3300 and 4800 bn Euro. In other words, the downward trend in the development of the shadow economy is likely to end.

**Austria's** shadow economy grew by 2.2% between 2003 (22.5 bn Euro) and 2004 (23.0 bn Euro). The major causes for this increase were the persistently high taxes and social security contributions, a result of the budget reform that took place in recent years. In contrast, in 2005 the shadow economy in Austria shrank for the first time to 22.0 bn Euro. This represents a drop of 4.35%, compared to the previous year! The cause for this decline was a tax decrease (step 1) that came into force at the beginning of 2005. According to the estimations, the shadow economy in Austria continued to decline and reached volume of 21.2 bn Euro, i.e. a drop of 800 million Euro. This is attributed to a tax rate reduction (step 2) and possibly to the so-called “Dienstleistungsscheck” (service cheque) legislation that came into force on 1 January 2006. However, up to now (July 2007), this service cheque has not been widely used due to bureaucracy obstacles. Consequently, the size of the shadow economy amounts to 9.7% of Austria's GDP in 2006. The further slight decrease of the shadow economy in 2007 by 200 Mio Euros is mainly caused by the strong upswing of the official economy.

Between 2003 and 2004 the size of the shadow economy **in Switzerland** slightly increased from 39.5 bn SFR to 39.6 bn SFR, which represents a rise of 0,3% or even a stagnation when

statistical inaccuracy is accounted for. Due to the planned stricter measures<sup>25</sup> against illicit employment and a partial inclusion of household services in the official economy, the size of the shadow economy decreased in 2005 to 38.7 bn SFR or to 9% of the official GDP. This represents a drop by 900 Mio. SFR or 2.3%. Also in 2006 the Swiss shadow economy was estimated to decrease to the level of 37 bn SFR and amounted to 8.5% of the GDP.

In order to allow for an international comparison of the shadow economy with other OECD countries, Table 5.4 and Figure 5.1 (figure 5.2 depicts the changes between 1997/98 and 2007) present the data for 21 OECD countries until 2007. They clearly reveal that since the end of 90's the size of the shadow economy in most OECD countries continued to decrease. The unweighted average for all countries in 1999/2000 was 16.8% and dropped to 13.9% in 2007. Since 1997/98 - the year in which the shadow economy was the biggest in most OECD countries, it has continuously shrank. Only in Germany, Austria and Switzerland the growing trend lasted longer and was reversed only two or three years ago. The reduction of the share of the shadow economy in the GDP between 1997/98 and 2007 is most pronounced in Italy (-5.0%) and Sweden (-4.0).

The German shadow economy lays in the middle of the ranking, whereas Austria and Switzerland are located in the lower bound. With 20% to 26%, South European countries exhibit the biggest shadow economies measured as a share of the official GDP. They are followed by Scandinavian countries whose shadow economies' shares in GDP range between 15 and 16%. One reason for the differences in the size of the shadow economy between these OECD countries includes, among others, that there are fewer regulations in the US compared to Germany, where everything what is not explicitly allowed is forbidden. The individual's freedom is limited in many areas by far-reaching state interventions. As a result, their necessity and eligibility are not recognised. Provocatively speaking: Italy's shadow economy is so large because much of what is forbidden is seen as legitimate. This is an equivalent to "the voting out the existing norms of the economy" (SVR, 1980/81, p.145). Without correcting the economic policy, Germany risks an escalation of a "South-European state of affairs".

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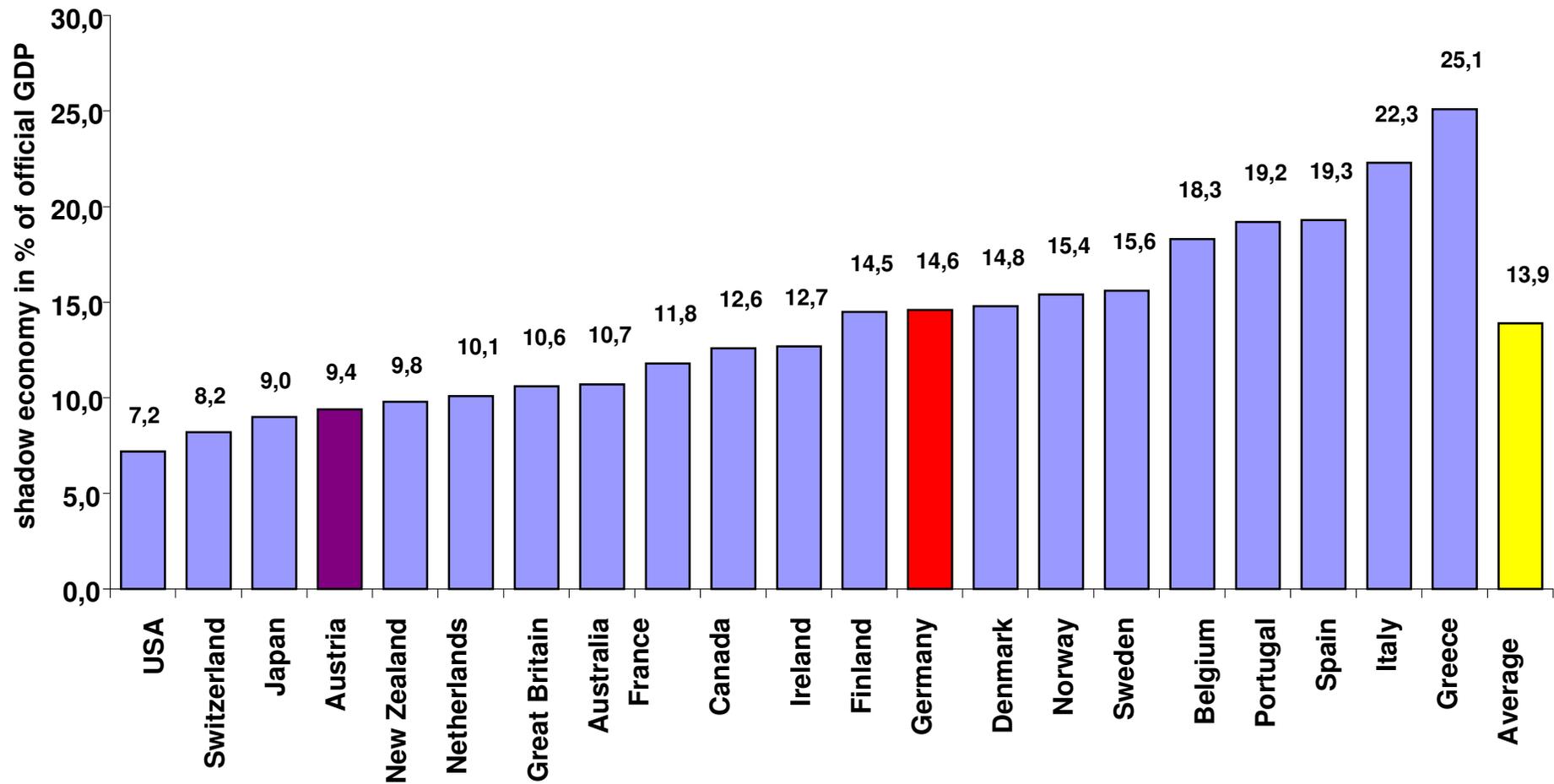
<sup>25</sup> It is assumed that all measures were undertaken in 2005 and had an immediate effect!

**Table 5.4: The size of the shadow economy in 21 OECD countries between 1989/90 and 2007  
Estimated using the money demand and DYMIMIC methods (in % of official GDP)**

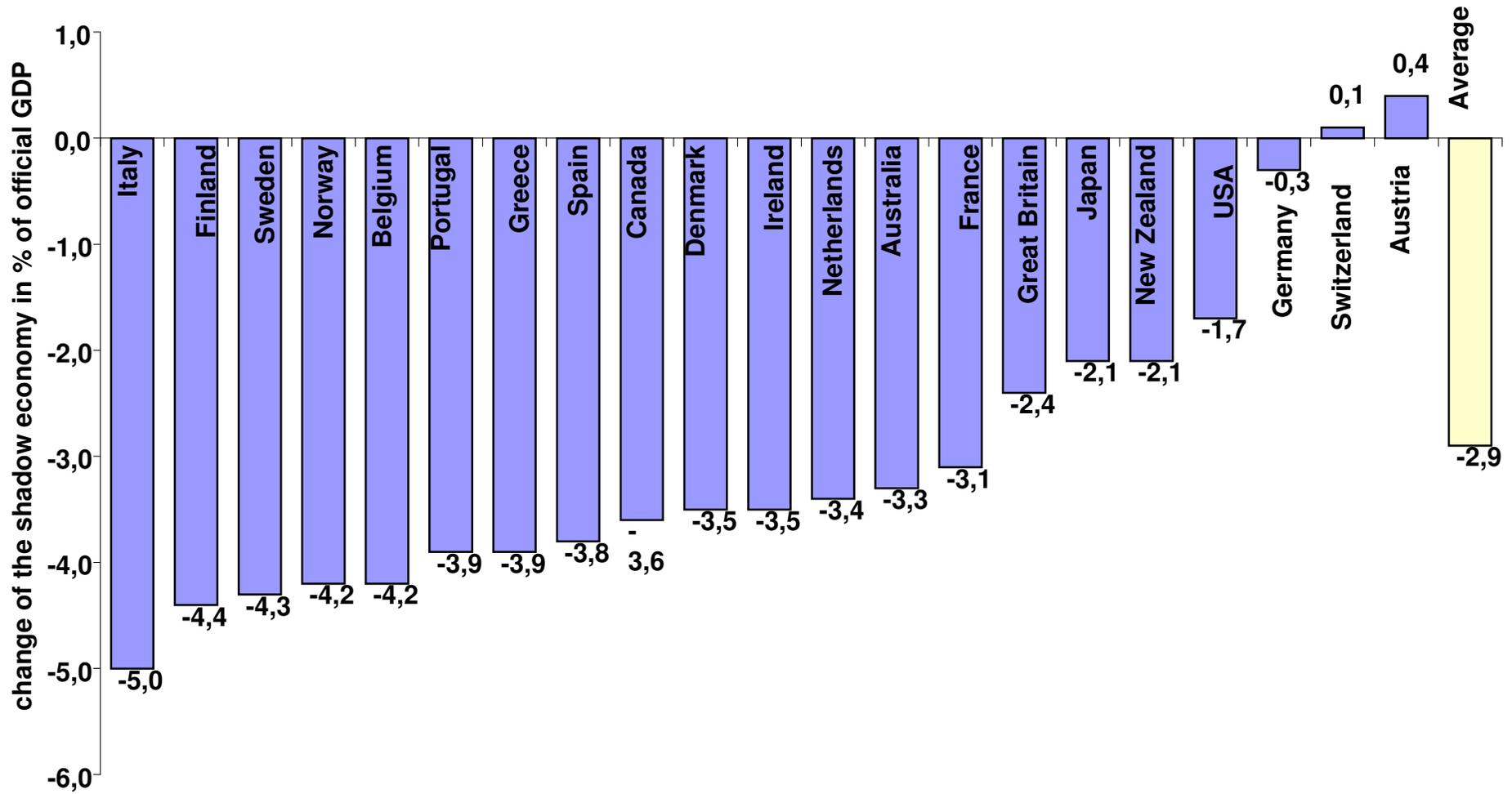
OECD-countries	Average 1989/90	Average 1994/95	Average 1997/98	Average 1999/00	Average 2001/02	2003	2004	2005 <sup>1</sup>	2006 <sup>1</sup>	2007 <sup>1</sup>
1. Australia	10.1	13.5	14.0	14.3	14.1	13.7	13.2	12.6	11.4	10.7
2. Belgium	19.3	21.5	22.5	22.2	22.0	21.4	20.7	20.1	19.2	18.3
3. Canada	12.8	14.8	16.2	16.0	15.8	15.3	15.1	14.3	13.2	12.6
4. Denmark	10.8	17.8	18.3	18.0	17.9	17.4	17.1	16.5	15.4	14.8
5. Germany	11.8	13.5	14.9	16.0	16.3	17.1	16.1	15.4	14.9	14.6
6. Finland	13.4	18.2	18.9	18.1	18.0	17.6	17.2	16.6	15.3	14.5
7. France	9.0	14.5	14.9	15.2	15.0	14.7	14.3	13.8	12.4	11.8
8. Greece	22.6	28.6	29.0	28.7	28.5	28.2	28.1	27.6	26.2	25.1
9. Great Britain	9.6	12.5	13.0	12.7	12.5	12.2	12.3	12.0	11.1	10.6
10. Ireland	11.0	15.4	16.2	15.9	15.7	15.4	15.2	14.8	13.4	12.7
11. Italy	22.8	26.0	27.3	27.1	27.0	26.1	25.2	24.4	23.2	22.3
12. Japan	8.8	10.6	11.1	11.2	11.1	11.0	10.7	10.3	9.4	9.0
13. Netherlands	11.9	13.7	13.5	13.1	13.0	12.7	12.5	12.0	10.9	10.1
14. New Zealand	9.2	11.3	11.9	12.8	12.6	12.3	12.2	11.7	10.4	9.8
15. Norway	14.8	18.2	19.6	19.1	19.0	18.6	18.2	17.6	16.1	15.4
16. Austria	6.9	8.6	9.0	9.8	10.6	10.8	11.0	10.3	9.7	9.4
17. Portugal	15.9	22.1	23.1	22.7	22.5	22.2	21.7	21.2	20.1	19.2
18. Sweden	15.8	19.5	19.9	19.2	19.1	18.6	18.1	17.5	16.2	15.6
19. Switzerland	6.7	7.8	8.1	8.6	9.4	9.5	9.4	9.0	8.5	8.2
20. Spain	16.1	22.4	23.1	22.7	22.5	22.2	21.9	21.3	20.2	19.3
21. USA	6.7	8.8	8.9	8.7	8.7	8.5	8.4	8.2	7.5	7.2
Unweighted average for 21 OECD countries	12.7	16.2	16.8	16.8	16.7	16.5	16.1	15.6	14.5	13.9

➔ Source: Own calculations, 2007, (Prof. Dr. Friedrich Schneider, University of Linz, Altenbergerstraße 69, A-4040 Linz/Auhof). Preliminary results.

**Figure 5.1: The size of the shadow economy (in % of GDP) in 21 OECD-countries using the DYMIMIC and currency demand approach for 2007**



**Figure 5.2: Increase (+) or decrease (-) of the shadow economy (in % of official GDP) of 21 OECD countries over 1997/98 to 2007**



### 5.3 Shadow Economy Labour Market and Productivity

Having examined the size and rise of the shadow economy in terms of value added over time, the analysis now focuses on the „shadow“ labor market, as within the official labor market there is a particularly tight relationship and “social network” between people who are active in the shadow economy.<sup>26)</sup> Moreover, by definition every activity in the shadow economy involves a “shadow” labor market to some extent: Hence, the “shadow labor market” includes all cases, where the employees or the employers, or both, occupy a „shadow economy position“. Why do people work in the shadow economy? In the official labor market, the costs firms (and individuals) have to pay when “officially” hiring someone are increased tremendously by the burden of tax and social contributions on wages, as well as by the legal administrative regulation to control economic activity.<sup>27)</sup> In various OECD countries, these costs are greater than the wage effectively earned by the worker – providing a strong incentive to work in the shadow economy. More detailed theoretical information on the labor supply decision in the underground economy is given by Lemieux, Fortin, and Fréchet (1994) who use micro data from a survey conducted in Quebec City (Canada). In particular, their study provides some economic insight into the size of the distortion caused by income taxation and the welfare system. The results of this study suggest that hours worked in the shadow economy are quite responsive to changes in the net wage in the regular (official) sector. Their empirical results attribute this to a (miss-)allocation of work from the official to the informal sector, where it is not taxed. In this case, the substitution between labor-market activities in the two sectors is quite high. These empirical findings clearly indicate, that “participation rates and hours worked in the underground sector also tend to be inversely related to the number of hours worked in the regular sector“ (Lemieux, Fortin, and Fréchet 1994 p. 235). These findings demonstrate a large negative elasticity of hours worked in the shadow economy with respect both to the wage rate in the regular sector as well as to a high mobility between the sectors.

Illicit work can take many shapes. The underground use of labor may consist of a second job after (or even during) regular working hours. A second form is shadow economy work by individuals who do not participate in the official labor market. A third component is the employment of people (e.g. clandestine or illegal immigrants), who are not allowed to work in the official economy. Empirical research on the shadow economy labor market is even more difficult than of the shadow economy on the value added, since one has very little knowledge

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<sup>26)</sup>Pioneering work in this area has been done by L. Frey (1972, 1975, 1978, 1980), Cappiello (1986), Lubell (1991), Pozo (1996), Bartlett (1998) and Tanzi (1999).

<sup>27)</sup>This is especially true in Europe (e.g. in Germany and Austria), where the total tax and social security burden adds up to 100% on top of the wage effectively earned; see also section 2.3.1.

about how many hours an average “shadow economy worker” is actually working (from full time to a few hours, only); hence, it is not easy to provide empirical facts.<sup>28)</sup>

In table 5.5 the estimates for the shadow economy labor force in 7 OECD-countries (Austria, Denmark, France, Germany, Italy, Spain and Sweden) are shown. In Austria the shadow economy labor force has reached in the years 1997-1998 500.000 to 750.000 or 16% of the official labor force (mean value). In Denmark the development of the 80s and 90s shows that the part of the Danish population engaged in the shadow economy ranged from 8.3% of the total labor force (in 1980) to 15.4% in 1994 – quite a remarkable increase of the shadow economy labor force; it almost doubled over 15 years. In France (in the years 1997/98) the shadow economy labor force reached a size of between 6 and 12% of the official labor force or in absolute figures between 1.4 and 3.2 million. In Germany this figure rose from 8 to 12% in 1974 to 1982 and to 22% (18 millions) in the year 1997/98. For France and Germany this is again a very strong increase in the shadow economy labor force. In other countries the amount of the shadow economy labor force is quite large, too: in Italy 30-48% (1997-1998), Spain 11.5-32% (1997-1998) and Sweden 19.8 % (1997-1998). In the European Union about 30 million people are engaged in shadow economy activities in the year 1997-1998 and in all European OECD-countries 48 million work illicitly.

These figures demonstrate that the shadow economy labor market is lively and may provide an explanation, why for example in Germany, one can observe such a high and persistent unemployment. In table 5.5 a first and preliminary calculation is done of the official GNP per capita and the shadow economy GDP per capita, shown in US-\$. Here one realizes immediately that in all countries investigated, the shadow economy GDP per capita is much higher - on average in all countries around 40%.<sup>29)</sup> This clearly shows, that the productivity in the shadow economy quite likely is considerably higher than the official economy - a clear indication, that the work effort; i.e. the incentive to work effectively is stronger in the shadow economy. In general these very preliminary results clearly demonstrate that the shadow economy labor force has reached a remarkable size in the developed OECD-countries, too, even when the calculation still might have many errors, but again the picture shows, that the shadow economy labor market has reached a sizeable figure in most countries.

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<sup>28)</sup>For developing countries some literature about the shadow labour market exists, e.g. the latest works by Dalgado (1990), Pozo (1996), Loayza (1996), especially Chickering and Salahdine (1991).

<sup>29)</sup>This is an astonishing result, which has to be further checked, because in the official per capita GDP figures the whole economy is included with quite productive sectors (like electronics, steel, machinery, etc.) and the shadow economy figures traditionally contain mostly the service sectors (and the construction sector). Hence one could also expect exactly the opposite result, as the productivity in the service sector is usually much lower than in the above mentioned ones. Sources of error may be either an underestimation of the shadow economy labor force or an overestimation of the shadow economy in terms of value added.

**Table 5.5: Estimates of the Size of the “Shadow Economy Labor Force” and of the Official and Shadow Economy Productivity in Some OECD Countries 1974-1998**

Countries	Year	Official GDP per capita in US-\$ <sup>1)</sup>	Shadow Economy GDP in US-\$ per capita	Size of the Shadow Economy (in % of official GDP) Currency Demand Approach <sup>2)</sup>	Shadow Economy Labor Force in 1000 people <sup>3)</sup>	Shadow Economy Participants in % of official Labor Force <sup>4)</sup>	Sources of Shadow Economy Labour Force
Austria	90-91	20,636	25,382	5.47	300-380	9.6	Schneider (1998) and own calculations
	97-98	25,874	29,630	8.93	500-750	16.0	
Denmark	1980	13,233	18,658	8.6	250	8.3	Mogensen, et. al. (1995) and own calculations
	1986	18,496	26,356	9.8	390	13.0	
	1991	25,946	36,558	11.2	410	14.3	
	1994	34,441	48,562	17.6	420	15.4	
France	1975-82	12,539	17,542	6.9	800-1500	3.0-6.0	De Grazia (1983) and own calculations
	1997-98	24,363	34,379	14.9	1400-3200	6.0-12.0	
Germany	1974-82	11,940	17,911	10.6	3000-4000	8.0-12.0	De Grazia (1983), F. Schneider (1998) and own calculations
	1997-98	26,080	39,634	14.7	7000-9000	19.0-23.0	
Italy	1979	8,040	11,736	16.7	4000-7000	20.0-35.0	Gaetani and d’Aragona (1979) and own calculations
	1997-98	20,361	29,425	27.3	6600-11400	30.0-48.0	
Spain	1979-80	5,640	7,868	19.0	1250-3500	9.6-26.5	Ruesga (1984) and own calculations
	1997-98	13,791	19,927	23.1	1500-4200	11.5-32.3	
Sweden	1978	15,107	21,981	13.0	750	13.0-14.0	De Grazia (1983) and own calculations
	1997-98	25,685	37,331	19.8	1150	19.8	
European Union	1978	9,930	14,458	14.5	15 000	-	De Grazia (1983) and own calculations
	1997-98	22,179	32,226	19.6	30 000	-	
OECD (Europe)	1978	9,576	14,162	15.0	26 000	-	De Grazia (1983) and own calculations
	1997-98	22,880	33,176	20.2	48 000	-	

1) Source: OECD, Paris, various years

2) Source: Own calculations.

3) Estimated full-time jobs, including unregistered workers, illegal immigrants, and second jobs.

4) In percent of the population aged 20-69, survey method.

## 6. Policy measures for reducing the shadow economy in Germany and Austria

The rigidity of the European and particularly German labour market and the tax and social system contributions burden are certainly two important causes of the relatively large shadow economy in most European OECD countries, compared to the US. Thus, in order to reduce the scope and size of the illicit employment and the shadow economy, one has to tackle these issues with appropriate reforms. If the necessary measures are not taken, the incentive to move from the underground economy to the official sector will decrease. Furthermore, stricter criminal law will not solve the problem, because German and Austrian citizens do not perceive illicit employment as law infringement and, as a result, 2/3 of them would not report illicit economic activities to the authorities.<sup>30)</sup>

From an economic and social policy perspective, the question of what the state authorities could do in order to reduce the size of the shadow economy is repeatedly raised; in other words, whether it is possible to transfer the millions of working hours and/or the ten-thousands of jobs from the shadow into the official economy. It is doubtful that this can be achieved only through legislation measures, i.e. more severe penalties,<sup>31)</sup> because 2/3 of the value added in the Austrian and German shadow economies is created by self-employed and employees. In other words, illicit employment is a common phenomenon across the entire country. Furthermore, German and Austrian citizens do not perceive illicit employment as law infringement. Only 2/3 of the society in both countries sees it as a minor violation of law.

In order to curb illicit employment down policy makers should concentrate on its causes. Some steps in the right direction have already been made in recent years. However, attempts to reduce non-wage labour cost were only moderately successful. These measures belong to the most important and efficient ones. At the same time, their enforcement demands social consensus, which requires also that other taxes, e.g. energy tax, will be increased. The increase of the value-added tax rate coming into force as of 1 January 2007 is contraproductive to the measures aiming at a reduction of the shadow economy. Thus, it is worth considering reimbursing VAT on labour intensive services (the so-called Luxembourg model) in order to strengthen the supply of those services by the official economy. Some European neighbour countries have retained an option to levy a reduced VAT rate on labour intensive services for

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<sup>30)</sup> See Kirchgässner (2003, 2006).

<sup>31)</sup> See Feld and Larsen (2005, 2007) and Feld and Frey (2002, 2007).

a limited period of time. Such measures lead obviously to a decrease in tax revenues, but if they succeed in transferring some part of services produced into the official economy (25-33%), the tax losses will be partially compensated. This recommendation could be introduced in such sectors as old building reconstruction, the catering and tourism, i.e. sectors that are particularly harmed by high labour cost.

It is obvious that the shadow economy represents a challenge for both economic and national policy. As already mentioned, in order to succeed in transferring illicit employment into the official sector, it is necessary to concentrate on the causes. The most important ones include the growing burden of taxation and contributions related to labour in the official sector. Stricter penalties address only the results of the shadow economy are expensive and do not necessarily eliminate the core problem (e.g. high taxation and regulation). In the middle and long run, the size of the shadow economy can be efficiently reduced only through such measures as lowering the non-wage labour costs, introducing flat-rate tax and social security contributions for side jobs and the increase of the tax-free amount. Other measures include the reduction of regulatory burden and the decrease of the value-added tax rate on labour intensive services.

It is much easier to move from the official sector into the shadow economy than to come back from it. In particular, because it is rather difficult to immediately find income alternatives in the “official” economy. Thus, the above measures will not have an instant effect. Applying them, however, guarantees a success in stabilizing or even restraining the shadow economy in the long run. The main problem is, therefore, not the lack of measures but rather the lack of the will on the side of the policy makers to take necessary steps despite likely resistance.

To conclude, it is necessary to answer the question of whether the decreasing size of the shadow economy is a blessing or a curse for Germany and Austria or other OECD-countries. Assuming that 2/3 of all activities in the shadow economy complement those in the official sector, i.e. those goods and services would not be produced in the official economy without input from the shadow economy, the development of the shadow economy can lead to more value added “creation”. Similarly, the decline of the shadow economy production will increase the social welfare only if a larger part of it is transferred into the official economy. If it is not the case, both the official and the unofficial production the overall (total) value added will decrease. It is therefore necessary to introduce such economic and fiscal measures that increase the incentive to move the production from the unofficial sector into the official economy. Only then will the decline of the shadow economy be a blessing for the entire economy.

Furthermore, it should be considered that declining social security and health insurance contributions, a result of the growing shadow economy, are most harmful for public institutions. Thus, it should be a part of the fiscal and economic policy agenda to create more jobs in the official sector, which will increase social security and health insurance contributions. Only in this case will the decline of the shadow economy be a blessing for public institutions as well.

## 7. Conclusions

Finally, I want to draw three conclusions of this paper:

The **first 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 the most important of which we can count are government actions, most notably, taxation and regulation. With this insight/conclusion goes a **second**, 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 important – among consequences of its own policy decisions.

Considering a public choice perspective a final and **third conclusion** for highly developed countries is that a government may not have a great interest to reduce the shadow economy due to the facts that:

- (i) tax losses may be moderate, as at least 2/3 of the 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 1/3 of the working population, and
- (iii) between 40 and 50% of the shadow economy activities have a complementary character, which means that additional value added is created, and this increases the official GDP.
- (iv) people who work in the shadow economy have less time for other things like going to demonstrations, etc.

Considering these three conclusions, 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 the work in the official economy more attractive. In a number of OECD countries this policy direction has been successfully implemented and this has led to a reduction of the shadow economy.

## 8. References

- Alderslade, Jamie, John Talmage and Yusef Freeman (2006), *Measuring the Informal Economy: One Neighborhood at a Time*, Discussion Paper, The Brookings Institution Metropolitan Policy Program, Washington D.C., September 2006.
- Andreoni, James, Brian Erard and Jonathan Feinstein (1998), Tax compliance. *Journal of Economic Literature*, 36, pp. 818-860.
- Bartlett, Bruce (1998), *Corruption, the underground economy, and taxation*. Washington D.C: National Center for Policy Analysis, unpublished manuscript.
- Bhattacharyya, Dilip K. (1999), On the economic rationale of estimating the hidden economy. In: *Economic Journal*, 109. Vol. 456, pp. 348-359.
- Brehm, J.W. (1966), *A Theory of Psychological Reactance*. New York (Academic Press).
- Brehm, J.W. (1972), *Responses to Loss of Freedom. A Theory of Psychological Reactance*. Morristown (General Learning Press).
- Brucek, Tilman, John B. Haisten-DeNew and Klaus F. Zimmermann (2006), *Creating low-skilled Jobs by Subsidizing Market Contracted Household Work*, *Applied Economics* 38/4, pp.899-911.
- Buehn, Andreas, Karmann, Alexander and Friedrich Schneider (2007), *Shadow Economy and Do-it-yourself Activities: The German Case*, Discussion Paper, Department of Economics, University of Linz.
- Cappiello, M.A. (1986), "Proposita di bibliografia ragionata sull'economia sommersa nell'industria (Italia 1970–82)", pp. 307–345, in: Bagnasco, A. (ed.): *L'altra metà dell'economia. La ricerca internazionale sull'economia informale*, Liguori, Naples.
- Chen, Martha (2004), *Rethinking the informal economy: Linkages with the formal economy and the formal regulatory environment*, paper presented at the EGDI-WIDR Conference 'unleashing human potential: linking the informal and formal sectors, Helsinki, Finland.
- Chickering, Lawrence A. and Muhamed Salahdine (eds.) (1991), *The silent revolution – The informal sector in five Asian and near Eastern countries*, San Francisco: An International Center for Economic Growth Publication (ICS Press).
- Dallago, Bruno (1990), *The irregular economy: The "underground economy" and the "black labour market"*, Dartmouth (U.K.), Publishing Company.
- De Grazia, Raffaele (1983), *Le travail clandestin: Situation dans les pays industrialisés à économie de marché*, Genf.
- Dell'Anno, Roberto (2003), *Estimating the shadow economy in Italy: A structural equation approach*, Discussion Paper, Department of Economics and Statistics, University of Salerno.
- Dell'Anno, Roberto and Friedrich Schneider (2004), *The shadow economy of Italy and other OECD countries: What do we know?*, Linz: University of Linz, Department of Economics, Discussion Paper, published in *Journal of Public Finance and Public Choice*, 2005.
- Dixon, Huw (1999), *Controversy, On the hidden economy. Editorial introduction*. In: *Economic Journal*, 109. Vol. 456, pp. 335-337.
- Enste, Dominik and Friedrich Schneider (2006), *Wie groß ist die Schattenwirtschaft? Des Rätsels Lösung*, *Wirtschaftsdienst – Zeitschrift für Wirtschaftspolitik* 86/2, pp.185-191.

- Feige, Edgar L. (ed.) (1989), *The underground economies. Tax evasion and information distortion*, Cambridge, New York, Melbourne (Cambridge University).
- Feige, Edgar L. (1994), *The underground economy and the currency enigma*, *Supplement to Public Finance/Finances Publiques*, 49, pp. 119-136.
- Feld, Lars and Bruno S. Frey (2002), *Trust, Breeds: How taxpayers are treated*, *Economics of Governments* 3/1, pp. 87-99
- Feld, Lars, and Bruno S. Frey (2002a), *Trust preeds trust: How Taxpayers are treated*, *Economics of Governments*, 3/1, pp 87-89.
- Feld, Lars, and Bruno S. Frey (2005), "Tax Complains as the Result of a Psychological Tax Contract: The Role of Incentives and Responsioe Regulation", Discussion Paper, University of Marburg, Germany.
- Feld, Lars and Bruno S. Frey (2007), *Tax compliants as a result of a psychological tax contract: The role of incentives and responsive regulation*, forthcoming *Law and Policy* 29 (2007).
- Feld, Lars and Claus Larsen (2005), *Black Activities in Germany in 2001 and 2004: A comparison based on survey data*, The rockwool foundation Research Unit, Study No. 12, Copenhagen
- Feld, Lars and Claus Larsen (2007), *Strafen, Kontrollen und Schwarzarbeit: Einige Anmerkungen auf Basis von Befragungsdaten für Deutschland*, in: Dominik Enste and Friedrich Schneider (editor), *Jahrbuch Schattenwirtschaft 2006/07: Zum Spannungsfeld von Politik und Ökonomie*, Berlin: LIT Verlag, pp. 81-107.
- Feld, Lars, Andreas J. Schmidt and Friedrich Schneider (2007), *Tax Evasion, Black Activities and Deterrence in Germany: An Institutional Empirical Perspective*, Discussion Paper, presented at the Public Choice meeting in Amsterdam, March 29<sup>th</sup>–April 1<sup>st</sup>, 2007
- Flaming, Daniel; Breut Hayolamak and Pascale Jossart (2005), *Hopeful Workers, Marginal Jobs: LA's Off-The-Books Labour Force*, Economic Roundtable, Los Angeles, CA, 2005.
- Fleming, M.H.; Roman, J. and G. Farrel (2000), *The shadow economy*, *Journal of International Affairs*, Spring 2000, No. 53/2, pp.64-89.
- Frey, Bruno S (1997), *Not just for the Money: An Economic Theory of Personal Motivation*, Cheltonham (UK): Edward Elgar.
- Frey, Bruno S. and Hannelore Weck-Hannemann (1984), *A hidden economy as an "unobserved" variable*, *European Economic Review*, 26/1, pp. 33-53
- Frey, Bruno S. and Werner Pommerehne (1984): *The hidden economy: State and prospect for measurement*, *Review of Income and Wealth*, 30/1, pp. 1-23.
- Frey, L. (1972), *Il lavoro a domicilio in Lombardia*, Giunta Regionale Lombarda, Assessorato al Lavoro, Milan.
- Frey, L. (1975), *Il potenziale di lavoro in Italia*, Documenti ISVET, no. 50.
- Frey, L. (1978), *Il lavoro nero nel 1977 in Italia*”, *Tendenze della occupazione*, no. 6.
- Frey, L. (1980), *Introduzione all'analisi economica del lavoro minorile*, *Economia del Lavoro*, no. 1-2, pp. 5-16.
- Giles, David E. A. (1999a), *Measuring the hidden economy: Implications for econometric modelling*. In: *Economic Journal*, 109. Vol. 456, pp. 370-380.
- Giles, David E. A. (1999b), *Modelling the hidden economy in the tax-gap in New Zealand*, *Empirical Economics*, 24/4, pp. 621-640.
- Giles, David E. A. (1999c), *The rise and fall of the New Zealand underground economy: Are the reasons symmetric?* *Applied Economic Letters*, 6, pp. 185-189

- Giles, David, E.A. and Lindsay M. Tedds (2002): Taxes and the Canadian Underground Economy, Canadian Tax Paper No. 106, Canadian Tax Foundation, Toronto/Ontario.
- Halla, Martin and Friedrich Schneider (2005), "Taxes and Benefits: Two Distinct Options to Cheat on the Stole?", Discussion Paper, Institute of Economics, University of Linz, Linz (Austria).
- IfD (1975), Freizeitarbeit 1974 – Eine Stichtagsuntersuchung, Studie im Auftrag der Kommission für wirtschaftlichen und sozialen Wandel, Bonn.
- Johnson, Simon; Kaufmann, Daniel and Pablo Zoido-Lobaton (1998a), Regulatory discretion and the unofficial economy. *The American Economic Review*, 88/ 2, pp. 387-392.
- Johnson, Simon; Kaufmann, Daniel and Pablo Zoido-Lobaton (1998b), Corruption, public finances and the unofficial economy. Washington, D.C.: The World Bank, discussion paper.
- Karmann, Alexander (1986), Monetäre Ansätze zur Erfassung der Schattenwirtschaft: Ein Vergleich verschiedener Messansätze, *Kredit und Kapital* 19/3, pp.233-247.
- Karmann, Alexander (1990), Schattenwirtschaft und ihre Ursachen: Eine empirische Analyse zur Schwarzwirtschaft und Selbstversorgung in der Bundesrepublik Deutschland, *Zeitschrift für Wirtschafts- und Sozialwissenschaften (ZWS)* 110/3, 1990, pp.185-206.
- Kazemier, Brugt, (2005a), The Undergroud Economy: A Survey of Methods and Estimates Discussion Paper, Statistics Netherlands, Voorburg, Netherlands
- Kazemier, Brugt, (2005b), Monitoring the Underground Labour Market: What Surveys can do, Discussion Paper, Statistics Netherlands, Voorburg, Netherlands
- Kazemier, Brugt (2006), Monitoring the Unterground Economy – A Survey of Methods and Estimates, in: Dominik Enste and Friedrich Schneider (eds.), *Jahrbuch Schattenwirtschaft 2006/07: Zum Spannungsfeld von Politik und Ökonomie*, Berlin: LIT Verlag, pp. 11-53.
- Kirchgaessner, Gebhard (1982), Size and Development of West-German Shadow Economy, 1955-1980, *Zeitschrift für die gesamte Staatswissenschaft*, 139/2, pp. 197-214
- Kirchgaessner, Gebhard (2003), Moralische Aspekte der Besteuerung, in: Manfred Hose (editor), *Integriertes Steuer- und Sozialsystem*, Heidelberg: Physica-Verlag 2003, pp. 215-241.
- Kirchgaessner, Gebhard (2006), Steuermoral und Schwarzarbeit, in: Dominik Enste and Friedrich Schneider (eds.), *Jahrbuch Schattenwirtschaft 2006/07: Zum Spannungsfeld von Politik und Ökonomie*, Berlin: LIT Verlag, pp. 109-131.
- Kirchgaessner, Gebhard and Werner Pommerehne (1986), Ausmaß und Ursachen der Schattenwirtschaft in der Bundesrepublik Deutschland, *Angewandte Sozialforschung* 14/1, pp.157-170.
- Kirchler, E.; Maciejovsky, B. and F. Schneider (2002), Everyday representations of tax avoidance, tax evasion and tax flight: Do legal differences matter?, *Economic Psychology*, 8/3, pp.1-19.
- Langfeldt, Enno (1983), Ursachen der Schattenwirtschaft und ihre Konsequenzen für die Wirtschaft, Finanz- und Gesellschaftspolitik, Universität Kiel, Kiel.
- Langfeldt, Enno (1984), The unobserved economy in the Federal Republic of Germany, in: Feige, Edgar L. (ed.), *The unobserved economy*, Cambridge University Press, pp. 236-260
- Lamnek, S., G. Olbrich and W. Schäfer (2000), Forschungsprojekt "Devianz im Sozialstaat", gefördert von der Volkswagen-Stiftung, Eichstätt.
- Lemieux, Thomas; Fortin, Bernard; and Pierre Fréchette (1994), The effect of taxes on labor supply in the underground economy. *The American Economic Review*, 84/no. 1, pp. 231-254.

- Lippert, Owen and Michael Walker (eds.) (1997), *The underground economy: Global Evidences of its Size and Impact*, Vancouver, B.C.: The Frazer Insitute.
- Loayza, Norman V. (1996), *The economics of the informal sector: a simple model and some empirical evidence from Latin America*. Carnegie-Rochester Conference Series on Public Policy 45, pp. 129-162.
- Lubell, Herald (1991), *The informal sector in the 1980's and 1990's*, Paris: OECD.
- Marcelli, Enrico A. (2004), *Unauthorized Mexican Immigration, the Labour and other Lower-Wage Informal Employment in California*, *Regional Studies* 38/1, pp.1-13.
- Marcelli, Enrico A., Manuel Pastor jr. and Pascale M. Joassart (1999), *Estimating the Effects of Informal Economic Activity: Evidence from Los Angeles County*, *Journal of Economic Issues* 33/3, pp.579-607.
- Mauleon, Ignacio (1998), *Quantitative estimation of the Spanish underground economy*, Discussion paper, Department of Economics and History, University of Salamanka, Salamanka, Spain.
- Mogensen, Gunnar V.; Kvist, Hans K.; Körmendi, Eszter and Soren Pedersen (1995), *The shadow economy in Denmark 1994: Measurement and results*, Study no. 3, Copenhagen: The Rockwool Foundation Research Unit.
- Mummert, Annette and Friedrich Schneider (2001), *The German shadow economy: Parted in a united Germany?* *Finanzarchiv*, 58/3, pp.260-285.
- Neck, R., M. Hofreither and Friedrich Schneider (1989), *The Consequences of Progressive Income Taxation for the Shadow Economy: Some Theoretical Considerations*, in: Börs, D. and Felderer, B. (editor), *The Political Economy of Progressive Taxation*, Berlin: Springer Verlag, pp.149-176.
- Pedersen, Soren (2003), *The Shadow Economy in Germany, Great Britain and Scandinavia: A Measurement Based on Questionnaire Service*, Study No. 10, The Rockwool Foundation Research Unit, Copenhagen.
- Pelzmann, Linde (1988), *Wirtschaftspsychologie. Arbeitslosenforschung, Schattenwirtschaft, Steuerpsychologie*. Wien, New York (Springer).
- Pickhardt, Michael and Sarda Pons, J. (2006), *Size and Scope of the Underground Economy in Germany*, *Applied Economics*, 38/4, pp. 1707-1713
- Pozo, Susan (ed.) (1996), *Exploring the underground economy: Studies of illegal and unreported activity*, Michigan: W.E. Upjohn, Institute for Employment Research.
- Schneider, Friedrich (1986), *Estimating the size of the Danish shadow economy using the currency demand approach: An attempt*. In: *The Scandinavian Journal of Economics*, 88. Vol. 4, pp. 643-668.
- Schneider, Friedrich (1994), *Determinanten der Steuerhinterziehung der Schwarzarbeit im internationalen Vergleich*, In: Ch. Smekal and E. Theurl (editor), *Stand und Entwicklung der Finanzpsychologie*, Baden-Baden: Nomos-Verlag, pp.247-288.
- Schneider, Friedrich (1994a), *Measuring the size and development of the shadow economy. Can the causes be found and the obstacles be overcome?* in: Brandstaetter, Hermann, and Güth, Werner (eds.): *Essays on Economic Psychology*, Berlin, Heidelberg, Springer Publishing Company, pp. 193-212.
- Schneider, Friedrich (1994b), *Can the shadow economy be reduced through major tax reforms? An empirical investigation for Austria*, *Supplement to Public Finance/ Finances Publiques*, 49, pp. 137-152.
- Schneider, Friedrich (1997), *The shadow economies of Western Europe*, *Journal of the Institute of Economic Affairs*, 17/3, pp. 42-48.

- Schneider, Friedrich (1998a), Further empirical results of the size of the shadow economy of 17 OECD-countries over time, Paper to be presented at the 54. Congress of the IIPF Cordowa, Argentina and discussion paper, Department of Economics, University of Linz, Linz, Austria.
- Schneider, Friedrich (1998b), Stellt das Anwachsen der Schwarzarbeit eine wirtschaftspolitische Herausforderung dar? Einige Gedanken aus volkswirtschaftlicher Sicht. Linz, Mitteilungen des Instituts für angewandte Wirtschaftsforschung (IAW), I/98, pp. 4-13.
- Schneider, Friedrich (1999), Ist Schwarzarbeit ein Volkssport geworden? Ein internationaler Vergleich des Ausmaßes der Schwarzarbeit von 1970-97, in: Lamnek, S. and Luedtke, J. (editor), Der Sozialstaat zwischen Markt und Hedeonismus, Opladen: Verlag Leske und Budrich, pp. 126-161.
- Schneider, Friedrich (2000), The increase of the size of the shadow economy of 18 OECD-Countries: Some preliminary explanations, Paper presented at the Annual Public Choice Meeting, March 10-12, 2000, Charleston, S.C.
- Schneider, Friedrich (2001), Die Schattenwirtschaft – Tatbestand, Ursachen, Auswirkungen, in: Anton Rauscher (editor), Die Arbeitswelt im Wandel, Mönchengladbacher Gespräche Bd.21, Köln: J.P.Bachem Verlag, pp. 127-143.
- Schneider, Friedrich (2003), Shadow Economy, in: Charles K. Rowley and Friedrich Schneider (eds.), Encyclopedia of Public Choice Vol. II, Dordrecht, Kluwer Academic Publishers, pp. 286-296.
- Schneider, Friedrich (2005), Shadow Economies around the World: What do we really know? European Journal of Political Economy, 21/3 Sept. 2005, pp. 598-642.
- Schneider, Friedrich (2006), Shadow Economies and Corruption all over the World: What do we really know? Universität Linz: Institut für Volkswirtschaftslehre, Diskussionspapier, August 2006.
- Schneider, Friedrich and Helmut Badekow (2006), Ein Herz für Schwarzarbeiter: Warum die Schattenwirtschaft unseren Wohlstand steigert. Berlin: Econ/Ullstein Buchverlag, 2006.
- Schneider, Friedrich and Dominik Enste (2000), Shadow economies: Size, causes, and consequences, The Journal of Economic Literature, 38/1, pp. 77-114.
- Schneider, Friedrich and Dominik Enste (2000a), Schattenwirtschaft und Schwarzarbeit – Umfang, Ursachen, Wirkungen und wirtschaftspolitische Empfehlungen. München (Oldenbourg).
- Schneider, Friedrich and Dominik Enste (2000b), Shadow Economies: Size, Causes and Consequences. In: Journal of Economic Literature, 38. (March 2000), pp. 73-110.
- Schneider, Friedrich and Dominik Enste (2002), The Shadow Economy: Theoretical Approaches, Empirical Studies, and Political Implications, Cambridge (UK): Cambridge University Press.
- Schneider, Friedrich and Dominik Enste (ed.) (2006), Jahrbuch Schattenwirtschaft 2006/07. Zum Spannungsfeld von Politik und Ökonomie. Berlin: LIT Verlag.
- Schneider, Friedrich, M. Hofreither and R. Neck (1989), The Consequences of a Changing Shadow Economy for the Official Economy: Some Empirical Results for Austria, in: Börs, D., Felderer, B. (editor), The Political Economy of Progressive Taxation, Berlin: Springer Verlag, pp.181-211.
- Schneider, Friedrich, J. Volkert and S. Caspar (2002), Schattenwirtschaft und Schwarzarbeit: Beliebt bei vielen – Problem für alle: Eine Analyse der schattenwirtschaftlichen Aktivitäten in Deutschland (am Beispiel Baden-Württemberg) und mögliche politische Konsequenzen, Baden-Baden: Nomos Verlagsgesellschaft.
- Tanzi, Vito (1999), Uses and abuses of estimates of the underground economy. In: Economic Journal, 109. Vol. 456, pp. 338-347.

- Thomas, Jim J. (1992), *Informal Economic Activity*. New York, London Toronto u.a. (Harvester/Weatsheaf).
- Thomas, Jim J. (1999), Quantifying the black economy: 'Measurement without theory' yet again? In: *Economic Journal*, 109. Vol. 456, pp. 381-389.
- Torgler, Benno (2002), "Speaking to Theorists and Searching for Facts: Tax Moral and Tax Compliance in Experiments", *Journal of Economic Surveys*, 16/5, p.657-683.
- Torgler, Benno and Friedrich Schneider (2005), "Attitudes Towards Paying Taxes in Austria: An Empirical Analysis", *Empirica*.
- Weck-Hannemann, Hannelore (1983), *Schattenwirtschaft: Eine Möglichkeit zur Einschränkung der öffentlichen Verwaltung? Eine ökonomische Analyse*, Frankfurt/Main, Verlag Peter Lang
- Williams, Colin C. (2004a), *Cash-In-Hand Work: The Underground Sector and the Hidden Economy of Favours*, Haunddemills/Hampshire (GB), Palgrave McMillan Publishing Company, 2004.
- Williams, Colin C. (2004b), Geographical Variations in the Nature of Undeclared Work, *Geographica Analer* 86/B/3, pp.187-200.
- Williams, Colin C. (2005a), Forstering Community Engagement and Tackling Undeclared Work: The Case for an Evidence – Based "joint-up" Public Policy Approach, *Regional Studies* 39/8, pp.1145-1155.
- Williams, Colin C. (2005b), *Small Business and the Informal Economy: Making the Transition to the Informal Economy – The Evidence Base*, Small Business Service, London.
- Williams, Colin C. (2006), What is to be done about Undeclared Work? Evaluating the Policy Options, *Policy and Politics* 34/1, pp.91-113.
- Williams, Colin C. and Jan Windebank (1998), *Informal Employment in the Advanced Economies: Implication for Work and Welfare*, Routledge, London.
- Williams, Colin C. and Jan Windebank (2001a), Beyond Profit Motivated Exchange: Some Lessons from the Study of Paid Informal Work, *European Urban and Regional Studies* 8/1, pp.49-61.
- Williams, Colin C. and Jan Windebank (2001b), Reconceptualizing Paid Informal Exchange: Some Lessons from English Cities, *Environment and Planning A* 33/1, pp.121-140.