May, 2011
Studien/pfuschneu/2011/ShadEcon_Schneider.doc

The Shadow Economy and Shadow Economy Labor Force: What do we (not) know?

by

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Abstract: *In this paper the main focus lies on the development and the size of the shadow economy and of undeclared work (or shadow economy labor force) in OECD, developing and transition countries. Besides informal employment in the rural and non-rural sector also other measures of informal employment like the share of employees not covered by social security, own account workers or unpaid family workers are shown. The most influential factors on the shadow economy and/or shadow labor force are tax policies and state regulation, which, if they rise, increase both. Furthermore the discussion of the recent literature underlines that economic opportunities, the overall situation on the labor market, and unemployment are crucial for an understanding of the dynamics of the shadow economy and especially the shadow labor force.*

JEL-Classification: K42, H26, D78.

Keywords: Shadow economy, undeclared work, shadow labor force, tax morale, tax pressure, state regulation

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1. INTRODUCTION

Fighting tax evasion and the shadow economy have been an important policy goals in OECD countries during recent decades. In order to do this one should have knowledge about the size and development of the shadow economy and shadow economy labor force as well as the reasons why people are engaged in shadow economy activities.

Hence, in this paper I am mainly concerned with the size and development of the shadow economy, black activities and undeclared work. Tax evasion is not considered in order to keep the subject of this paper tractable and because too many additional aspects would be involved[1]. Also tax morale or experimental studies on tax compliance are beyond the scope of this paper[2].

My paper is organized as follows: Section 2 presents theoretical considerations about the definition and measurement of the shadow economy and discusses also the main factors determining its size. In Section 3, empirical results of the size and development of the shadow economy is discussed. In section 4 a detailed discussion of the size and development of the shadow economy labor force is presented. In section 5 the interaction between the shadow economy and unemployment is analyzed. In section 6 the adjustments of shadow economy measures in national accounts are presented. Finally section 7 concludes.

2. SOME THEORETICAL CONSIDERATIONS ABOUT THE SHADOW ECONOMY

2.1. Defining the Shadow Economy

Most authors trying to measure the shadow economy still face the difficulty of the definition of the shadow economy.[3] According to one commonly used definition it comprises all

1. See Andreoni, Erard and Feinstein (1998) for the authoritative survey, Feld and Frey (2007) or Kirchler (2007) for broader interdisciplinary approaches, or the papers by Kirchler, Maciejovsky and Schneider (2003), Kastlunger, Kirchler, Mittore and Pitters (2009), Kirchler, Hoelzl and Wahl (2007).
2. The authoritative scientific work on tax morale is by Torgler (2007). See also Torgler (2002) for a survey on experimental studies and Blackwell (2009) for a meta-analysis.
3. Our paper focuses on the size and development of the shadow economy for uniform countries and not for specific regions. Recently first studies have been undertaken to measure the size of the shadow economy as well as the "grey" or "shadow" labor force for urban regions or states (e.g. California). See e.g. Marcelli, Pastor and Joassart (1999), Marcelli (2004), Chen (2004), Williams and Windebank (1998, 2001a, b), Flaming, Hayolamak, and Jossart (2005), Alderslade, Talmage and Freeman (2006), Brück, Haisten-DeNew and Zimmermann (2006). Herwartz, Schneider and Tafenau (2009) and Tafenau, Herwartz and Schneider (2010) estimate the size of the shadow economy of 234 EU-NUTS regions for the year 2004 for the first time demonstrating a considerable regional variation in the size of the shadow economy.

currently unregistered economic activities that contribute to the officially calculated (or observed) Gross National Product.[4] 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". Put differently, one of the broadest definitions is: "…those economic activities and the income derived from them that circumvent or otherwise avoid government regulation, taxation or observation".[5] As these definitions still leave room for interpretation, *Table 2.1* provides a better feeling as to what could be a reasonable consensus definition of the underground (or shadow) economy.

Table 2.1: A Taxonomy of Types of Underground Economic Activities[1)]

Type of Activity	Monetary Transactions		Non Monetary Transactions	
ILLEGAL ACTIVITIES	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.	
	Tax Evasion	Tax Avoidance	Tax Evasion	Tax Avoidance
LEGAL ACTIVITIES	Unreported income from self-employment; wages, salaries and assets from unreported work related to legal services and goods	Employee discounts, fringe benefits	Barter of legal services and goods	All do-it-yourself work and neighbor help

[1)] Structure of the table is taken from Lippert and Walker (1997, p. 5) with additional remarks.

From *Table 2.1*, it is obvious 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 productive 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.[6] The shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities for the following reasons:

4. This definition is used, e.g., 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 Bühn, Karmann und Schneider (2009) or Karmann (1986, 1990).
5. 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) or Feld and Larsen (2005, p. 25).
6. See 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.

1. to avoid payment of income, value added or other taxes,
2. to avoid payment of social security contributions,
3. to avoid having to meet certain legal labor market standards, such as minimum wages, maximum working hours, safety standards, etc., and
4. to avoid complying with certain administrative obligations, such as completing statistical questionnaires or other administrative forms.

Thus, I will not deal with typically illegal underground economic activities 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.

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, a number of ambiguities and controversies can be avoided. In general, there are two types of underground economic activity: illicit employment and the production of goods and services consumed within the household.[7] 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 productive economic activities that would normally be included in the national accounts but which remain underground due to tax or regulatory burdens.[8] Although such legal activities contribute to the country's value added, 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 craftsman's certificate)[9]. 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 aggregate value added can be assessed rather positively.

7. For a broader discussion of the definition issue see Thomas (1992), Schneider, Volkert and Caspar (2002), Schneider and Enste (2002, 2006) and Kazemier (2005a, b).
8. With this definition the problem of having classical crime activities included could be avoided, because neither the MIMIC procedure nor the currency demand approach captures these activities: e.g. drug dealing is independent of increasing taxes, especially as the included causal variables are not linked (or causal) to classical crime activities. See e.g. Thomas (1992), Kazemir (2005a, b) and Schneider (2005).
9 However, compare chapter 6, where it is shown, that shadow economy activities are partly captured in the official statistics in some countries.

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.[10] There are three methods of assessment:

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

My estimation of the shadow economy of highly developed OECD is firstly based on a combination of the MIMIC procedure and the currency demand method, i.e. a combination of methods (2) and (3).[11] The MIMIC procedure assumes that the shadow economy remains an unobserved phenomenon (latent variable) 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, official GDP and official working time. A disadvantage of the MIMIC 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[12] is used to calibrate the relative into absolute estimates by using two or three absolute values of the absolute size of the shadow economy.

Secondly, the size of the shadow economy is estimated by using survey methods (Feld and Larsen (2005, 2008, 2009)). In order to minimize the number of respondents dishonestly replying or totally declining answers to the sensitive questions, structured interviews are undertaken (usually face-to-face) in which the respondents are slowly getting accustomed to the main purpose of the survey. Like it is done by the contingent valuation method (CVM) in

10. For the strengths and weaknesses of the various methods see Bhattacharyya (1999), Breusch (2005a, b), Dell'Anno and Schneider (2009), Dixon (1999), Feige (1989), Feld and Larsen (2005), Giles (1999a, b, c), Schneider (1986, 2001, 2003, 2005, 2006), Schneider and Enste (2000a, b, 2002, 2006), Tanzi (1999), Thomas (1992, 1999). See also the discussion in the appendix of this paper.
11. These methods are presented in detail in Schneider (1994a, b, c, 2005) and Schneider and Enste (2000b, 2002, 2006). Furthermore, these studies discuss advantages and disadvantages of the MIMIC- and the money demand methods as well as other estimation methods for assessing the size of illicit employment; for a detailed discussion see also Feld and Larsen (2005).
12. This indirect approach is based on the assumption that cash is used to make transactions within the shadow economy. By using this method one econometrically estimates a currency demand function including independent variables like tax burden, regulation etc. which "drive" the shadow economy. This equation is used to make simulations of the amount of money that would be necessary to generate the official GDP. This amount is then compared with the actual money demand and the difference is treated as an indicator for the development of the shadow economy. On this basis the calculated difference is multiplied by the velocity of money and one gets a value added figure for the shadow economy. See footnote 10 for references discussing this method critically.

environmental economics (Kopp et al. 1997), a first part of the questionnaire aims at shaping respondents' perception as to the issue at hand. In a second part, questions about respondents' activities in the shadow economy are asked, and the third part contains the usual socio-demographic questions.

In addition to the studies by Merz and Wolff (1993), Feld and Larsen (2005, 2008, 2009) and Enste and Schneider (2006) for Germany, the survey method has been applied in the Nordic countries and Great Britain (Isachsen and Strøm 1985, Pedersen 2003) as well as in the Netherlands (van Eck and Kazemier 1988, Kazemier 2006). While the questionnaires underlying these studies are broadly comparable in design, recent attempts by the European Union to provide survey results for all EU member states runs into difficulties regarding comparability (Renooy et al. 2004, European Commission 2007): the wording of the questionnaires becomes more and more cumbersome depending on the culture of different countries with respect to the underground economy.

These two sets of approaches are most broadly used in the literature. Although each has its drawbacks, and although biases in the estimates of the shadow economy almost certainly prevail, no better data are currently available. In tax compliance research, the most interesting data stem from actual tax audits by the US Internal Revenue Service (IRS). In the Taxpayer Compliance Measurement Program (TCMP), actual compliance behavior of taxpayers is observed and is used for empirical analysis (Andreoni, Erard and Feinstein 1998). The approach of the IRS is broader in a certain sense as tax evasion from all sources of income is considered, while the two methods discussed before aim at capturing the shadow economy or undeclared work and thus mainly measure tax evasion from labor income. Even the data obtained from the TCMP is biased however because the actually detected tax non-compliance could only be the tip of the iceberg. Although the perfect data on tax non-compliance does therefore not exist, the imperfect data in this area can still provide interesting insights also regarding the size, the development and the determinants of the shadow economy.

2.3. The Main Causes Determining the Shadow Economy

A useful starting point for a theoretical discussion of tax non-compliance is the paper by Allingham and Sandmo (1972) on income tax evasion. While the shadow economy and tax evasion are not congruent, activities in the shadow economy in most cases imply the evasion of direct or indirect taxes, such that the factors affecting tax evasion will most certainly also affect the shadow economy. According to Allingham and Sandmo tax compliance depends on

its expected costs and benefits. The benefits of tax non-compliance result from the individual marginal tax rate and the true individual income. In the case of the shadow economy the individual marginal tax rate is obtained by calculating the overall marginal tax burden from indirect and direct taxes including social security contributions. The individual income generated in the shadow economy is usually categorized as labor income and less probably as capital income. The expected costs of non-compliance derive from deterrence enacted by the state. Tax non-compliance thus depends on the state's auditing activities raising the probability of detection and the fines individuals face when they are caught. As individual morality also plays a role for compliance, additional costs could pertain beyond pure punishment by the tax administration in the form of psychic costs like shame or regret, but also additional pecuniary costs if, e.g., reputation loss results.

Kanniainen, Pääkönen and Schneider (2004) incorporate many of these insights in their model of the shadow economy by also considering labor supply decisions. They hypothesize that tax hikes unambiguously increase the shadow economy, while the effect of public goods financed by those taxes depends on the ability to access public goods. Morality is also included in this analysis. But the costs for individual non-compliers resulting from moral norms appear to be mainly captured by state punishment although self-esteem also plays a role.

A shortcoming of these analyses is the neglected endogeneity of tax morale and good governance. In contrast, Feld and Frey (2007) argue that tax compliance is the result of a complicated interaction between tax morale and deterrence measures. While it must be clear to taxpayers what the rules of the game are and as deterrence measures serve as signals for the tax morale a society wants to elicit (Posner 2000a, b), deterrence could also crowd out the intrinsic motivation to pay taxes. Moreover, tax morale is not only increased if taxpayers perceive the public goods received in exchange for their tax payments worth it. It also increases if political decisions for public activities are perceived to follow fair procedures or if the treatment of taxpayers by the tax authorities is perceived to be friendly and fair. Tax morale is thus not exogenously given, but is influenced by deterrence, the quality of state institutions and the constitutional differences among states.

Although this leaves me with a rich set of variables that might influence the size of the shadow economy, it is only the starting point. As labor supply decisions are involved, labor and product market regulations are additionally important. Recent theoretical approaches thus suggest following a differentiated policy to contain the shadow economy's expansion.

2.3.1 Deterrence[13]

Although the traditional economic theory of tax non-compliance derives unambiguous predictions as to their impact only for deterrence measures and despite the strong focus on deterrence in policies fighting the shadow economy, there is surprisingly little known about the effects of deterrence from empirical studies. In their survey on tax compliance, Andreoni, Erard and Feinstein (1998) report that deterrence matters for tax evasion, but that the reported effects are rather small. Blackwell (2009) finds strong deterrence effects of fines and audits in experimental tax evasion. Regarding the shadow economy, there is however little evidence.

This is due to the fact that data on the legal background and the frequency of audits are not available on an international basis. They would also be difficult to collect even for the OECD member countries. A recent study by Feld, Schmidt and Schneider (2007) demonstrates this for the case of Germany. The legal background is quite complicated differentiating fines and punishment according to the severity of the offense, to true income of the non-complier, but also regionally given different directives on sentences by the courts in different Länder. Moreover, the tax authorities at the state level do not reveal how intensively auditing is taking place. With the available data on fines and audits, Feld, Schmidt and Schneider (2007) conduct a time series analysis using the estimates of the shadow economy obtained by the MIMIC approach. According to their results, deterrence does not have a consistent effect on the German shadow economy. Conducting Granger causality tests, the direction of causation (in the sense of precedence) is ambiguous leaving room for an impact of the shadow economy on deterrence instead of deterrence on the shadow economy.

Feld and Larsen (2005, 2008, 2009) follow a different approach by using individual survey data for Germany. First replicating Pedersen (2003), who reports a negative impact of the subjectively perceived risk of detection by state audits on the probability of working in the shadows for the year 2001, they then extend it by adding subjectively perceived measures of fines and punishment. Fines and punishment do not exert a negative influence on the shadow economy in any of the annual waves of surveys, nor in the pooled regressions for the years 2004-2007 (about 8000 observations overall). The subjectively perceived risk of detection has a robust and significant negative impact in individual years only for women. In the pooled sample for 2004-2007, which minimizes sampling problems, the probability of detection has a

[13] This part is taken from Feld and Schneider (2010, pp. ……)

significantly negative effect on the probability of working in the shadow economy also for men (keeping the one for women) and is robust across different specifications.[14]

Pedersen (2003) reports negative effects of the subjectively perceived risk of detection on the probability of conducting undeclared work in the shadows for men in Denmark in 2001 (marginally significant), for men in Norway in 1998/2002 (highly significant),[15] men and women in Sweden in 1998 (highly significant in the first and marginally significant in the second case), and no significant effect for Great Britain in 2000. Moreover, van Eck and Kazemier (1988) report a significant negative of a high perceived probability of detection on participation in the hidden labor market for the Netherlands in 1982/1983. In none of these studies perceived fines and punishments are included as explanatory variables. The large scale survey study on Germany by Feld and Larsen (2005, 2009) thus appears to be the most careful analysis of deterrence effects on undeclared work up to date.

Overall, this is far from convincing evidence on the proper working of deterrence as it is always the combination of audits and fines that matters according to theoretical analysis, but also to pure plausibility arguments. The reasons for the unconvincing evidence of deterrence effects are discussed in the tax compliance literature by Andreoni, Erard and Feinstein (1998), Kirchler (2007) or Feld and Frey (2007). They range from interactions between tax morale and deterrence, thus the possibility that deterrence crowds out tax morale, to more mundane arguments like misperceptions of taxpayers. Likewise, these reasons could be important for the evidence on the deterrence effects on work in the shadow economy. As the latter mainly stems from survey studies, the insignificant findings for fines and punishment may also result from shortcomings in the survey design.

2.3.2 Tax and Social Security Contribution Burdens

In contrast to deterrence, almost all studies ascertain that the tax and social security contribution burdens are among the main causes for the existence of the shadow economy.[16] Since taxes affect labor-leisure choices and stimulate labor supply in the shadow economy, the distortion of the overall tax burden is a major concern. The bigger the difference between the total labor cost in the official economy and after-tax earnings (from work), the greater is the incentive to reduce the tax wedge and work in the shadow economy. Since the tax wedge

14. An earlier study by Merz and Wolff (1993) does not analyze the impact of deterrence on undeclared work.
15. The earlier study by Isachsen and Strøm (1985) for Norway does also not properly analyze the impact of deterrence on undeclared work.
16. See Thomas (1992), Lippert and Walker (1997), Schneider (1994a, b, c, 1997, 1998a, b, 1999, 2000, 2003, 2005, 2009), Johnson, Kaufmann, and Zoido-Lobatón (1998a, b), Tanzi (1999), Giles (1999a), Mummert and Schneider (2001), Giles and Tedds (2002) and Dell'Anno (2003) as more recent ones.

depends on the level and increase of the social security burden/payments and the overall tax burden, they are key features of the existence and the increase of the shadow economy.

2.3.3 Intensity of Regulations

Increased intensity of regulations, for example labor market regulations, trade barriers, and labor restrictions for immigrants. is another important factor which reduces the freedom (of choice) for individuals engaged in the official economy. Johnson, Kaufmann, and Zoido-Lobatón (1998b) find significant empirical evidence of the influence of (labor) regulations on the shadow economy; and the impact is clearly described and theoretically derived in other studies, e.g. for Germany (Deregulierungskommission/ Deregulation Commission 1991).[17] Regulations lead to a substantial increase in labor costs in the official economy. But since most of these costs can be shifted to employees, regulations provide for another incentive to work in the shadow economy where they can be avoided. Johnson, Kaufmann, and Shleifer (1997) report empirical evidence supporting their model which predicts that countries with higher general regulation of their economies tend to have a higher share of the unofficial economy in total GDP. 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-Lobaton (2000) arrive at 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.

2.3.4 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-Lobatón (1998a, b) present a simple model of this relationship. According to their findings smaller shadow economies occur in countries with higher tax revenues 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

17. The importance of regulation on the official and unofficial (shadow) economy is more recently investigated by Loayza, Oviedo and Servén (2005a, b). Kucera and Roncolato (2008) extensively analyze the impact of labor market regulation on the shadow economy.

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-Lobatón 1998a, p. I).

2.3.5 Other Public Institutions

Recently, various authors[18] consider quality of public institutions as another key factor of the development of the informal sector. They argue that the efficient and discretionary application of tax systems and regulations by government may play a crucial role in the decision of conducting undeclared work, even more important than the actual burden of taxes and regulations. In particular, corruption of bureaucracy and government officials seems to be associated with larger unofficial activity, while a good rule of law by securing property rights and contract enforceability, increases the benefits of being formal.

Hence, it is important to analyze theoretically and empirically the effect of political institutions like the federal political system on the shadow economy. If the development of the informal sector is considered as a consequence of the failure of political institutions in promoting an efficient market economy, since entrepreneurs go underground when there is an inefficient public goods provision, then the effect of institutions of the individual's incentive to operate unofficially can be assessed. In a federal system, competition among jurisdictions and the mobility of individuals act as constraints on politicians because "choices" will be induced that provide incentives to adopt policies which are closer to a majority of voters' preferences. Frequently, the efficient policies are characterized by a certain level of taxation, mostly spent in productive public services. In fact, the production in the formal sector benefits from a higher provision of the productive public services and is negatively affected by taxation, while the shadow economy reacts in the opposite way. As fiscal policy gets closer to a majority of voters' preferences in federal systems, the size of the informal sector goes down.

[18] See e.g. Johnson et al. (1998a, b), Friedman et al. (2000), Dreher and Schneider (2009), Dreher, Kotsogiannis and Macorriston (2007, 2009), as well as Teobaldelli (2011), Schneider (2010) and Buehn and Schneider (2010).

This leads to the hypothesis that the size of the shadow economy should be lower in a federal system than in a unitary state, ceteris paribus.

2.3.6 Tax Morale

In addition to the incentives effects discussed before, the efficiency of the public sector has an indirect effect on the size of the shadow economy because it affects tax morale. As Feld and Frey (2007) argue, tax compliance is driven by a psychological tax contract that entails rights and obligations from taxpayers and citizens on the one hand, but also from the state and its tax authorities on the other hand. Taxpayers are more heavily inclined to pay their taxes honestly if they get valuable public services in exchange. However, taxpayers are honest even in cases when the benefit principle of taxation does not hold, i.e. for redistributive policies, if the political decisions underlying such policies follow fair procedures. Finally, the treatment of taxpayers by the tax authority plays a role. If taxpayers are treated like partners in a (tax) contract instead of subordinates in a hierarchical relationship, taxpayers will stick to their obligations of the psychological tax contract more easily. In addition to the empirical evidence on these arguments reported by Feld and Frey (2007), and by Kirchler (2007) present a comprehensive discussion of the influence of such factors on tax compliance.

Regarding the impact of tax morale on the shadow economy, there is scarce and only recent evidence. Using data on the shadow economy obtained by the MIMIC approach, Torgler and Schneider (2009) report the most convincing evidence for a negative effect of tax morale. They particularly address causality issues and establish a causal negative relation from tax morale to the size of the shadow economy. This effect is also robust to the inclusion of additional explanatory factors and specifications. These findings are also in line with earlier preliminary evidence by Körner et al. (2006). Using survey data, Feld and Larsen (2005, 2009) likewise report a robust negative effect of tax morale in particular and social norms in general on the probability of respondents to conduct undeclared work. Interestingly, the estimated effects of social norms are quantitatively more important than the estimated deterrence effects. Van Eck and Kazemier (1988) also report a marginally significant effect of tax morale on the participation in the hidden labor market.

2.3.7 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. The overview is based on the studies in which the size of the shadow economy is measured by the MIMIC approach. As there is no evidence on deterrence using this approach – at least with respect to the broad panel data base on which this table draws – the most central policy variable does not show up. This is an obvious

shortcoming of the studies, but one that cannot be coped with easily due to the lack of internationally comparable deterrence data. 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 morale accounts for some 22–25% of the variance of the shadow economy,[19] there is a third factor, "quality of state institutions", accounting for 10-12% and a forth factor, "intensity of state regulation" (mostly for the labor market) for 7-9%. 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)
(1) Increase of the Tax and Social Security Contribution Burdens	35-38	45-52
(2) Quality of State Institutions	10-12	12-17
(3) Transfers	5-7	7-9
(4) Specific Labor Market Regulations	7-9	7-9
(5) Public Sector Services	5-7	7-9
(6) Tax Morale	22-25	-
Influence of all Factors	84-98	78-96

(a) Average values of 12 studies.
(b) Average values of empirical results of 22 studies.
Source: Schneider (2009)

19. The importance of this variable with respect to theory and empirical relevance is also shown in Frey (1997), Feld and Frey (2002a, 2002b, 2007) and Torgler and Schneider (2009).

3. ESTIMATION AND SIZE OF THE SHADOW ECONOMIES AND SHADOW LABOR FORCE

3.1. Econometric Estimation

Following the theoretical considerations in section 2, I develop seven hypotheses below, all ceteris paribus, which will be empirically tested subsequently using the MIMIC approach:

1. An increase in direct and indirect taxation increases the shadow economy.
2. An increase in social security contributions increases the shadow economy.
3. The more the country is regulated, the greater the incentives are to work in the shadow economy.
4. The lower the quality of state institutions, the higher the incentives to work in the shadow economy.
5. The lower tax morale, the higher the incentives to work in the shadow economy.
6. The higher unemployment, the more people engage in shadow economy activities.
7. The lower GDP per capita in a country, the higher is the incentive to work in the shadow economy.

As the sample consists of 21 highly developed OECD countries between 1990 and 2005 (pooled cross section time series data), the effect of deterrence cannot be empirically tested. The size of fines and punishment and the probability of detection are only available for one or two countries across time. The following estimation results thus rather correspond to the factors reported in *Table 2.2* which are gained from an overview of existing studies.

Table 3.1: MIMIC 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.	
Cause Variables	**Estimated Coefficients**
Share of direct taxation (in % of GDP)	λ1 = 0.384** (3.06)
Share of indirect taxation (in % of GDP)	λ2 = 0.196(*) (1.84)
Share of social security contribution (in % of GDP)	λ3 = 0.506** (3.86)
Burden of state regulation (index of labor market regulation, Heritage Foundation, score 1 least regular, score 5 most regular)	λ4 = 0.213(*) (1.96)
Quality of state institutions (rule of law, World Bank, score -3 worst and +3 best case)	λ5 = -0.307* (-2.61)
Tax morale (WVS and EVS, Index, Scale tax cheating always justified =1, never justified =10)	λ6 = -0.582** (-3.66)
Unemployment rate (%)	λ7 = 0.324** (2.61)
GDP per capita (in US-$)	λ8 = -0.106** (-3.04)
Indicator Variables	**Estimated Coefficients**
Employment rate (in % of population 18-64)	λ 9= -0.626** (-2.72)
Average working time (per week)	λ10 = -1.00 (Residuum)
Annual growth rate of GDP (adjusted for the mean of all 22 OECD countries)	λ11 = -0.274** (-3.03)
Change of local currency per capita	λ12 = 0.312** (3.74)
Test-statistics	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 in parentheses (*); *; ** indicates significance at the 90%, 95%, or 99% confidence levels.

1) Steiger's 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 Σ (θ) (model implied covariance matrix). This test has a statistical validity with a large sample (N ≥ 100) and multinomial distributions; both are given for all three equations in tables 3.1.1-3.1.3 using a test of multinomial 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 *Table 3.1* the econometric results using the MIMIC approach (latent estimation approach) are presented for these 21 OECD-countries for which I have eight data points of the years 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 contributions and state regulation I have added two further causal factors, i.e. tax morale and the quality of state institutions. In addition to the employment rate, the annual growth rate of GDP and the change of currency *per capita*, I use the average working time (per week) as an additional indicator variable.[20] 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. The development of the official economy measured by 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 rate and the change of currency per capita.[21] 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[22].

3.2. The Development and Size of the Shadow Economy in German-Speaking Countries

Existing estimates of the German shadow economy (measured in percentage of official GDP) are shown in *table 3.2* (see also Feld et.al. 2007). 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, 2008) undertook an extensive research project using the survey method to estimate shadow economic activities in the years 2001 to 2006.[23] Using the officially paid wage rate, they

20. Using this indicator variable the problem might arise that this variable is influenced by state regulation, so that it is not exogenous; hence the estimation may be biased.
21. 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).
22. Compare also Schneider, Buehn and Montenegro (2010), and Feld and Schneider (2010).
23. In my paper there is no extensive discussion about the various methods to estimate the size and development of the shadow economy; I do also not discuss the strength and weaknesses of each method.

concluded that these activities reached 4.1% in 2001, 3.1% in 2004, 3.6% in 2005 and 2.5% in 2006.[24] Using the (much lower) shadow economy wage rate these estimates shrink however to 1.3% in 2001 and 1.0% in 2004, respectively. If I consider at the discrepancy method, for which I have estimates from 1970 to 1980, the German shadow economy is much larger: using the discrepancy between expenditure and income, I get approximately 11% for the 1970s, and using the discrepancy between official and actual employment, roughly 30%. The physical input methods from which 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 (1989) 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 I look at latent 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 MIMIC approach (Schneider 2005, 2009) 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. The estimates from the MIMIC approach can be regarded as the upper bound of the size of the shadow economy. For the reasons outlined in Section 3, the estimates obtained from the survey approach provide for its lower bound. It should be noted that the "true" size of the shadow economy does not necessarily lie between both bounds, nor

See Schneider and Enste (2000), Schneider (2005), Feld and Larsen (2005, 2008, 2009), Pedersen (2003), and Giles (1999a, b, c).

24. Due to the extraordinarily low rate of participation based on a relatively small sample, the results for 2006 must be interpreted with extra great care. The results for 2006 should be regarded as tentative and, at the most, as an indication that black activities do not appear to have increased from 2005 to 2006.

is it precluded that it is closer to the upper than the lower bound. But both benchmarks help us to understand the phenomenon pretty well.

3.3. Size and Development of the Shadow Economy in 21 OECD Countries

In order to calculate the size and development of the shadow economies of the 21 OECD countries, I have to overcome the disadvantage of the MIMIC approach, which is, that only relative sizes of the shadow economy are obtained such that another approach to calculate absolute figures must be used. For the calculation of the absolute sizes of the shadow economies from these MIMIC estimation results, I take the already available estimates from the currency demand approach for Austria, Germany, Italy and the United States (from studies of Dell'Anno and Schneider 2003, Bajada and Schneider 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, we can use them in a benchmark procedure to transform the index of the shadow economy from the MIMIC estimations into cardinal values.[25]

Table 3.3 presents the findings 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. This means, that since 1997/98 – the year in which the shadow economy was the biggest in most OECD countries, it has continuously shrunk. Only in Germany, Austria and Switzerland the growing trend lasted longer and was reversed two or three years ago. The reduction of the share of the shadow economy from GDP between 1997/98 and 2007 is most pronounced in Italy (-5.0%) and in Sweden (-4.0). The German shadow economy ranges in the middle of the ranking, whereas Austria and Switzerland are located at the lower end. With 20% to 26%, South European countries exhibit the biggest shadow economies measured as a share from 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 for example there are fewer regulations in the OECD country USA compared to the OECD country Germany where everything what is not explicitly allowed is forbidden. The individual's freedom is limited in many areas by far-reaching state interventions. Another reason is the large differences in the direct and indirect tax burden with the lowest in the U.S. and Switzerland in this sample.

25. This procedure is described in great detail in the paper Dell'Anno and Schneider (2004, 2009), see also the appendix where the procedure is shortly described and the advantages and disadvantages are shown.

Table 3.2: The Size of the Shadow Economy in Germany According to Different Methods (in Percentage of Official GDP)

Method	Shadow economy in Germany (in percentage of official GDP) in:								Source
	1970	1975	1980	1985	1990	1995	2000	2005	
Survey	-	3.6 [1)]	-	-	-	-	-	-	IfD Allensbach (1975)
	-	-	-	-	-	-	4.1 [2)]	3.6 [2)]	Feld and Larsen (2005, 2008)
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 (1984a, b)
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 (1984a, b)
	4.5	7.8	9.2	11.3	11.8	12.5	14.7	-	Schneider and Enste (2000)
Latent (MIMIC) approach	5.8	6.1	8.2	-	-	-	-	-	Frey and Weck (1984)
	-	-	9.4	10.1	11.4	15.1	16.3	-	Pickhardt and Sarda Pons (2006)
	4.2	5.8	10.8	11.2	12.2	13.9	16.0	15.4	Schneider (2005, 2007)
Soft modeling	-	8.3 [4)]	-	-	-	-	-	-	Weck-Hannemann (1983)

1) 1974.
2) 2001 and 2005; calculated using wages in the official economy.

Table 3.3: The Size of the Shadow Economy in 21 OECD Countries between 1989/90 and 2007 Estimated Using the Money Demand and MIMIC Methods (in % of Official GDP)										
	Shadow Economy									
OECD-countries	Average 1989/90	Average 1994/95	Average 1997/98	Average 1999/00	Average 2001/02	2003	2004	2005[1]	2006[1]	2007[1]
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.										

4. SHADOW ECONOMY LABOR FORCE AND LABOR MARKET

4.1. Shadow Economy Labor Market

Having examined the size, rise and fall 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.[26] Moreover, by definition every activity in the shadow economy involves a "shadow labor market" to some extent:[27] 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.[28] 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 Fréchette (1994) who use micro data from a survey conducted in Quebec City (Canada). In particular, their study provides some economic insights regarding 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 (mis-) allocation of work from the official to the informal sector, where it is not taxed. In this case, the substitution between labor market activities in the two sectors is quite high. These empirical findings indicate, that "participation rates and hours worked in the underground sector also tend to be inversely related to the number of hours worked in the regular sector" (Lemieux, Fortin and Fréchette 1994, p. 235). 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.

26. 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).
27. Compare also the latest OECD report with the title "Is Informal Normal: Toward More and Better Jobs" by the OECD (2009).
28. 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.

Illicit work can take many forms. 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 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.[29]

Kucera and Roncolato (2008, p. 321) also deal with informal employment. They address two issues of crucial importance to labor market policy:

(i) The intensive labor market regulations as one (major) cause of informal employment, and

(ii) the so-called "voluntary" informal employment. Kucera and Roncolato give a theoretical overview on both issues and also a survey of a number of empirical studies, in which mainly the effect of official labor market regulations on informal employment is analyzed, where they find a significant and quantitatively important influence.

4.2. Shadow Economy Labor Force

4.2.1 World Wide Aspects

The following results of the shadow economy labor force are based on the OECD and World Bank database on informal employment in major cities and in rural areas, as well as on other sources mentioned in the footnotes of this chapter. The values of the shadow economy labor force are calculated in absolute terms, and as a percentage of the official labor force, under the assumption that the shadow economy in rural areas is at least as high as in the cities. This is a conservative assumption, since in reality it is likely to be even larger.[30] Survey techniques and, for some countries, the MIMIC-method and the method of the discrepancy between the official and actual labor force are used for estimation. The following results are preliminary and should be treated as a first attempt to calculate the shadow economy labor force.

29. For developing countries some literature about the shadow labor market exists (Dallago (1990), Pozo (1996), Loayza (1996), Chickering and Salahdine (1991) and OECD (2009)).

30 The assumption that the shadow economy labour force is at least as high in rural areas as in major cities, is a very modest one and is supported by Lubell (1991). Some authors (e.g., Lubell (1991), Pozo (1996), and Chickering and Salahdine (1991)) argue that the illicit labour force is nearly twice as high in the

One of the latest OECD study (2009)[31] concludes that (over the period 1990 to 2007) informal employment is the norm, not the exception, in many parts of the world. More than half of all jobs in the non-agricultural sectors of developing countries – over 900 million workers – can be considered informal. If agricultural workers in developing countries are included, the estimates size to roughly 2,000 million people. In some regions, including Sub-Saharan Africa and South Asia, over 80% of non-agricultural jobs are informal. Most informal workers in the developing world are self-employed and work independently, or owe and manage very small enterprises. According to the OECD study (2009), informal employment is a result of both, people being excluded from official jobs and people voluntarily opting out of formal structures, e.g. in many middle income countries incentives drive individuals and businesses out of the formal sector.

To summarize, this OECD study clearly comes to the conclusion that informal is really the norm or the normal case. 1.8 billion people work in informal jobs, compared to 1.2 billion who benefit from formal contracts and social security protection. Informal economic activity, excluding the agricultural sector, accounts for three quarters of the jobs in Sub-Saharan Africa, more than two thirds in South and South East Asia, half in Latin America, the Middle East and North Africa, and nearly one quarter in transition countries. If agriculture is included, the informal share of the economy in the above mentioned regions is even higher (e.g. more than 90 % in South Asia). Also, the OECD study (2009) comes to the result that more than 700 million informal workers "survive" on less than $ 1.25 a day and some 1.2 billion on less than $ 2 a day. The study also concludes that the share of informal employment tends to increase during economic turmoil. For example, during the Argentine economic crisis (1999-2002), the countries' "official" economy shrank as by almost one fifth while the share of informal employment expanded from 48 to 52 percent. The share of informal employment is also shown in Figure 4.1. One can clearly see that even under strong economic growth, the share of non-agricultural employment, the share of informal employment is strongly rising.

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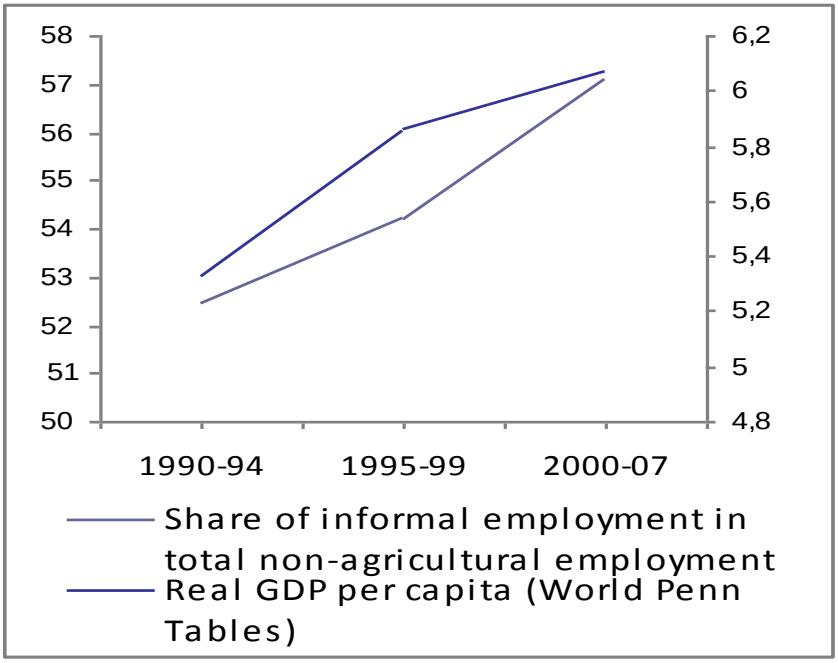
countryside as in urban areas. But since no (precise) data exists on this ratio, the assumption of an equal size may be justified arguing that such a calculation provides at least minimal figures.

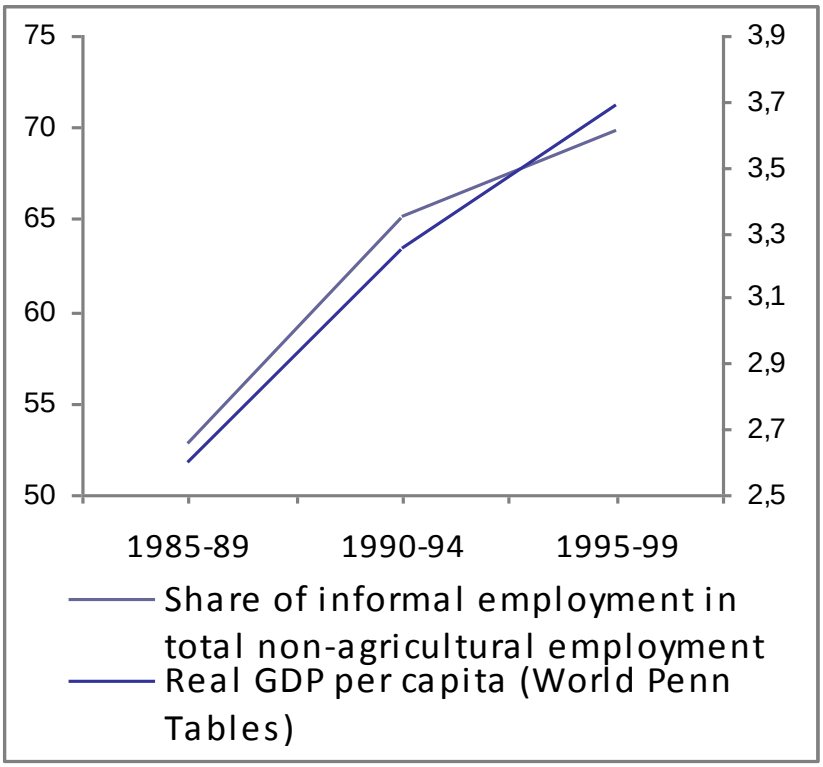
31 The following results and figures are taken from the OECD (2009), executive summary.

Figure 4.1: Informal Employment and GDP in Latin America and Southeast Asia

Latin America



Southeast Asia



Source: OECD, Is Informal Normal, Paris, 2009.

Table 4.1.: Estimates of the Size of the "Shadow Economy Labor Force" in Some OECD Countries 1974-1998							
Countries	Year	Official GDP per capita in US-$[1)]	Total Economy (Shadow Economy plus official GDP per capita in US-$)	Size of the Shadow Economy (in % of official GDP) Currency Demand Approach[2)]	Shadow Economy Labor Force in 1000 people[3)]	Shadow Economy Participants in % of official Labor Force[4)]	Sources of Shadow Economy Labor Force
Austria	90-91 97-98	20,636 25,874	25,382 29,630	5.47 8.93	300-380 500-750	9.6 16.0	Schneider (1998a, b) and own calculations
Denmark	1980 1986 1991 1994	13,233 18,496 25,946 34,441	18,658 26,356 36,558 48,562	8.6 9.8 11.2 17.6	250 390 410 420	8.3 13.0 14.3 15.4	Mogensen, et. al. (1995) and own calculations
France	1975-82 1997-98	12,539 24,363	17,542 34,379	6.9 14.9	800-1,500 1,400-3,200	3.0-6.0 6.0-12.0	De Grazia (1983) and own calculations
Germany	1974-82 1997-98	11,940 26,080	17,911 39,634	10.6 14.7	3,000-4,000 7,000-9,000	8.0-12.0 19.0-23.0	De Grazia (1983), F. Schneider (1998a, b) and own calculations
Italy	1979 1997-98	8,040 20,361	11,736 29,425	16.7 27.3	4,000-7,000 6,600-11,400	20.0-35.0 30.0-48.0	Gaetani-d'Aragona (1979) and own calculations
Spain	1979-80 1997-98	5,640 13,791	7,868 19,927	19.0 23.1	1,250-3,500 1,500-4,200	9.6-26.5 11.5-32.3	Ruesga (1984) and own calculations
Sweden	1978 1997-98	15,107 25,685	21,981 37,331	13.0 19.8	750 1,150	13.0-14.0 19.8	De Grazia (1983) and own calculations
European Union	*1978* *1997-98*	*9,930* *22,179*	*14,458* *32,226*	*14.5* *19.6*	*15,000* *30,000*	-	*De Grazia (1983) and own calculations*
OECD (Europe)	*1978* *1997-98*	*9,576* *22,880*	*14,162* *33,176*	*15.0* *20.2*	*26,000* *48,000*	-	*De Grazia (1983) and own calculations*

1) Source: OECD, Paris, various years
2) Source: Own calculations from Schneider (2000, 2001).
3) Estimated full-time jobs, including unregistered workers, illegal immigrants, and second jobs.
4) In percent of the population aged 20-69, survey method.

Table 4.2.: Development of „full time shadow economy workers“ and of illegal foreign workers of 1000 people in Germany, Austria and Switzerland over the period 1995 to 2009[1).]

Year	Germany		Austria		Switzerland	
	Full time shadow economy workers	Illegal foreign workers	Full time shadow economy workers	Illegal foreign workers	Full time shadow economy workers	Illegal foreign workers
1995	7.320	878	575	75	391	55
1996	7.636	939	617	83	426	61
1997	7.899	987	623	86	456	67
1998	8.240	1.039	634	89	462	69
1999	8.524	1.074	667	93	484	74
2000	8.621	1.103	703	99	517	79
2001	8.909	1.149	734	104	543	84
2002	9.182	1.194	746	109	556	88
2003	9.420	1.225	769	112	565	90
2004	9.023	1.103	789	114	560	89
2005	8.549	1.002	750	104	520	82
2006	8.124	952	716	98	493	78
2007	8.206	961	709	97	490	77
2008	8.154	955	679	93	471	74
2009	8.272	968	713	98	484	76

Source: Own calculations (2010).

1) Explanations: These numbers of full time shadow economy domestic workers are a fiction, because these are calculated from the million hours worked in the shadow economy. Most people, who work in the shadow economy in these three countries, are “part-time” shadow economy workers. The calculation is only done to make comparisons to official statistics.

4.2.2 OECD-Countries

4.2.2.1 General Results

In *Table 4.1* the estimates for the shadow economy labor force in highly developed OECD countries (Austria, Denmark, France, Germany, Italy, Spain and Sweden) are shown.[32] In Austria the shadow economy labor force has arrived at 500.000 to 750.000 or 16% of the official labor force (mean value) in the years 1997-1998. 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 between 1.6 and 3.2 million in absolute figures. In Germany this figure rose from 8 to 12% in 1974 to 19% and to 22% (8 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 years 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.

Additionally, *Table 4.1* contains a preliminary calculation of the total GDP per capita (including the official and the shadow economy GDP per capita) in US-$. In all countries investigated, total GDP per capita is much higher – on average in all countries around 40%. This clearly shows that the productivity in the shadow economy is roughly as high as in the official economy – a clear indication, that the work effort (i.e. the incentive to work effectively) is as strong in the shadow economy as in the official one. In general these results demonstrate that the shadow economy labor force has reached a remarkable

32. Shadow economy labor force consists of estimated full-time “black” jobs, including unregistered workers, illegal immigrants and second “black” jobs.

size in the developing countries as well as in highly developed OECD countries, even though the calculation still might have many errors.

Data about the share of the shadow economy labor force in highly developed countries is really scarce. For three countries (compare Table 4.2), we have some data, these are Austria, Germany and Switzerland, where we have a shadow economy labor force calculated in full time shadow economy workers[33]. If we consider Germany, the full time shadow economy workers were about 7 million in 1995 and increased to 9.4 million in 2004 and decreased again to 8.2 million in 2009. If we consider the illegal foreign shadow economy full time workers in Germany, they are roughly one twelfth of the full time German or legal resident shadow workers. In 1995 they were 878,000, increased to 1.2 million in 2002 and decreased again to 968,000 in 2009. In Austria, the full time shadow economy workers were 575,000 in 1995, increased to 798,000 in 2004 and have decreased since to 713,000 in 2009. Table 4.2 clearly shows that the figures of the shadow economy work force in these highly developed countries Austria, Germany and Switzerland, are much smaller than the ones in developing countries.

4.2.2.2 Case Studies of Denmark and Germany

Finally two case studies about the size and development of shadow economy labor markets in Denmark and in Germany will be presented and discussed.

The first study is done by Hvidtfeldt, Jensen and Larsen (2011), which investigates the size and development of undeclared work in Denmark over the years 2008-2010, but also going back to the year 1994. Hvidtfeld, Jensen and Larsen (2011, p. 1) claim that more than half of all Danes purchase undeclared work in the course of a year. The authors got this finding with the help of an interview survey of 2.200 randomly-selected Danes who were conducted by the Rockwool Foundation Research Unit in 2010. According to their survey, 52% of those questioned had had undeclared work done for them in the previous year and had paid in cash, in kind or through return services. Their survey (2011, p. 2) also showed that an additional 28% would be willing to buy undeclared services, even

33. These numbers of full time shadow economy workers are a "fiction", because most people in these three countries are "part time" shadow economy workers. They are only calculated here to make the figure comparable to the work force in the official economy. Let me repeat, these full time shadow economy workers do not exist for Germany, Austria and Switzerland.

though they had not actually done so within the previous year. In total, 80% of the Danish population are potential customers for undeclared work and only 20% said, they would refuse to pay for undeclared services.

In table 4.3 it is shown the proportions of Danish men who carried out undeclared work in the previous 12 month (year 2010). Table 4.3 clearly says that 48% of such undeclared work is done in the construction sector, followed by agriculture of 47% and motor vehicle sales and repairs of 43%. The least amount is done in the public and personal services with 26%.

Table 4.3: Proportions of men who had carried out undeclared work in the previous 12 months

SECTOR	in percent
Building and construction	**48%**
Agriculture (incl. gardening), fishing and mineral extraction	**47%**
Motor vehicle sales and repairs	**43%**
Energy and water supply	**(38%)**
Manufacturing	**36%**
Transport and telecommunications	**31%**
Hotel and restaurant	**(30%)**
Financial and business services	**28%**
Public and personal services	**26%**
Retail, wholesale and repair (excluding motor vehicles)	**26%**
OVERALL	**32%**

Note: Data from 1998-2005; Figures in parentheses are based on fewer than 50 observations.
Source: Rockwool Foundation Research Unit, 2011, p. 5.

In this study the authors also investigate the amount of undeclared work since the year 1994 and they come to the conclusion that Danes do roughly as much undeclared work today as they did 15 years ago. The latest figures from 2008-2010 show that every forth

adult Dane carried out some kind of undeclared work in the course of a year. Those involved spend around three hours per week working on the undeclared labor market. This figure has not changed since the mid 1994. Calculations of the amount of undeclared work in relation to GDP also show that the situation remains largely unchanged. Undeclared work today is at a level of 2,8% in relation to GDP.[34]

Finally what is a quite interesting result of this study, is the acceptance of black labor among the Danish population.

Table 4.4 A: Proportion of the Danish population who find it acceptable that a schoolgirl should earn undeclared income for babysitting, 2007-2008.

If she earns DKK 200 per week	**84%**
If she earns DKK 300 per week	**70%**

Source: Rockwool Foundation Research Unit, March 2011, p.14

Table 4.4 B: Proportion of the Danish population who find it acceptable that a skilled tradesman should earn undeclared income, 2007-2008.

If he earns DKK 10.000 per year	**47%**
If he earns DKK 50.000 per year	**27%**

Source: Rockwool Foundation Research Unit, March 2011, p. 14.

The Danish population evaluates a school girl who earns some money in the shadow economy was asked about the acceptance and the same question war asked about a skilled tradesman. The results are reported in table 4.4. They clearly show that there is a high acceptance of shadow economy labor work for a school girl compared to a well established skilled tradesman with a reasonable high income. Not astonishing for the school girl the acceptance is 70% earning 300 DKK per week and 84% earning 200 DKK per week. For the tradesman to earn additional 10.000 DKK per year the acceptance

[34] In this study a lot of interesting facts are reported, like who is working, like distribution of men and women in the shadow economy, like, how much is paid per hour in the different sectors, etc. Also it is investigated whether high income households demand more or less shadow economy work and it seems they demand more.

drops down to 47% (below 50%) and if he earns more than 50.000 DKK per year the acceptance is only 27%. A quite interesting finding.

Also in a new study by Haigner, Jenewein, Schneider and Wakolbinger (2011) the informal labor supply and demand in Germany for the year 2010 is investigated. In this study the authors use data from a representative survey among 2104 German residents, conducted in May 2010. As a matter of fact, questions on illegal behavior like informal labor supply and demand are highly confidential and it is possible that survey respondents who have engaged in such activities do not want to declare that they have done so. In order to encourage honest answers, the interviewees have been read the following text (translated from German).

"The next set of questions deals with what is called black work. We survey these questions on behalf of a group of independent scientists, who will process the results within a study. By black work they mean the following: One works for somebody and agrees not to pay taxes for the payment. Both partners are better off because no value added tax, income tax or social security contributions are paid. Such procedures are frequently occurring, for example, in cleaning, gardening, baby-sitting, waiting at table, writing or programming. Also, work which is not taxed is prevalent in construction, renovation, car repair and taking care of elderly people."

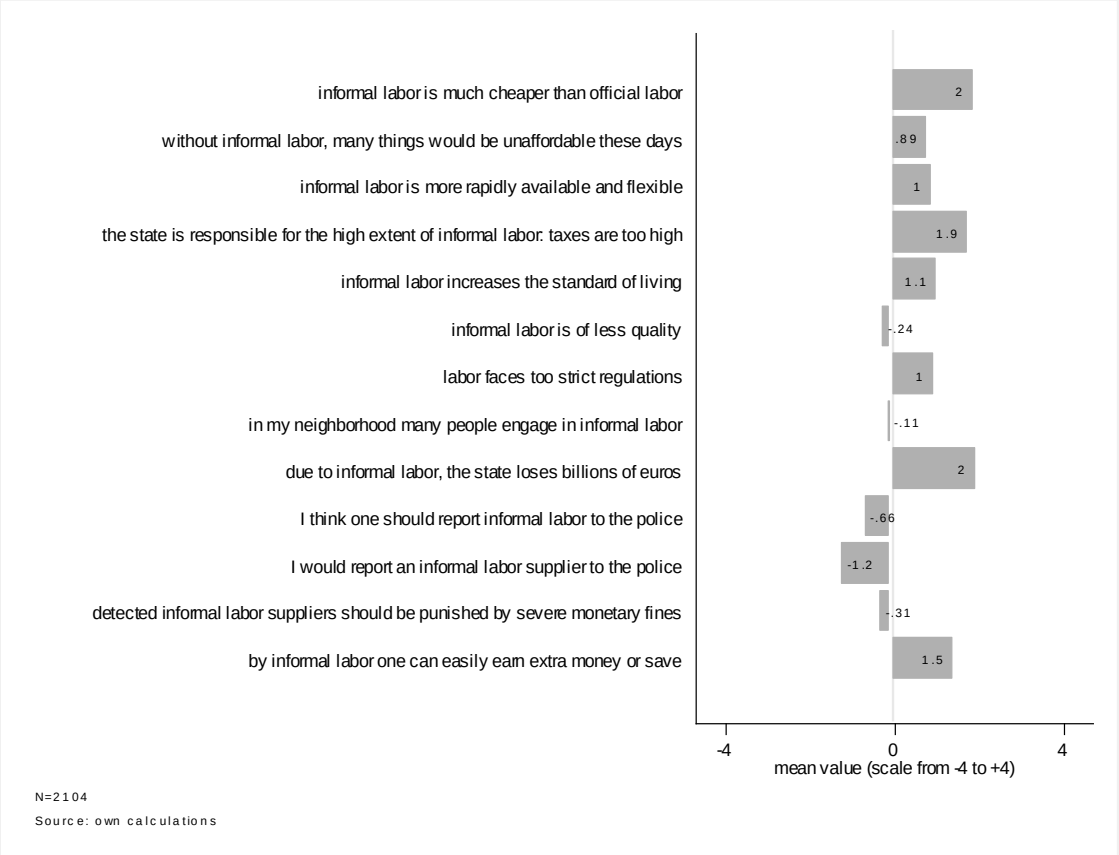
Moreover, if interviewers recognized that the interviewees hesitated to answer the questions on informal labor supply and demand, they would again note that the interview is confidential and that answers are confidential, anonymous and only for scientific use. We are confident that this procedure minimizes the fraction of wrong answers. The question on informal labor supply was (translated from German) *"Have you, during the last year, worked for somebody in the way described above (black work)?*" The question on informal labor demand was (again translated from German) *"Have you, during the last year, demanded black work?"* Moreover, they have asked informal labor suppliers on the reasons for doing so, on the time when they have done such works (working time, weekends, vacations,…), on the sector in which they have worked, on the number of hours they have worked per month and on the estimated hourly wage they have received. Also, they have been asked whether they would continue to supply informal labor if an unconditional basic income system was launched. Informal labor demanders have been

asked on the sector in which they demanded work and whether they would shift demand into the formal labor market if an unconditional basic income system came into effect.

In order to grasp the general attitudes towards informal labor supply and demand, they have asked the survey respondents to declare their accordance with a set of 13 statements on the topic. Possible answers were indicated on a scale ranging from -4 (total disagreement) to +4 (total agreement). Figure 4.2 shows the results.

While there seems to be considerable awareness of the fact that informal labor reduces the tax revenues of the state, many people claim, on the other hand, that high tax rates make the informal labor market thrive. Interestingly, many people like informal labor because it is more rapidly available and more flexible than official labor, which is widely perceived to be subject to too strict regulations. Moreover, people, on average, do not agree with the statement that informal labor suppliers should be reported to the police, nor would many people report them to the police themselves. This shows that informal labor is, in Germany, perceived as a rather trivial offense.

Figure 4.2: Attitudes towards informal labor supply and demand



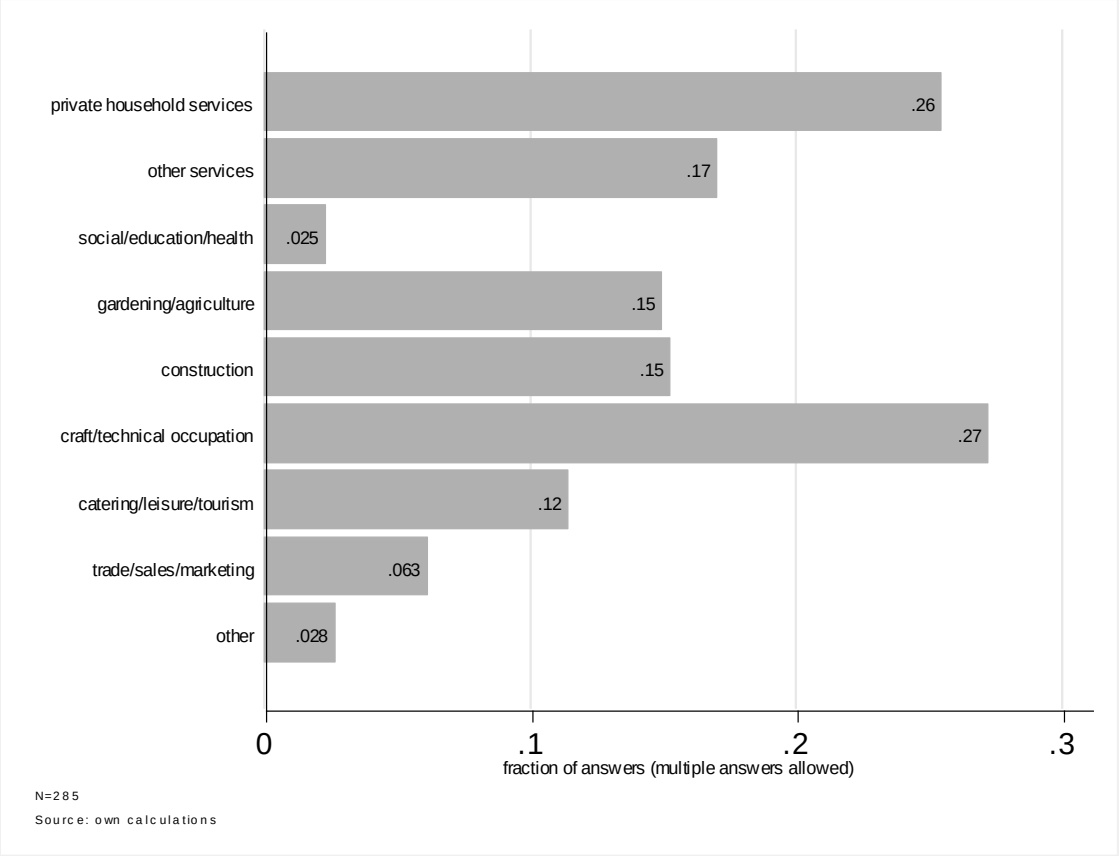
(1) Informal Labor Supply

Out of 2104 respondents, 285 (13.55%) declared that they have been supplying informal labor during the year before the survey. Among men, the fraction of informal labor suppliers was significantly higher (18.82%) than among women (8.58%) (Mann-Whitney U-Test, N=2104, p=0.00). Moreover, we find above average fractions of informal labor suppliers among the unemployed (29.29%) and people out of labor force "due to other reasons" (23.53%). Among pensioners (5.10%) and housewives and housemen (9.52%), the fraction is below the average, while it is close to the average among students (14.44%), apprentices (11.75%), self-employed persons (15.17%) and dependent employees (15.60%). Among persons not having completed compulsory education and those who have completed an apprenticeship, informal labor suppliers are overrepresented (24.24% and 20.41%), while they are underrepresented among persons with a university degree (7.19%).

(2) Sectors of Informal Labour Supply

Figure 4.3 shows in which sectors informal labor supply takes place. Not surprisingly, crafts and technical occupations and private household services have the highest relative importance. In both branches, more than a quarter of informal labor suppliers are engaged. About 15% of informal labor suppliers declare to be working in other services, gardening/agriculture and construction. Fractions do not add up to 100% since multiple answers have been allowed.

Figure 4.3: sector of informal labor supply



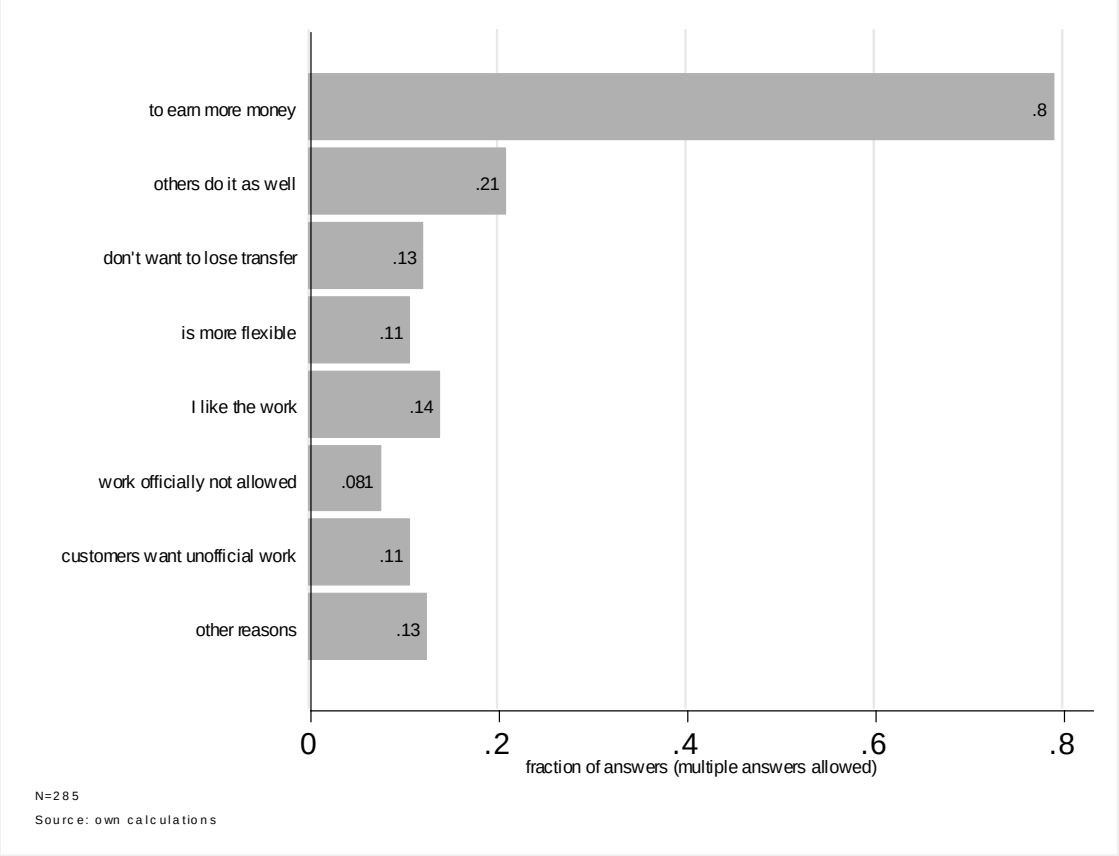
(3) Directly reported reasons

The authors have directly asked the survey respondents declaring to engage in informal labor supply for the reasons for doing so. Again, the results are as expected. Figure 4.4 shows that four in five declare to supply informal labor in order to earn more money. All

other noted reasons are far less important. However, it is interesting to see, for example, that one in about eight informal labor suppliers do so because they do not want to lose transfer payments. In the German social system, pensioners as well as unemployment benefit and social assistance recipients face a full transfer cut and thus implicit marginal tax rates of 100% and more if they would officially supply labor.

More than one in five informal labor suppliers claim that a reason for doing so is that others do it as well. This result is in line with our (earlier reported) finding that German residents perceive, in general, informal labor supply and demand as a rather trivial offence. By the same token, slightly more than ten percent of informal labor suppliers claim that they do so because their customers want the demanded work to be done unofficially. Another ten percent say that they like the flexibility of informal labor supply.

Figure 4.4: Directly reported reasons for supplying informal labor



4.2.3 Developing Countries – Earlier Results[35]

Table 4.5. shows the results of countries in Africa. Gambia has the largest shadow economy labor force with 80% of the official one, followed by Guinea with 79%, Benin with 76.9%, Rwanda with 75%, and the Republic of Congo with 50%.[36] Zimbabwe has the lowest rate of illicit work with 33.9% of the official labor force. For African countries, the figures show considerable variation and should really be seen as first and preliminary results. Under the assumption that this informal or shadow economy labor force is as productive as the official economy and contributes per capita a similar added value, the shadow economy GNP can be calculated, which is also shown in Table 4.4. Gambia has the largest shadow economy as a percentage of official GNP with 41.2%, followed by Guinea with 36.9%, and Rwanda with 38.7%. On average, the supply of illicit work in these 33 African countries is 54.2% (of the official labor force) and 24.6% of the population.

Table 4.6 illustrates the results for some Asian countries. Here, China, India, and Indonesia have to be examined more closely, as they are the three largest countries in Asia (regarding population). In China, it is estimated that 160 million people work in the shadow economy – 21.9% of the official labor force.[37] In India, 217 million people work illicitly – 50% of the official labor force. In Indonesia, 36.7 million people engage in shadow economic activities, this corresponds to 37.4% of the official labor force. In Pakistan, 29.4 million people or 60% work in the shadow economy. One realizes that in Asia the shadow economy labor force is quite high, but these values are also preliminary

35 This parts follows closely Schneider and Enste (2002, part 5, pp. 43-51).

36 These high values strongly indicate that a considerable number of these illicit workers also have (at least part-time) jobs in the official economy. Yet, the number of these 'double-job-holders' (official and unofficial at the same time) is unknown and may differ from country to country. The ratio of the shadow economy labour force as a percentage of the official one should be interpreted very cautiously, since it is unclear what this ratio actually stands for. Hence, an interpretation is very difficult. In addition, making comparisons between different countries is very complicated and such comparisons provide only a very crude picture. Maybe the rate of the shadow economy labour force as a percentage of the population is a somewhat better gauge.

37 The figure for China should be interpreted with great care as this country still has a communist regime with some regions under a capitalist system.

and have to be reevaluated. On the whole, the shadow economy labor force in these Asian countries makes up 46.5% of the official labor force and 19.6% of the population.

In Table 4.7 some Latin and South American states are shown. In absolute terms, Brazil has the highest shadow economy labor force with 37.4 million (49.2% of the official labor force), followed by Colombia with 9.7 million or 53.8%. Both Ecuador with 58.8%, and Peru with 54.6%, have a quite high rate of illicit work. Chile has the lowest rate, with 40%, as well as Paraguay with 41%, and El Salvador with 47.3% of the official labor force. Overall, the shadow economy labor force in these nine countries is 49.6% of the official labor force and 20.3% of the population.

4.2.4 Transition Countries – Earlier Results

Nine transition countries were analyzed (see Table 4.8.). Armenia has the highest rate with an illicit labor force of 75.5% of the official labor force, followed by Croatia with 70%, and Bulgaria with 63%. In absolute figures, Russia has by far the largest shadow economy labor force among the transition countries with 32.9 million illegal workers, followed by Rumania with 4.7 million, and Kazakhstan with 2.8 million. Slovenia has the lowest black labor force with 31%.[38] Generally, the shadow economy labor force in these nine countries is 49% of the official labor force and 23.9% of the population.

[38] Of the official labor force.

Table 4.5: Shadow economy labor force in Africa

Country	Informal employment (1998)			Population (1997) millions	Labor force (1997)		Shad. ec. GNP in billion $, 1998	Official GNP in billion $, 1998	Shad. ec. GNP as % of official GNP
	Millions	As % of official labor force	In % of population		Millions	As % of population			
Angola	1.90	35.7	16.3	11.66	5.3	45.45	646	4,000	16.2
Benin	2.00	76.9	34.5	5.80	2.6	44.83	758	2,200	34.5
Botswana	0.30	45.0	19.6	1.53	0.7	45.75	1,080	5,600	19.3
Burkina Faso	3.40	65.0	32.5	10.47	5.2	49.67	816	2,600	31.4
Cameroon	3.50	61.7	25.1	13.94	5.7	40.89	2,135	8,700	24.5
Chad	1.30	38.0	18.2	7.15	3.4	47.55	299	—	—
Congo	0.60	50.3	22.1	2.71	1.1	40.59	414	1,900	21.8
Côte d'lvoire	3.40	60.3	23.9	14.21	5.7	40.11	2,380	10,100	23.6
Dem. Rep. of Congo	15.70	80.0	33.6	46.71	19.6	41.96	1,727	5,400	32.0
Ethiopia	15.70	61.0	26.3	59.75	25.7	43.01	1,570	6,200	25.3
Gabon	0.30	58.0	26.1	1.15	0.5	43.48	1,251	—	—
Gambia	0.50	80.0	42.4	1.18	0.6	50.85	170	413	41.2
Ghana	6.10	72.3	33.9	17.98	8.5	47.27	2,379	7,200	33.0
Guinea	2.60	79.0	37.6	6.92	3.3	47.69	1,404	3,800	36.9
Kenya	6.00	40.8	21.0	28.61	14.6	51.03	2,100	9,800	21.4
Lesotho	0.31	38.8	15.4	2.01	0.8	39.80	185	1,200	15.4
Liberia	0.40	35.0	13.8	2.89	1.2	41.52	—	—	—

Table 4.5: Shadow economy labor force in Africa – cont.

Country	Informal employment (1998)			Population (1997) millions	Labor force (1997)		Shad. ec. GNP in billion $, 1998	Official GNP in billion $, 1998	Shad. ec. GNP as % of official GNP
	Millions	As % of official labor force	In % of population		Millions	As % of population			
Madagascar	3.90	57.5	27.6	14.15	6.7	47.35	1,014	3,700	27.4
Malawi	2.50	51.7	24.3	10.28	4.9	47.67	500	2,100	23.8
Mali	1.80	36.0	17.5	10.29	5.0	48.59	450	2,600	17.3
Mauritania	0.50	41.0	20.3	2.46	1.1	44.72	205	1,000	20.5
Namibia	0.33	47.1	20.4	1.62	0.7	43.21	652	3,200	20.4
Niger	2.30	51.0	23.5	9.80	4.6	46.94	437	—	—
Nigeria	23.40	48.9	19.8	117.90	47.9	40.63	17,780	36,400	48.8
Rwanda	3.20	75.0	40.5	7.90	4.2	53.16	736	1,900	38.7
Senegal	2.50	62.4	28.4	8.79	4.0	45.51	1,325	4,800	27.6
Sierra Leone	1.30	70.0	27.4	4.75	1.8	37.89	182	702	25.9
Sudan	4.60	42.6	16.3	28.30	10.8	38.16	1,333	8,200	16.3
Tanzania	6.80	42.2	21.7	31.32	16.1	51.40	1,476	6,800	21.7
Togo	0.70	38.9	16.1	4.34	1.8	41.47	226	1,400	16.1
Tunisia	2.00	57.1	21.5	9.30	3.5	37.63	4,272	19,400	21.5
Uganda	5.80	56.4	28.5	20.32	10.2	50.20	1,798	—	—
Zimbabwe	1.80	33.9	15.7	11.47	5.3	46.21	1,082	6,900	15.7
Average over 33 countries	3.9	54.2	24.6			44.9			25.7

Source: Schneider and Enste (2002, chapter 5), based on World Bank, Africa Region Live Database, http://www.worldbank.org/html/extdr/regions.htm.

Table 4.6: Shadow economy labor force in Asia

Country	Informal employment (1998)			Population (1998) millions	Labor force (1998)		Informal GNP in billion $, 1998	Official GNP in billion $, 1998	Informal GNP as % of official GNP
	Millions	As % of labor force	As % of population		Millions	As % of population			
China	**162.40**	**21.9**	**13.1**	**1,238.60**	**743.0**	**59.99**	**138,327**	**1,055,000**	**13.1**
India	**217.20**	**50.4**	**22.2**	**979.70**	**431.0**	**43.99**	**95,568**	**427,400**	**22.4**
Indonesia	**36.70**	**37.4**	**18.0**	**203.70**	**98.0**	**48.11**	**24,956**	**221,500**	**11.3**
Mongolia	**0.42**	**44.0**	**16.2**	**2.60**	**1.0**	**38.46**	**169**	**1,000**	**16.9**
Nepal	**8.60**	**78.1**	**37.6**	**22.90**	**11.0**	**48.03**	**1,803**	**4,800**	**37.6**
Pakistan	**29.40**	**60.0**	**22.3**	**131.60**	**49.0**	**37.23**	**—**	**—**	**—**
Philippines	**9.80**	**30.6**	**13.0**	**75.20**	**32.0**	**42.55**	**11,520**	**88,400**	**13.1**
Sri Lanka	**2.50**	**31.3**	**13.3**	**18.80**	**8.0**	**42.55**	**—**	**—**	**—**
Yemen	**3.30**	**65.0**	**19.9**	**16.60**	**5.0**	**30.12**	**990**	**4,400**	**22.5**
Average of 9 countries	**52.3**	**46.5**	**19.5**			**43.4**			**19.5**

Source: Own calculations based on World Bank, World Development Indicators, http://www.worldbank.org/html/extdr/regions.htm.

Table 4.7: Shadow economy labor force in Latin and South America

Country	Informal employment (1998)			Population (1998) millions	Labor force (1998)		Informal GNP in billion $, 1998	Official GNP in billion $, 1998	Informal GNP as % of official GNP
	Millions	As % of labor force	As % of population		Millions	As % of population			
Bolivia	**1.54**	**51.3**	**19.5**	**7.90**	**3.0**	**37.97**	**1,540**	**7,400**	**20.8**
Brazil	**37.40**	**49.2**	**22.5**	**165.90**	**76.0**	**45.81**	**—**	**—**	**—**
Chile	**2.40**	**40.0**	**16.2**	**14.80**	**6.0**	**40.54**	**11,544**	**73,400**	**15.7**
Colombia	**9.70**	**53.8**	**23.8**	**40.80**	**18.0**	**44.12**	**25,220**	**106,100**	**23.8**
Ecuador	**2.94**	**58.8**	**24.1**	**12.20**	**5.0**	**40.98**	**4,482**	**18,600**	**24.1**
El Salvador	**1.40**	**47.3**	**23.0**	**6.10**	**3.0**	**49.18**	**2,590**	**11,200**	**23.1**
Guatemala	**2.01**	**50.3**	**18.6**	**10.80**	**4.0**	**37.04**	**3,296**	**16,800**	**19.6**
Paraguay	**0.80**	**41.0**	**15.4**	**5.20**	**2.0**	**38.46**	**1,408**	**9,200**	**15.3**
Peru	**4.91**	**54.6**	**19.8**	**24.80**	**9.0**	**36.29**	**12,079**	**61,100**	**19.8**
Average of 9 countries	**7.0**	**49.6**	**20.3**			**41.2**			**20.3**

Source: Schneider and Enste (2002, chapter 5) based on World Bank, World Development Indicators, http://www.worldbank.org/html/extdr/regions.htm.

Table 4.8: Shadow economy labor force in transition countries

Country	Informal employment (1998)			Population (1998) millions	Labor force (1998)		Informal GNP in billion $, 1998	Official GNP in billion $, 1998	Informal GNP as % of official GNP
	Millions	As % of labor force	As % of population		Millions	As % of population			
Armenia	**1.51**	**75.5**	**39.7**	**3.80**	**2.0**	**52.63**	**725**	**1,800**	**40.3**
Bulgaria	**2.52**	**63.0**	**30.4**	**8.30**	**4.0**	**48.19**	**3,100**	**10,100**	**30.7**
Croatia	**1.40**	**70.0**	**31.1**	**4.50**	**2.0**	**44.44**	**6,328**	**20,700**	**30.6**
Georgia	**1.10**	**36.7**	**20.4**	**5.40**	**3.0**	**55.56**	**1,023**	**5,100**	**20.1**
Kazakhstan	**2.80**	**40.0**	**17.9**	**15.60**	**7.0**	**44.87**	**3,668**	**19,400**	**18.9**
Kyrgyzstan	**0.80**	**40.0**	**17.0**	**4.70**	**2.0**	**42.55**	**280**	**1,600**	**17.5**
Rumania	**4.70**	**42.7**	**20.9**	**22.50**	**11.0**	**48.89**	**6,533**	**31,300**	**20.9**
Russian Federation	**32.90**	**42.2**	**22.4**	**146.90**	**78.0**	**53.10**	**75,670**	**337,900**	**22.4**
Slovenia	**0.31**	**31.0**	**15.5**	**2.00**	**1.0**	**50.00**	**3,026**	**19,400**	**15.6**
Average of 9 countries	**5.3**	**49.0**	**23.9**			**48.9**			**24.1**

Source: Schneider and Enste (2002, Chapter 5) based on World Bank, World Development Indicators, http://www.worldbank.org/html/extdr/regions.htm

4.2.5 Developing and Transition Countries – Latest Results

Compared to the first estimates presented in the subchapters 4.2.3 and 4.2.4 there have been some newer studies with respect to estimate the size and development of the shadow economy labour force[39]. Kucera and Roncolato (2008, p.321) deal with informal employment. They address issues of crucial importance to labour market policy; first, the intensive labour market regulation is one major cause of informal employment, and second, the so called voluntary informal employment. Kucera and Roncolato give a theoretical overview on both issues and also a survey of a number of empirical studies, in which the effect of the official labour market regulations on informal employment is analyzed, where they find a significant and quantitatively important influence.

In Table 4.9 the share of informal employment in total non-agricultural employment by five-year period and by country and region is presented. From the table one clearly sees that in all countries the share of informal employment has remarkably increased over time. The share of informal employment in Algeria in the period of 1975-1979 21 was 21.8% and increased in the period of 2000-2007 to 41.3%. In India the employment rose in the period of 1985-1989 from 76.2% to 83.4% from 1995-1999. In the Republic of Mali the share of informal employment (in percent of total non agricultural employment) was 63.1% from 1975-1979, and increased to 81.8% in 2000-2007. Table 5.5 clearly demonstrates that there is a very strong positive trend in the share of informal employment (in percent of total non agricultural employment).

Table 4.10 provides the share of informal employment in total non-agricultural employment by country, region and gender. If one splits up the share of informal employment (in percent of total non agricultural employment) by gender, we generally observe, that the share of women is significantly higher than the share of men. In North Africa (countries Algeria, Morocco, Tunisia, Egypt) the share of informal employment of women is 43.3% and the one of men 49.3% over the period 1990-1999. In Sub-Saharan Africa the share of women is 84.1%, the one of men 63.0%. In Latin America the share of women is 56.2% and the share of men 47.1%. Only in the region of West Asia and in the transition countries the share of men of informal employment is higher than the one of women. In West Asia (countries Lebanon, West Bank and Gaza Strip, Syria, Turkey, Yemen) the share of women is 31.1%, the share of men 43.4%. In the Transition countries (Kyrgyzstan, Moldova, Russia) the share of women is

[39] See also Feld and Schneider (2010) and Schneider, Buehn and Montenegro (2010).

22.3% and the share of men 27.2%. We also see here some remarkable differences. In general the share of informal employment is rather large worldwide and certainly has severe policy implications.

Table 4.9: Share of Informal Employment in Total Non-Agricultural Employment by five-year period and by country and region (in percent)

	Periode					
Region	**1975-79**	**1980-84**	**1985-89**	**1990-94**	**1995-99**	**2000-07**
North Africa					**47.5**	**47.3**
Algeria	21.8		25.6		42.7	41.3
Morocco		56.9			44.8	67.1
Tunesia	38.4	35.0	39.3		47.1	35.0
Egypt	58.7		37.3		55.2	45.9
Sub-Saharan Africa				**76.0**		
Benin				92.9		
Burkina Faso			70.0	77.0		
Chad				74.2	95.2	
Guinea		64.4		71.9	86.7	
Kenya			61.4	70.1	71.6	
Mali	63.1		78.6	90.4	94.1	81.8
Mauritania		69.4	80.0			
Mozambique				73.5		
Niger	62.9					
Senegal		76.0				
South Africa						50.6
Zaire (now Democratic Republic of Congo)		59.6				
Zambia				58.3		
Latin America					**54.2**	
Argentina				47.5	53.3	
Bolivia				56.9	63.5	
Brazil				60.0	60.0	51.1
Chile					35.8	
Colombia					38.4	
Costa Rica					44.3	
Dominican Republic					47.6	
Ecuador					53.5	74.9
El Salvador					56.6	
Guatemala				56.1		
Haiti					92.6	
Honduras					58.2	
Mexico				55.5	59.4	50.1
Panama					37.6	49.4
Paraguay					65.5	
Peru						67.9
Venezuela				38.8	46.9	49.4
South and Southeast Asia					**69.9**	
India			76.2	73.7	83.4	
Indonesia			39.2		77.9	
Pakistan			39.0		64.6	
Philippines				70.5	72.0	
Thailand			57.4	51.4	51.5	

Table 4.9: Share of Informal Employment in Total Non-Agricultural Employment by five-year period and by country and region (in percent) – cont.

Region	Periode					
	1975-79	**1980-84**	**1985-89**	**1990-94**	**1995-99**	**2000-07**
West Asia						**43.2**
Iran			43.5			48.8
Lebanon						51.8
West Bank and Gaza Strip						43.4
Syria				41.7	42.9	30.7
Turkey					30.9	33.2
Yemen				57.1		51.1
Transition countries						**24.1**
Kyrgyzstan						44.4
Moldova						21.5
Romania					5.4	22.0
Russia						8.6

Sources: OECD 2009, pages 34-35; and Charmes (2002, 2007, 2008) for the ILO Women and Men in the Informal Economy, 2002. For the most recent period: Heintz and Chang (2007) for the ILO, and for West Asia: Charmes (2007 and 2008). For detailed sources, see annex 2 A4. Stat.Link http://dx.doi.org/10.1787/533451351643

Table 4.10: Share of Informal Employment in Total Non-Agricultural Employment, by country, region and gender (in percent), 1190s and 2000s

Region	**1990 - 1999**		**2000-2007**	
	Women	**Men**	**Women**	**Men**
North Africa	**43.3**	**49.3**		
Algeria	40.6	43.1		
Morocco	46.8	44.0		
Tunesia	39.2	53.2		
Egypt	46.5	56.9	38.6	47.2
Sub-Saharan Africa	**84.1**	**63.0**	**77.1**	**62.6**
Benin	97.3	87.0		
Chad	95.2	59.5		
Guinea	86.7	65.6		
Kenya	83.1	59.1		
Mali			89.2	74.2
South Africa	58.4	43.6	64.9	51.0
Latin America	**56.2**	**47.1**	**59.5**	**55.4**
Bolivia	74.4	55.0		
Brazil	67.3	54.7	52.3	50.2
Chile	43.9	30.9		
Colombia	44.0	34.1		
Costa Rica	48.0	42.1		
Dominican Republic	49.7	46.5		
Ecuador			76.9	73.2
El Salvador	68.6	45.7		
Guatemala	69.4	46.5		
Honduras	65.5	73.6		
Mexico	55.0	54.3	53.5	47.8
Panama	40.8	35.5	50.4	48.7
Peru			72.0	65.1
Venezuela	47.3	46.7	52.1	47.5
South and Southeast Asia	**72.7**	**70.2**		
India	85.7	82.9		
Indonesia	77.2	78.0		
Philippines	73.4	70.8		
Thailand	54.3	49.1		
West Asia	**31.1**	**43.4**	**35.4**	**44.4**
Lebanon			60.0	44.4
West Bank and Gaza Strip			20.2	46.8
Syria	34.6	42.8		
Turkey	19.1	29.1	32.2	33.4
Yemen	39.7	58.2	29.3	52.8
Transition countries			**22.3**	**27.2**
Kyrgyzstan			40.9	47.1
Moldova			18.4	28.0
Russia			7.6	9.6

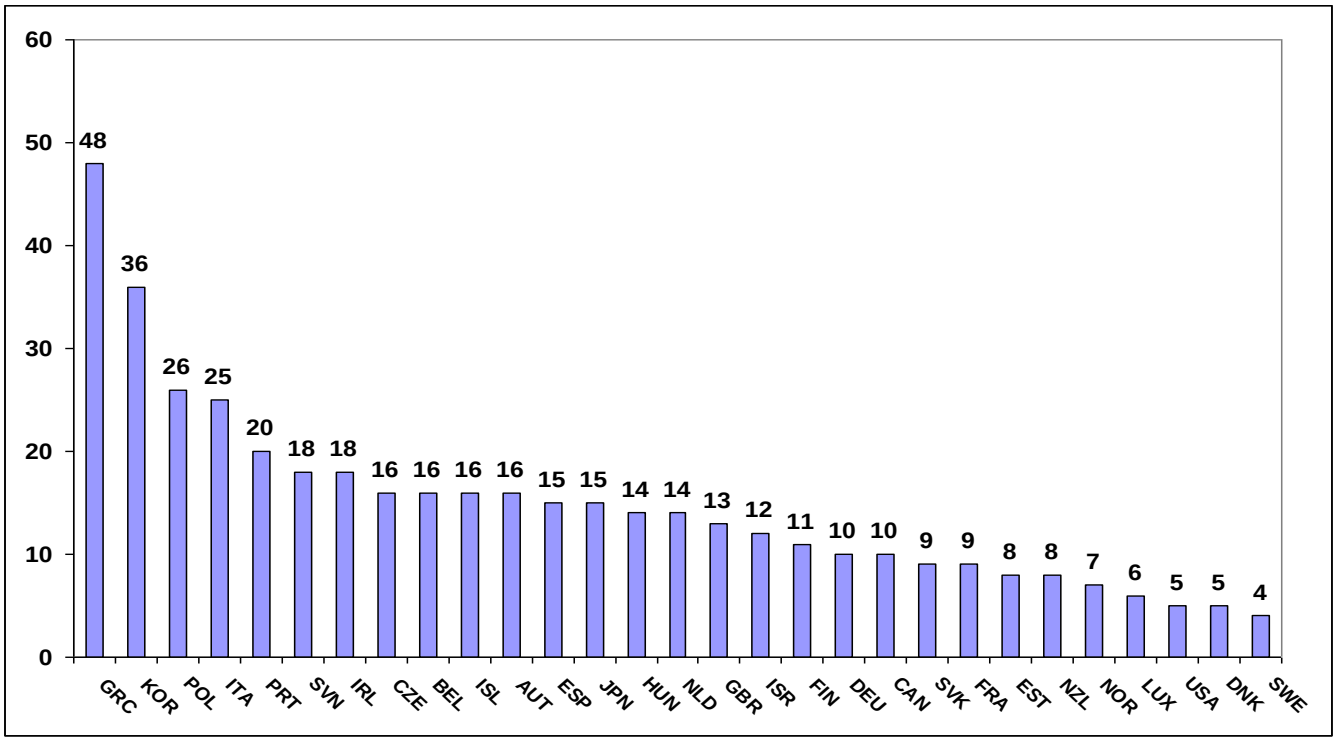
Source: OECD 2009, page 47; and Charmes (2002), for the ILO Women and Men in the Informal Economy, 2002. For the most recent period: Heintz and Chang (2007) for the ILO, and for West Asia:

4.3. Further Indicators of the Shadow Labor Force

In this part some further indicators of the shadow economy labor force are discussed, as there are no exact measures of the shadow economy labor force, all measures which serve as proxies are shown.

4.3.1 The Share of Self-Employed in total Employment

Figure 4.5: Share of self employed in total employment (Average: circa 1995 to latest available)



Source: OECD, STAN database, 2010, Paris.

The share of self employment in total employment can be seen as one indicator of the shadow economy labor force. If we consider Figure 4.5 we clearly see, that Greece, Korea, Poland, Italy, Portugal have the highest share of self employed (in percent of total employed) with a value of 48 % for Greece, a value of 26 % and 25 % for Poland and Italy respectively. As these values are highly correlated with the size of the shadow economy it is quite obvious that at least a great part of this self employed work in the shadow economy, (too).

4.3.2 The Share of Employees not covered by Social Security Contributions

In Table 4.11 the share of employees without social security contributions are shown for some European countries. If we compare the single countries in Table 4.11 we clearly see that there are vast differences between the listed countries where in some the share of employees without any social security advantage is pretty high. The leader is Poland with a value between 65 and 57 % in the years 2007 and 2008, followed by France with 51,9 % and then followed by Spain with 41,5 %. Again the values in Table 4.3 give some indication about the size of the shadow economy labor force, as it is quite plausible that at least some of these work in the shadow economy.

Table 4.11: Share of employees not covered by social security contributions

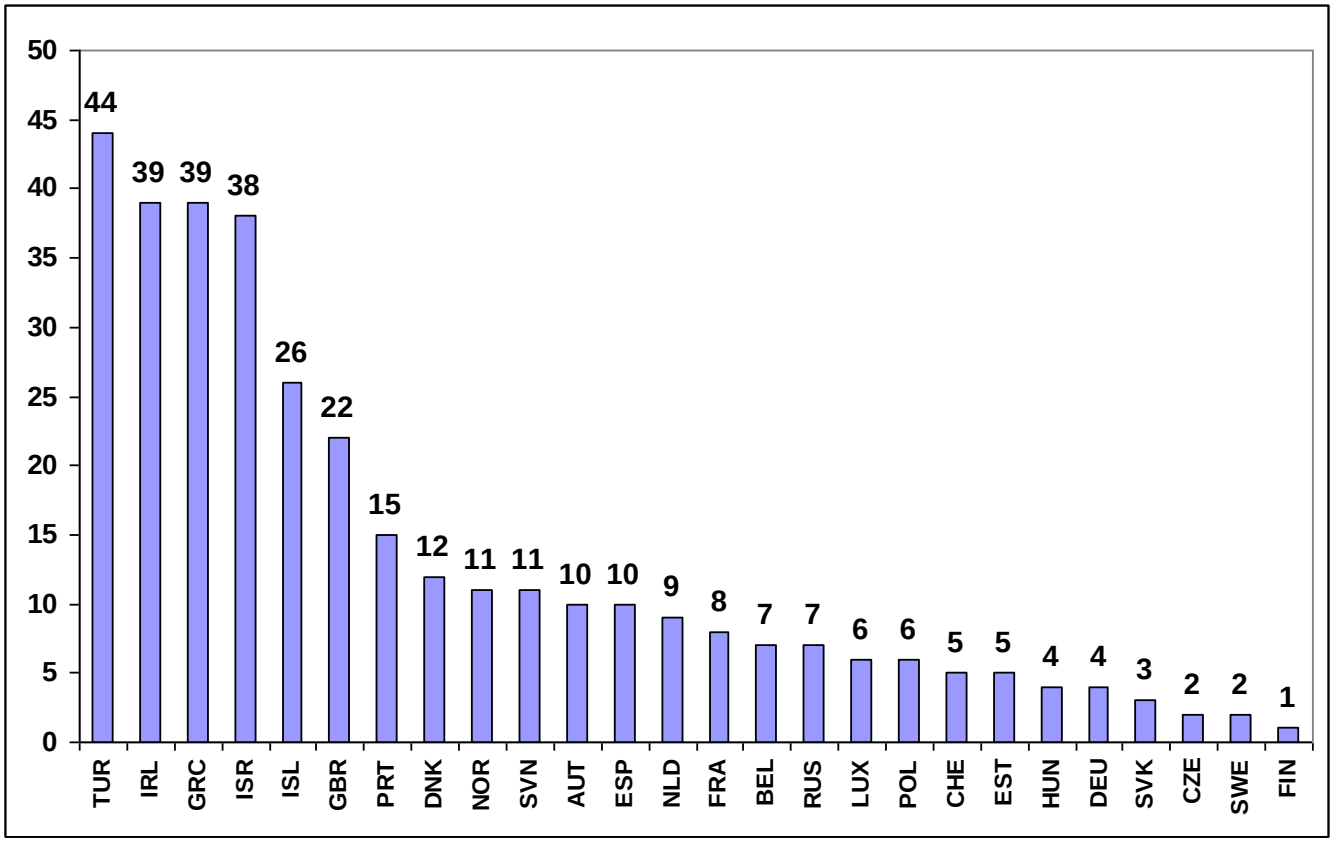
	2007	2008
Austria	**35,4**	**34,5**
Belgium	**38,8**	**36,2**
Czech Republic	**40,8**	**40,4**
Estonia	**34,6**	**33,9**
Finland	**23,0**	**23,5**
France	**51,9**	**--**
Greece	**37,1**	**37,3**
Hungary	**40,6**	**42,4**
Iceland	**13,4**	**13,3**
Ireland	**39,8**	**40,3**
Italy	**40,0**	**39,3**
Luxembourg	**34,6**	**32,6**
Netherlands	**17,7**	**21,6**
Norway	**12,2**	**13,2**
Poland	**65,3**	**57,0**
Portugal	**35,1**	**38,5**
Slovak Republic	**39,1**	**38,5**
Slovenia	**24,7**	**25,2**
Spain	**41,5**	**41,4**
Sweden	**22,7**	**22,0**

Source: OECD calculation based on EU-SILC 2007 and 2008.

4.3.3 The Share of Workers without an Employment Contract

In Figure 4.6 the share of workers without an employment contract is shown for various European countries. The leading country is Turkey with 44 %, followed by Ireland 39 % and Greece 39 %, then Israel 38 %. The lowest countries are Sweden and Finland with only 2 or 1 % share of workers without an employment contract.

Figure 4.6: Share of workers without an employment contract, 2006



Source. European Social Survey (ESS), 2008.

4.3.4 Summary of the Measures of Informal Employment

In an OECD study (OECD 2008) OECD focused on informal employment in seven OECD countries, the Czech Republic, Hungary, Korea, Mexico, Poland and the Slovak Republic and Turkey. Table 4.12 which is taken from this OECD study nicely, shows the alternative measures of informal employment and undeclared work. It is grouped in employees in informal job and own account workers, unpaid family workers, multiple job holders with undeclared income. The highest values for almost all of these seven categories has Mexico, followed by Turkey and then by Korea. Table 4.12 clearly shows, how difficult the informal or shadow economy labor force measurement is and how difficult the problems are. In all categories there might be some real shadow economy work, but it is very difficult to precise how large this figure is.

Table 4.12: Alternative measures of informal employment and undeclared work, Year 2006.

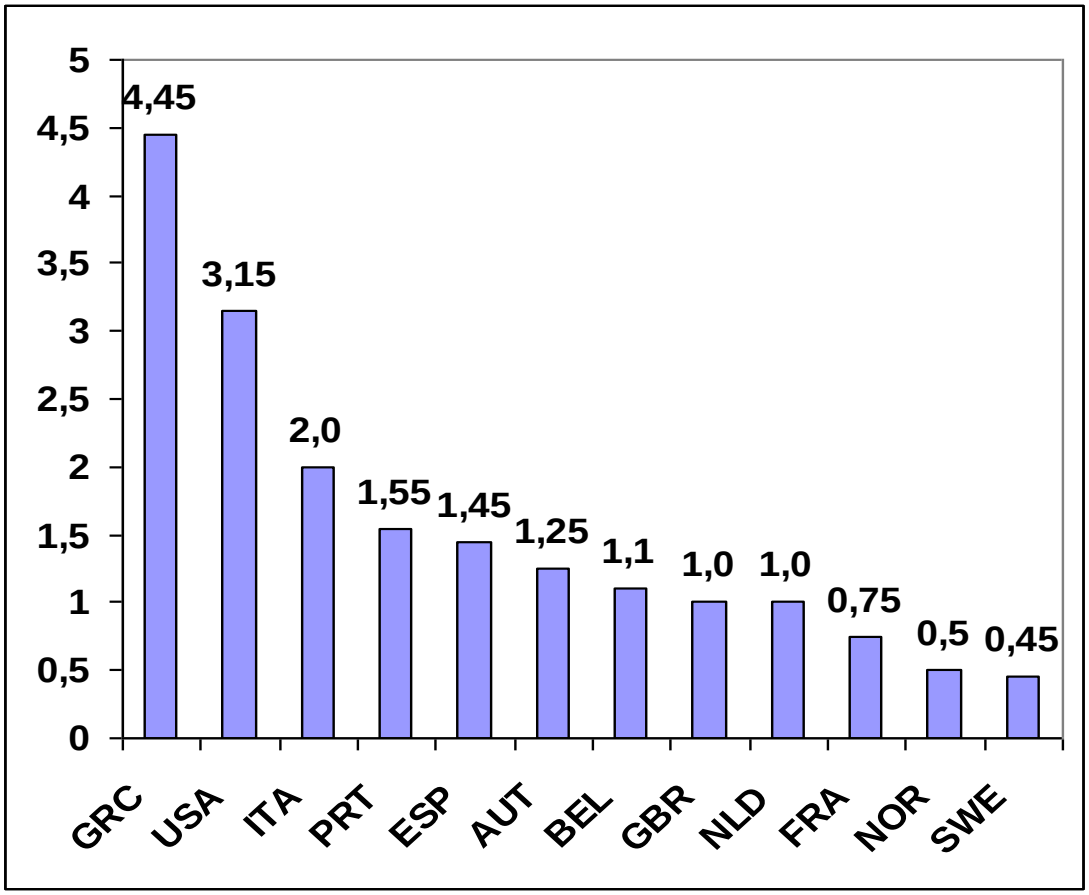
Country	Employees in informal jobs		Own account workers	Unpaid family workers	Multiple jobs holders	Undeclared income	
	Employees not registered for mandatory social security	Employ-ees without work contract	% of non-farm employ-ment	% of non-farm employ-ment	% of total employ-ment	% of work-force typically not re-ported for tax purposes[2]	% of employees receiving wages cash-in-hand[3]
	% of non-farm employment[1]						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Czech Republic	--	1,8	11,4	0,7	2,1	10,1	3,0
Hungary	19,4	2,6	6,4	0,3	1,8	8,6	8,0
Korea	25,8	--	17,1	4,7	1,7	7,0	--
Mexico	31,5	26,9	20,6	5,1	3,3	30,9	--
Poland	--	4,9	7,0	0,7	7,5	10,6	11,0
Slovak Republic	--	2,2	9,2	0,1	1,2	5,6	7,0
Turkey	21,7	--	16,6	3,3	3,1	24,6	--

Source: OECD (2008), Paris.

4.3.5 Shadow Economy Workers with Illegal Immigrant Background

In a number of European countries I have also shadow economy workers coming from illegal immigrants. A first estimate has been undertaken again by OECD (2011) and are shown in Figure 4.7. One sees the size again is increased with 4,4 % of total employment the highest, followed by the United States with 3,15 %, by Italy 2 % and at the lowest end are Norway and Sweden with 0,5 % or 0,4 % of total employment. This table also confirms the values in table 4.2 for Germany, Switzerland and Austria. Both tables clearly show that illegal immigrant employment takes place, but from the size perspective it is rather small for most countries.

Figure 4.7: Illegal employed immigrants as a share of total employment[1]



[1] The estimates of the number of employed illegal immigrants are calculated using the number of irregular migrants and assuming the same employment rate for illegal immigrants as for legal migrants.

Source: OECD Calculations based on OECD International Migration Outlook (2009) and OECD Economic Outlook Database (2010).

5. SHADOW ECONOMY AND UNEMPLOYMENT

Although there has been some discussion on the size of the shadow economy labor force, comparatively little attention has been given to the relationship between unemployment and working in the shadow economy. As Tanzi (1999) points out, "the current literature does not cast much light on these relationships even though the existence of large underground activities would imply that one should look more deeply at what is happening in the labor market" (p. 347). The objective of the paper by Bajada and Schneider (2009) is to examine the extent of participation in the shadow economy by the unemployed. Their paper has investigated the relationship between the unemployment rate and the shadow economy. Previous literature on this topic has suggested that the relationship between these two

variables is ambiguous, predominantly because a heterogeneous group of people working in the shadow economy exists and there are also various cyclical forces at work, such that they produce a net effect that is weakly correlated with unemployment. In this paper they have provided a suggestion for disentangling these cyclical effects, so as to study the component of the shadow economy that is influenced directly by those who are unemployed. They refer to this effect as the 'substitution effect' which typically increases during declining periods of legitimate economic activity (and increasing unemployment). Equipped with this approach for measuring the 'substitution effect', they discover that a relationship exists between changes in the unemployment rate and shadow economy activity.

By examining the growth cycle characteristics of the 'substitution effect' component of the shadow economy Bajada and Schneider (2009) determine that the growth cycles are symmetric (in terms of steepness and deepness) and that changes in the unemployment rate, whether positive or negative, had similar impacts on changes in the substitution effect component. They suggest that the shadow economy is a source of financial support during periods of unemployment for those genuinely wanting to participate in the legitimate economy. Although this does not exclude the possibility that long-term unemployed may also be participating in the shadow economy, it would appear that short-term fluctuations in unemployment directly contribute to short-term fluctuations in the shadow economy.

When Bajada and Schneider consider the various unemployment support programs across 12 OECD countries, there appears to be no real systematic relationship between the generosity of the social security systems and the nature of short-term shadow economic activity by the unemployed. Even the various replacement rates across the OECD countries appear to have little consequence on the rate at which the unemployed take on and cut back shadow economy activity. There is however some evidence to suggest that extended duration spell in unemployment lasts anywhere between less than 3 months to approximately 9 months.

On the whole Bajada and Schneider argue that dealing with unemployment participation in the shadow economy as a way of correcting the inequity it generates, is best handled by more stringent monitoring of those receiving unemployment benefits rather than reducing replacement rates as a way of encouraging re-integration into the work force. A strategy of reducing replacement rates would not only fail to maintain adequate support for those experiencing financial hardship during periods of unemployment, it is likely to have little impact on reducing participation by the unemployed who are willing and able to engage in shadow economy activity.

6. ADJUSTMENTS OF SHADOW ECONOMY MEASURES (VALUE ADDED) IN NATIONAL ACCOUNTS

Due to the strong increase of the size and development of the shadow economy (in value added terms) a number of countries have undertaken adjustments of this non observed economy measures in their national accounts[40]. OECD (2011, p.14) has detected seven adjustment activities, which are included in some countries in their national accounts.

A1: A producer deliberately does not register to avoid tax and social security obligations.

A2: A producer deliberately does not register as a legal identity or as entrepreneur because he is involved in illegal activities.

A3: A producer is not required to register because he has no market output.

A4: A legal person not surveyed due to reasons such as business register is out of date or updating procedures are in equate.

A5: Registered entrepreneurs may not be surveyed due to the statistical office does not conduct a survey of registered entrepreneurs.

A6: Cross output is underreported and/or intermediate consumption is overstated.

A7: Data is either not complete or not collected or not directly collectable and/or data are incorrectly handled.

If one considers those countries, which do some adjustment, one amazing thing is, that big adjustment takes place in Italy between 14,8 and 16,7 % and in Poland between 7,8 and 15,7 %. The largest adjustment is taking place in Russia with 24,3 % and the smallest one in the United States with 0,8 %. Table 6.1 clearly shows that those countries, which do some adjustment, their adjustment is vastly different compared to other countries. Hence, this leads to the problem, that for these countries starting from Australia and ending with the United States the measures of the size and development of the shadow economy in percent of official GDP is biased, because a part of the shadow economy has been already considered. This is certainly a further difficulty when comparing the size and development of shadow economies between countries.

Table 6.1: Adjustment of non-observed economy in National Accounts, around 2000

[40] The following text closely follows OECD (2011) page 14. Also the Table is taken from there.

		Activities included						
	Size of non-observed economy (% of GDP)	A 1	A 2	A 3	A 4	A 5	A 6	A 7
Australia	1,3			X			X	X
Austria	7,9	X		X	X	X	X	X
Belgium	3,0-4,0	X		X			X	X
Canada	Not stated	X	X	X			X	X
Czech Rep.	4,6(E); 6,6 (I); 9,3 (O)	X	X	X	X	X	X	X
Estonia	9,6	X	X				X	X
Finland	Not stated	X		X			X	
Germany	Not stated							
Hungary	11,9	X	X	X			X	X
Ireland	4,0			X	X		X	X
Italy	14,8(L); 16,7(U)	X		X	X	X	X	
Mexico	12,1		X	X				
Netherlands	1,0						X	X
Norway	2,4(O);1(E)			X	X	X	X	X
Poland	15,7(O);7,8(E)	X	X	X			X	X
Russia	24,3	X		X	X	X	X	X
Spain	11,2	X			X		X	X
Sweden	1,3		X				X	X
Turkey	1,66	X		X			X	
UK	Not stated	X		X		X	X	X
US	0,8						X	

O=according to output approach; E-according to expenditure approach; I=according to income approach; L=Lower bound; U=Upper bound

Source: United Nations, UN, 2008.

7. CONCLUSIONS

In my paper some of the most recent developments in research on the shadow economy and undeclared work in OECD developing and transition countries are shown. Besides the figures of the illicit work force in the rural and non-rural sector some other measures of the shadow economy labor force, like unpaid family workers, own account workers, multiple job holders, etc. are presented. The studies based on the MIMIC approach also report strong effects of tax morale, but underline the higher importance of tax policies and state regulation to increase the shadow economy.

The discussion of the recent literature shows that economic opportunities for employees, the overall situation on the labor market, not least unemployment are crucial for an understanding of the dynamics of the shadow economy. Individuals look for ways to improve their economic situation and thus contribute productively to aggregate income of a country. This holds regardless of their being active in the official or the unofficial economy.

If I come back to the headline of my paper "The shadow economy and undeclared work in OECD countries: What do we (not) know?", we clearly realize that we have some knowledge about the size and development of the shadow economy and the size and development of the shadow economy labor force. For developing countries, the shadow economy labor force has reached a remarkable size according to OECD (2009) estimates, which is where for most countries the shadow economy labor force is higher than the official labor force. What we do not know are the exact motives that people work in the shadow economy and what is their relation and feeling if a government undertakes reforms in order to bring them back into the official economy. Hence, much more micro studies are needed to obtain a more detailed knowledge about people's motivation to work either the shadow economy and/or in the official one.

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