

Regulation and Shadow Economy: Empirical Evidence for 25 OECD-countries

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Abstract

New empirical findings for the impact of regulations on activities in the shadow economy are presented. A comprehensive regulation index covering five major fields (labour, product and capital market; education/ innovation and the quality of institutions) has been used to analyze the relationship between the density of regulations and the size of shadow economies. The empirical results from 25 OECD countries for the time period 1995-2005 show that – apart from tax burden and tax moral – main causes are labour and product market regulations, overall regulations and poor quality of official public institutions and administration.

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1 Introduction

The shadow economy has become an important field of research in social science, and is of great interest for the public, for politicians, and for scientists. While firms and companies can escape ineffective and inefficient institutional settings by moving their companies into other countries, migration into the shadow economy is the reaction of the less mobile factor. National governments are therefore not only under pressure because of globalisation, but also because of the development “under ground”. The danger of this development has for a long time been neglected in a lot of countries, but is now – e.g. in Germany and Italy and for the EU-Commission (see Renooy et al., 2004) – a top subject on the political agenda.

In general, political recommendations focus either on fighting illicit work and illegal employment by harsher sanctions and tighter control or on the reduction of the tax and social security contribution burden. But fighting the symptoms is expensive, not very successful and quite often only a symbolic measure (see for example Enste, 2006; Feld/ Larsen, 2006). The reduction of tax rates as an alternative goes, at least in the beginning, hand in hand with a loss of tax revenue. Therefore, searching for an alternative economic policy measure, which reduces the size of the shadow economy but not the state revenues, could be useful. In literature, the importance of institutional settings (Good Governance, quality of institutions) and regulations are mentioned, but empirical evidence was often weak due to the lack of a comprehensive data set on regulations (see e.g. Johnson/ Kaufmann/ Zoido-Lobaton, 1998). Sometimes, the share of state employees of all employees or the amount of pages of laws, has been used instead of more detailed regulation data (see Frey/ Weck-Hannemann, 1984; Schneider/ Pöll, 1999). Recent studies based on World Bank Good Governance data (Kaufmann/ Kraay/ Mastruzzi 2003) have found correlations between the quality of institutions and the size of shadow economies (e.g. Torgler/ Schneider, 2007; Enste, 2006).

But improved regulation data is available now. For the first time a new, comprehensive regulation index covering 25 OECD-countries is developed and used to investigate the influence of regulation on the development of the shadow economy.

In addition to other studies, (1) a more comprehensive regulation index covering the time period 1995 to 2005 is used to explore the link between regulation and the size of shadow economies. (2) Taking into account, that less developed and developed countries face different challenges regarding institutional change and regulatory interventions, this analysis – compared to other studies – only focuses on OECD-countries with a similar economic situation, although this makes it more difficult to get significant results in the empirical analysis. (3) The regulation index used here, covers not only the quantity of regulations, but partly also the quality and the actual enforcement of regulations. (4) Whereas several factors like tax burden, tax morale, official GDP per head, unemployment rate etc. are used in the DYMIMIC-approach (Dynamic Multiple Indicator Multiple Causes) by applying the LISREL-method (Linear Independent Structure Relationship) to estimate the size of the shadow economy, this data on regulation is not used in such DYMIMIC estimates. The correlation between tax burden and the size of the shadow economy is not surprising, because tax rates and social security contributions burdens are used in the model as a cause for informality. But data on regulation (and the quality of institutions) is not included in the equations estimating the size of the shadow economy, so that a significant impact would be more than an artificial result and provide relevant insights in the relationship between regulation and informal economy.

Starting with some theoretical considerations on the factors influencing the size of shadow economies – with a focus on recent findings on the impact of regulation – the main hypotheses are developed (part 2). Subsequently, the structure of the regulation index and some findings of the impact of regulation on official labour force are described (part 3). The link between

shadow economic activities, regulations, the quality of institutions and several control variables is explored in multivariate analysis followed by simulations of deregulation effects on the German shadow economy (part 4). A summary concludes this paper (part 5).

2 Theoretical Considerations about the Impact of Regulations

2.1 Literature Review

The development of shadow economies is influenced by different factors such as tax burden and tax morale (see for an overview Frey and Pommerehne, 1984; Thomas, 1992 and for recent results Enste, 2006; Davis/ Henrekson, 2005; Bouev, 2005; Torgler/ Schneider, 2007). Besides taxation, the institutional framework and state regulation have a profound effect on economic factors such as economic growth, employment, investment behaviour and productivity. A good quality of official institutions providing a stable and reliable surrounding and framework for enterprises can boost the official economy. But a high level of regulation carries the risk of limiting both individual freedom and enterprises' ability to act, as well as negatively affecting the functioning of market mechanisms (see Conway/Nicoletti, 2006, Enste/Hardege, 2006a, 12-22; Nicoletti/Scarpetta, 2005, OECD, 1997, Thießen, 2003). Intentionally or not, regulation can impose rigidities and distort incentives for factor reallocation, capital accumulation, competition and innovation in the official economy. In the absence of perfect monitoring and compliance, firms and individuals will find it optimal (or necessary) to evade regulations and work outside the strict legal regime (see Loayza, Oviedo, Servén, 2006, p.121-122). The informal sector is only the second-best response to regulation, because firms lose the advantages of legality, such as police and judicial protection or access to formal credits. Trying to hide from the state forces, firms remain small and divert resources to mask their

illegal activities. In addition, a large shadow economy can generate negative externalities if using the public infrastructure without contributing the tax revenue to finance it.

In assessing the impact of regulation, it is important to consider, that both, the quality and the quantity of regulations and institutions have an influence: if the quality of the official institutions is poor and the regulation density high, firms try to escape from this regulatory framework by going underground or abroad. Loayza, Oviedo, Servén (2006, p.122-123) state, “countries with better institutions tend to create regulatory environments genuinely aimed to improve business conditions rather than privilege a few interest groups. They are also more likely to enforce regulation in a transparent and even-handed manner, limiting the regulator’s margin for arbitrariness and corruption.” Therefore, in this study the quality of institutions (governance indicators) *and* the regulation density are used to explore the impact of regulation on the shadow economy.

A certain level of regulation is necessary to reduce uncertainty and secure property rights. But over-regulation raises costs and barriers to invest, employ or operate formally. The “right” or best level of state intervention can not be derived theoretically, because it heavily depends on tradition and culture and the level of development of the country. But empirical analysis can provide insights, what level of regulation and what quality of institutions is better for economic growth and smaller shadow economies (see e.g. Johnson/ Kaufmann/ Zoido-Lobaton, 1998; Friedman/ Johnson/ Kaufmann/ Zoido-Lobaton, 2000, Loayza/ Rigolini, 2006, Loayza/ Oviedo/ Servén, 2006).

Empirical evidence supporting the model of Johnson, Kaufmann, and Shleifer (1997), which predicts, inter alia that countries with more general regulation of their economies tend to have a higher share of the unofficial economy in total GDP, is found in their empirical analysis. A

one point increase of the regulation index (ranging from 1 to 5, with 5 = the most regulation in a country), *ceteris paribus*, is associated with an 8.1 percentage point increase in the share of the shadow economy, when controlled for GDP per capita (Johnson et al., 1998). They conclude it is the enforcement of regulation that is the key factor for the burden levied on firms and individuals, that drive firms into the shadow economy, and not the overall extent of regulation mostly not enforced.

Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000) obtain a similar result. In their study, every measure of regulation is significantly correlated with the share of the unofficial economy and the sign of the relationship is unambiguous: higher regulation is correlated with a larger shadow economy. A one point increase in the index of regulation (ranging from 1–5) is associated with a 10 percent increase in the shadow economy for 76 developing countries, countries in transition, and developed countries. These findings demonstrate that governments need to put more emphasis on improving enforcement of laws and regulations, rather than increasing their number. Some governments, however, prefer this policy option (more regulations and laws), when trying to reduce the shadow economy, mostly because it leads to an increase in power of the bureaucrats and to a higher rate of employment in the public sector.

The intensity of regulations in these models is measured by the number of laws and regulations, such as license requirements, labour market regulations, trade barriers and labour restrictions for immigrants (e.g. Johnson/ Kaufmann/ Zoido-Lobaton, 1998; Loayza/ Rigolini, 2006). Loayza/ Oviedo/ Serven (2006) present correlations between several other regulation indices and official GDP, but also on informality. They show the importance of the interaction between the level of governance (quality of institutions) and the regulatory density. E.g., if a country's index of labor market regulation were decreased by one standard deviation in the cross-country sample and its level of governance is equal to the world median, then the size of

the informal sector relative to GDP would decrease by nearly three percentage points. Reducing product market regulation in an developing country on the median level of developed countries, the informal sector would decrease by seven percentage points.

2.2 Development of Hypotheses

Based on the theoretical considerations and empirical results mentioned above, the following hypotheses can be developed describing the impact of different regulation indices on the size of the shadow economy.

The core hypotheses are:

(1) *Overall regulation (REG)*: The literature review in part 2.1 suggests the following hypothesis of the impact of regulation: The more intense the overall regulation (REG) in a country is, the larger is the shadow economy, *ceteris paribus*.

(2) *Labour (L-REG)* and (3) *product market regulation (P-REG)*: The more intense labour regulation (L-REG) and/or product market regulation (P-REG) in a country is, the larger is the shadow economy, *ceteris paribus*. Hence, for our three core hypotheses tested in this paper, a positive sign of the independent regulation variables on the shadow economy is expected.

In order to fulfil the *ceteris paribus* condition, the following variables are included based on the results of 30 studies (see e.g. Körner/ Strotmann, 2006, p.48, Schneider/ Enste, 2000):

(4) *Tax burden (TB)*: The influence of the tax burden is measured here based on the total tax and social security wedge (incl. employer contributions, less cash benefits) of an average single earner (in percent of labour costs), plus VAT, using OECD-data and additional country

specific sources (see Enste, 2006). A higher tax burden leads – *ceteris paribus* – to a larger shadow economy and has therefore a positive impact (+).

(5) *Tax morale (TM)*: Less civic virtue and loyalty towards public institutions combined with a declining tax morale, partly as a result of corruption and the poor quality of public institutions, can lead to more illicit work (see Kirchgässner, 2006; Fetchenhauer/ Gresser/ Haferkamp, 2006). According to research using data of the World Values Survey (e.g. Körner/ Strotmann, 2006) a good tax morale has a negative influence on the size of the informal sector (-). Social norms can stop people from going underground (see Torgler/ Schneider, 2007 for further analysis of the importance of tax morale on tax evasion). The hypothesis is: The better the tax morale, the smaller the shadow economy in that country, *ceteris paribus*.

(6) *GNP per capita (GNP)*: Main findings in several studies (see e.g. Schneider, 2005) show, that poorer countries (GNP per capita) have larger shadow economies. The impact of this variable is negative (-) due to the fact, that people in less developed countries quite often work in the shadow economy to survive (see the path breaking study of de Soto, 1989). The higher the GNP per capita, the smaller is the shadow economy in the country, *ceteris paribus*.

(7) *Unemployment rate (UEP)*: The relation between the unemployment rate and shadow economy is ambiguous (Tanzi, 1999, p.341), due to the fact that labour force is heterogeneous in shadow economies: some are unemployed, some are retired persons, illegal immigrants or minors. Furthermore, there are people who have at the same time an official and an unofficial job (Tanzi, 1999, p. 343). Nevertheless, the unemployment rate can be used as a control variable in the model. The higher the unemployment rate, the larger the shadow economy. We expect a positive sign in our analysis.

(8) *Quality of official institutions (INST)*: Several studies show, that better official institutions lead to smaller shadow economies, *ceteris paribus*. A negative sign is expected, because good institutions make it more attractive to stay in the official economy rather than going underground, since e.g. property rights are better protected there.

The following equation summarizes the expected relationship:

$$SSH_{i,t} = \beta_0 + \beta_1 * REG_{i,t} + \beta_2 * L-REG_{i,t} + \beta_3 * P-REG_{i,t} + \beta_4 * TB_{i,t} - \beta_5 * TM_{i,t} - \beta_6 * GNP_{i,t} + \beta_7 * UEP_{i,t} - \beta_8 * INST_{i,t} + u_{i,t}$$

(with SSH = size of the shadow economy; β_0 = constant; β_1 to β_7 = coefficients with β_1 to $\beta_4, \beta_5 > 0$ and $\beta_5; \beta_6; \beta_8 < 0$; i = country, t = time period ; u = disturbance term)

3 Investigation of the Impact of Regulations

Using the data of a new, overall regulation index (see Enste/ Hardege 2006a), bi- and multivariate analysis are undertaken, to find out more about the influence of regulations on the size of shadow economies.

3.1 Measuring the Shadow Economy

The term “shadow economy” comprises numerous economic activities and it is difficult to provide a formal definition. In general, the shadow economy can be seen as the decision of individuals and firms for economic activity against official norms, formal institutions and regulations. From the economic policy’s point of view, those shadow economic activities are particularly relevant, which create addition value and is basically based on voluntary contracts between two persons (e.g. illicit work). The shadow economy includes unreported income resulting from the production of legal goods and services, either from monetary or barter transactions – and, hence, includes all economic activities that would generally be taxable were

they reported to the (tax) authorities. This analysis basically focuses on the irregular sector, especially illicit work, combined with tax evasion.

In various studies several different methods are used by which the size of shadow economies are measured (see for an overview e.g. Schneider/ Pöll 1999; Schneider/ Enste 2000). They all have their strengths and weaknesses (see for a detailed discussion Kazemier 2006). Here, estimates based on the DYMMIC approach are used, because time series of the size of the shadow economies are available using these methods. The size of the shadow economy is presented by percent of the official GDP, although some shadow economic activities are already included in the official GDP and, hence, the shadow economy cannot simply be added to GDP to obtain the total value added.

Recent comparisons of survey and DYMMIC approach data on the size of the shadow economy proved that the data used here is quite reliable, although all methods have their caveats and can be criticised on several grounds (see Enste/ Hardege 2007). Survey data for Germany showed, that figures for the size of the shadow economy (14,7 percent) used here, are not too high compared to this survey data. In Germany, more than 20 percent of the population admitted to have worked on average 6 hours and 25 minutes illicitly in 2006. Altogether, this equals 7,0 percent of GDP. Since illicit work is only a fraction of the shadow economy and because only the working time is measured here, the difference between illicit work (time input) with 7 percent in relation to GDP, and the shadow economy with 14,7 percent in relation to GDP can be explained. Main reasons are that macroeconomic methods such as the DYMMIC and the currency demand approach also measure material input and some criminal activities, whereas survey data only cover illicit working time.

3.2 Measuring Regulation Density: Structure of IW Regulation Index

The IW-Regulation index enables international ranking as well as it provides an analysis of comparative weaknesses and strengths in the national set of institutions. The latter offers the possibility of identifying areas of policy and regulation in particular need of reform, as well as discussing and comparing potential approaches made by other countries. The index comprises a summarised general index and individual sub-indices. Although we are well aware of the harsh criticism of summarised indices and their caveats (see e.g. Addison/Teixeira, 2003; Grupp/ Mogege, 2004; Kladroba, 2005; Nardo et al., 2005), we believe, that such an index can still be helpful for policy advice and analysis of the influence of regulation.

Compared to studies and regulation indices already in existence (e.g. OECD, 1999, 2004; Hafemann/van Suntum, 2004; World Bank, 2004, 2005, 2006; Conway et al., 2005; Botero et al., 2004), this regulation index covers a broader spectrum: labour market, capital market, product market, Education and Innovation as well as the quality of institutions are compared (see Enste/ Hardege, 2006a). The IW-Regulation index includes hard data facts as well as subjective (survey) data (120 variables by over 20 international studies and over 10.000 single facts) and is the most comprehensive regulation index known by the author. Data of the variables is based on raw data supplied by offices of statistics and international organizations, as well as on existing index values of other studies. These include variable values of partial studies on regulation intensity or of international rankings (e.g., OECD, 2004; Fraser Institute, 2004; IMF, 2004; Heritage Foundation, 2005), as well as individual values taken from other studies and hard data (e.g. WEF, 2004; IMD, 2004). Objective (hard) and subjective (soft) data is used to cover not only the formal but also actually enforced regulation (see e.g. Nicoletti/Pryor, 2006). Indicators are calculated using the available raw data to cover various acts and regulations (e.g. banking regulation, limitations on capital transfer, regulation of edu-

cation). By comparing the results the results of a World Bank study (World Bank, 2006), which uses only hard, objective data, it is found, that the IW-Regulation Index, using hard and soft facts, provides similar but not the same results ($r = +.875^{***}$).

The variables of the IW-Regulation index have been standardised to fit one indicator. They have been transformed on the scale 0-100, with 100 describing the maximum density of regulation. For other possible methods of standardisation see Nardo et al., 2005; Kladroba, 2005.

$$X = ((I - I_{\min}) / (I_{\max} - I_{\min})) * 100$$

X is the standardised value of the regulation density, I is the original value, I_{max} (I_{min}) is the highest (lowest) value of this variable of the country sample. All sub-indices are aggregated using equal weights. Sensitivity analysis have been undertaken, proofing the reliability of the methods used. Even when applying different weighing measures, the results are robust.

The IW-Regulation index covers two time periods (1995-2000 and 2001-2005) and 25 OECD-countries ($n = 50$). Since regulation density does not change very quickly (see e.g. Loayza/ Oviedo/ Serven, 2006, p.124) and because some data is not available on a annual basis, finally two time periods were chosen. Table 1 gives an overview of the data for the five sub-indices and the ranking of each country for the last time period. The Anglo-Saxon countries are the least regulated, followed by the Scandinavian countries.

Table 1: IW Regulation Index: Ranking and Detailed Results (2001-2005)

The different regulation sub-indices are all correlated significantly on the 1 percent level (***). The overall regulation index is highly correlated to the product market regulation index ($r = .865^{***}$), the labour market regulation index ($r = .707^{***}$) and the index of the quality of institutions ($r = -.874^{***}$). Product market regulation is correlated to labour market regulation

($r = .518^{***}$) and quality of institutions ($r = -.801^{***}$) as well. A weaker correlation can be found between labour market regulation and the quality of institutions ($r = -.416^{***}$).

3.3 Regulations, Official Labour Force and Long Term Unemployment

This IW-regulation index has already been used to examine the positive effects of less regulation on official employment, general economic performance, reduction of long time unemployment and the impact of subjective expected job security. Enste and Hardege (2006b) found e.g. strong correlations (r_{reg}) between overall regulation and the labour force participation rate in 22 OECD-countries ($r_{\text{reg}} = -.341$, $t = 4,1$). The impact is still significant, if other control variables such as tax burden ($r_{\text{reg}} = -.296$, $t = 3,3$) and an indicator for active labour market policy ($r_{\text{reg}} = -.192$, $t = 1,80$) are included in a regression analysis. Labour market regulation ($r_{\text{l-reg}}$) itself has also a significant impact ($r_{\text{l-reg}} = .157$, $t = 2,3$). A strong relationship between labour market regulation and the structure of unemployment is reported by Enste/Hardege (2006b, p.10) as well ($r_{\text{l-reg}} = .475$, $t = 4,0$). According to their findings, reducing the density of the labour market regulation by 10 regulation points (measured on a scale from 0 to 100) can increase the labour force participation rate by 1,6 percentage points. For Germany one percentage point equals 550.000 people. Reducing the labor market regulation density in Germany (81 points) on the level of the cluster of Scandinavian countries (52 points) could therefore lead to 1,3 up to 2,5 million additional jobs, depending on the OLS-model. Berger and Danninger (2005) obtain in their study for the IMF similar results. Deregulation of labour and product markets lead to additional employment between 1,1 and 1,6 percent per year.

4 Estimates of the Impact of Regulation on Shadow Economies

4.1 Results of Random Effects Models

Based on theoretical considerations and findings in other studies (see part 2.1), we are testing the hypothesis of the impact of different regulation indices and other (control) variables on the size of shadow economies using random effects models. The results of several multivariate regression analysis are summarised in table 2. All models included a Dummy Shift variable, because two time periods for the same countries were used. For results of simple OLS models and the Beta-Coefficients for the significant impact of this variables on the size of the shadow economy see Enste/ Hardege (2007). The following variables have according to other studies (see part 2.2) an impact on the shadow economy: tax burden, tax morale, the GNP per capita and the unemployment rate, which are also used to estimated the size of the shadow economy in DYMIMIC models.

(1) Overall regulation: Regulation has a positive impact on the size of shadow economies. The standardised coefficients in line 1 show, that in models 1 to 4 the impact is significant at least on the 10 percent level. In model 1 the tax burden and the overall regulation together can explain 67 percent of the differences between the size of the shadow economies in these 25 countries. In the course of time, changes within one country do not provide additional explanations (R^2 within = 0,001). Depending on other control variables the impact varies from .210 to .110 (non standardised coefficient).

(2) Labour and (3) product market regulation: Due to the strong correlation between the different regulation indices, they are only separately included in the models. The quality of institutions (model 5), the product (model 6) and the labour market regulation (model 7) have all the expected sign and but only the regulation indices are significantly correlated to the size of

the shadow economy: more regulation of labour or product markets lead to more irregular activities. Depending on the model and the variables included up to 74 percent of the shadow economy can be explained by the factors used here.

(4) *Tax burden*: The random effects model in table 3 line 2 shows the results of the relationship between the impact of overall regulation and the tax burden on the size of the shadow economy. Since the tax burden is used as a variable to estimate the size of the shadow economy in DYMIMIC models (see e.g. Schneider, 2005), the impact of the tax burden is trivial and not surprising, although different variables and sources for estimating the tax burden are used in the approaches. In all models, in which the tax burden is included, it has a very significant influence on the size of the shadow economies. The tax burden can be used as a control variable to find out, whether the regulation density, which is not used in the DYMIMIC Model, still is an important cause of the size of the shadow economy, even if the tax burden is included in the analysis.

(5) *Tax Morale*: The international measurement of tax morale is difficult and only the World Value Survey provides some comparable data (1981-2001), which is used in model 2 to 5 and 7. The impact of tax morale is significant on the 5 resp. 10 percent level. The regression coefficient of the impact of tax morale (measured as 1 = high tax morale; 10 low tax morale) on the size of shadow economies has in all models – considering the reversed scale – the expected sign: the higher the tax morale, the smaller the size of shadow economies.

(6) *GNP per Capita*: The GNP per capita is a relevant for the size of shadow economies: in poorer countries (GNP per capita) shadow economies are larger than in wealthier countries. The relationship is significant on the one percent level in model 2 to 5 and 7.

(7) *Unemployment rate*: In this analysis, the unemployment rate only has a significant, positive impact in model 4, 6 and 7. Higher unemployment is related to a larger shadow economy.

(8) *Quality of Institutions*: The quality of institutions is not significant in the random effects models due to the strong correlation with regulation (see for bivariate analysis part 4.3.3)

Table 2: Regression Results: Main Causes of the Size of Shadow Economies

4.2 Bivariate Analysis: Regulation and Shadow Economy

The impact of regulation on illegal activities can be visualized by using simple regression analysis (see appendix for figure 1 of the correlations) testing the hypothesis that a higher regulation density in the official sector leads to more activities in the unofficial sector. The correlation between the overall IW regulation index and the size of shadow economy is very strong ($r = .734^{***}$). The overall regulation can – ceteris paribus - explain 53 percent of the variance between shadow economies (corrected $R^2 = .530$). For example, a reduction of the overall regulation in Germany (50 points) on the average level of “Anglo-Saxon cluster” (New Zealand, USA, Great Britain, Canada, Australia, Ireland = 26 points) could even lead to a reduction of 8 percentage points of the size of the shadow economy, ceteris paribus.

Using the IW regulation labour market sub index and figures for the size of shadow economy, a correlation between labour market regulation and the size of shadow economies can be found. The impact is significant on the 1 percent level and labour market regulation can at least explain one fourth of the variance of the size of shadow economies ($R^2 = .27$; $r = .526^{***}$). This correlation is robust when using OECD-labour market regulation indices.

A similar correlation has been found by using the product market regulation sub index. The regulation of product markets increases the number of goods and services bought and sold in

the shadow economy significantly. The variance of the size of shadow economies can be explained to nearly 40 percent ($R^2 = .39$) and the correlation is strong ($r = .636^{***}$).

4.3 Bivariate Analysis: Quality of Institutions and Shadow Economies

The quality of constitutions represents another important factor in many studies. If the state guarantees property rights, provides a well developed infrastructure and public goods according to the preferences of the people, paying taxes and fees is accepted. The proper combination of efficiency of the state, quality of institutions and public goods on the one hand and taxes and fees on the other hand is of great importance. If one looks at OECD and Eastern European Countries, the quality of the institutions can explain two thirds of the variance between the sizes of shadow economies (Enste, 2006b). Loayza/ Oviedo/ Servén (2006) present similar results ($R^2 = .61$) using World Bank governance data and figures for the shadow economy of 75 developed and less developed countries. Even within the OECD-countries, which all have - compared to poorer, less developed countries – relatively good institutions, the corrected R-squared is still high, as figure 2 in the appendix shows ($R^2 = .51$). Better institutions do not only help to reduce shadow economy, but also have a positive impact on official growth rates and official employment (see e.g. Enste/ Hardege, 2006b). The non significant results in multivariate analysis largely depends on the strong correlation between regulation and the quality of institutions (see also Loayza/ Oviedo/ Servén, 2006).

4.4 Simulation of Deregulation Effects on the German Shadow Economy

Based on this analysis of the impact of regulations on the size of shadow economies, the effects of a deregulation e.g. in Germany can be estimated. Reducing the regulation density by one standard deviation (12 points of the IW regulation scale) can lead to a decrease of the size of the shadow economy – depending on the model and the factors included – by 1,24 to 4,26

percentage points, because the non standardized regression coefficients vary from 0,103*** to 0,355*** (see table 2 and figure 1). In Germany, for example, with 50 regulation points on the IW regulation scale, a reduction on the average level of the OECD countries (38 points) could lead to a decrease of the size of the shadow economy by 1,24 to 4,26 percentage points from 15 percent of GDP (2006) to 13,76 or 10,74 percent. A reduction of 4,26 percentage points equals 95 billion Euro, since Germany's GDP was 2.245 billion Euro (2006).

But not the whole production in the shadow economy can be legalised and easily transferred into the official sector. Around one third of the added value is based on illegal goods and services and their consumption is forbidden by law. But 64 billion Euro come from legal goods and services, where "only" taxes are evaded or regulations are ignored (see Schneider, 2005). But only one third of these goods would – according to survey data (Feld/Larsen, 2006 and Enste, Hardege, 2007) – would be bought under legal conditions and for higher official prices, if no shadow economy were existing. The rest would not be bought anymore or done by "do it yourself". The potential added value that could be transferred by deregulation from the informal to the formal sector equals therefore up to 21 billion Euro (1 percent of GDP), if the regulation density was reduced to the average level of OECD-countries. The effect would be doubled, if the regulation density level of the Anglo-Saxon cluster could be reached (see table 3).

Table 3: Effects of Deregulation in Germany

When estimating the potential for the quantity of jobs, that can be transferred from the informal to the formal sector by deregulation, one has to take into account, that only around two thirds of this added value (up to 14 billion Euro) comes from illicit working time (see Enste/Hardege, 2007). The rest comes from the irregular material input (up to 7 billion euro). Assuming an illicit worker (fulltime) can create around 57.000 Euro value-added per year (this equals half the per head added value in labour intensive industries), reducing regulation

density on the average of OECD-countries (Anglo-Saxon cluster), up to 250.000 (500.000) additional jobs could be moved from the informal to the formal sector in Germany, *ceteris paribus*. Using the results of the multivariate analysis, which takes further independent variables into account, the effects are much smaller, of course. Using the lower estimates for the coefficients (.103), deregulation on the average level of all OECD-countries (Anglo-Saxon cluster) could still help to legalize up to 100.000 (200.000) jobs.

5 Conclusion

Using a comprehensive regulation index covering five major fields (labour, product and capital market; education/ innovation and the quality of institutions), the impact of regulation on the shadow economy has been analysed. The empirical results of 25 OECD countries show that regulations are – apart from tax wedge and tax morale – main causes for the size of the shadow economy. Deregulation is a promising alternative to the reduction of tax rates and tax and social security contributions burden, which is often quite difficult due to the necessity to finance public goods and services as well as the social security system. Less regulations, fewer guidelines and more efficient bureaucracy do not increase the budget deficit, but the freedom of choice for people, so that shadow economy is less attractive. The multivariate analysis as well as the simulation results show, that deregulation can help to reduce the size of the shadow economy considerably.

In addition, deregulation does not generally imply feeling less secure. For example, less labour market regulation does not mean less job security. On the contrary, Enste/ Hardege (2006c) found the opposite correlation: Employees in OECD-countries with a lower regulation density are less anxious about losing their jobs than their colleagues in countries with more labour market regulations. An international comparison shows that e.g. the perceived job security is

significantly lower in Germany than in many other European countries – even though the government aims to foster job security via regulatory measures like strict employment protection legislation. Contrary to political intention, the analysis of survey data suggests that tight regulation does not correspond with a high degree of perceived job security. The latter seems to be stronger influenced by indicators like labour market performance and individual qualification. The decrease of regulation density can provide additional opportunities to work, invest or innovate in the official economy and hence can boost structural change there, making the shadow economy less attractive.

6 Figures and Tables

Table 1: IW Regulation Index: Ranking and Detailed Results (2001-2005)

Country	Sub-index Labour Mar- ket Regula- tion	Sub-index product market regulation	Sub-index Capital market- regulation	Sub index Education and Innova- tion regula- tion	Sub-index Good Gov- ernance	IW- Regulation index
New Zealand	4 (26)	1 (19)	1 (17)	11 (41)	3 (87)	1 (23)
USA	1 (12)	10 (30)	8 (28)	1 (21)	13 (73)	2 (24)
UK	5 (26)	8 (29)	3 (18)	3 (31)	11 (76)	3 (26)
Canada	2 (17)	4 (26)	10 (34)	5 (36)	9 (78)	4 (27)
Denmark	6 (30)	9 (29)	6 (24)	6 (37)	5 (84)	5 (27)
Finland	14 (49)	2 (21)	5 (21)	9 (39)	2 (88)	6 (29)
Australia	7 (34)	3 (23)	11 (35)	2 (30)	8 (78)	7 (29)
Ireland	8 (37)	5 (26)	2 (17)	13 (45)	12 (76)	8 (30)
Switzerland	3 (26)	13 (37)	13 (37)	12 (44)	1 (92)	9 (30)
Sweden	17 (56)	6 (27)	7 (27)	4 (32)	7 (81)	10 (32)
Netherlands	18 (56)	11 (34)	4 (21)	7 (38)	6 (81)	11 (34)
Norway	12 (48)	15 (38)	16 (40)	17 (51)	4 (85)	12 (39)
Belgium	15 (50)	17 (39)	9 (30)	14 (48)	15 (65)	13 (40)
Austria	24 (65)	7 (28)	12 (36)	19 (54)	10 (77)	14 (41)
Japan	13 (49)	20 (44)	22 (56)	8 (39)	18 (59)	15 (46)
Slow. Rep.	10 (39)	18 (41)	18 (44)	18 (53)	21 (47)	16 (46)
Spain	25 (66)	12 (36)	17 (42)	16 (50)	16 (61)	17 (47)
France	22 (64)	21 (46)	14 (37)	n.a.	19 (58)	18 (47)
Hungary	11 (48)	23 (49)	19 (45)	15 (48)	20 (48)	19 (49)
Portugal	21 (63)	16 (39)	20 (45)	21 (56)	17 (60)	20 (49)
Czech. Rep.	9 (39)	25 (51)	21 (47)	20 (55)	23 (42)	21 (50)
Germany	28 (81)	14 (37)	15 (38)	22 (65)	14 (67)	22 (51)
Korea	16 (51)	24 (50)	25 (67)	10 (39)	24 (42)	23 (53)
Italy	19 (61)	22 (48)	24 (62)	24 (71)	25 (40)	24 (60)
Greece	23 (65)	19 (44)	23 (61)	25 (79)	22 (42)	25 (61)
Poland	20 (62)	27 (63)	27 (74)	n.a.	26 (34)	26 (66)
Mexico	27 (69)	28 (66)	26 (73)	23 (66)	27 (15)	27 (72)
Turkey	26 (66)	26 (53)	28 (80)	n.a.	28 (8)	28 (73)

Rank (Index value: 0 = no regulation; 100 highest regulation) Source: Enste/ Hardege (2006a)

Table 2: Regression Results: Main Causes of the Size of Shadow Economies

	Size of the Shadow Economy						
	Random Effects Models						
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Overall Regulation	0,210*** (3,3)	0,110* (1,8)	0,103* (1,67)	0,118* (1,8)	-	-	-
Tax Burden	0,167*** (3,4)	0,118*** (2,6)	0,103** (2,1)	-	0,116** (2,4)	0,144*** (2,7)	-
Tax Morale	-	2,11* (1,7)	2,24* (1,8)	2,93** (2,3)	2,45** (2,0)	-	2,80** (2,1)
GNP per capita	-	-0,408*** (3,49)	-0,377*** (3,0)	-0,416*** (3,2)	-,374*** (2,7)	-	-0,571*** (4,8)
Unemployment Rate	-	-	0,145 (0,8)	0,273* (1,7)	0,159 (0,9)	0,336* (1,9)	0,217* (1,7)
Quality of Institutions	-	-	-	-	-0,052 (1,1)	-	-
Labor Market Regulation	-	-	-	-	-	-	0,101* (1,7)
Product Market Regulation	-	-	-	-	-	0,149** (2,4)	-
Dummy Shift	0,07 (0,2)	2,02*** (2,8)	1,93** (2,6)	1,89** (2,4)	1,82** (2,1)	0,09 (0,2)	2,33*** (3,38)
R ² overall	0,646	0,740	0,743	0,698	0,732	0,641	0,674
R ² within	0,001	0,086	0,110	0,103	0,113	0,081	0,155
R ² between	0,674	0,764	0,767	0,721	0,7557	0,671	0,694
Number of observations	50	50	50	50	50	50	50

Regression Coefficients and Results (z-Statistics); */**/** = significant on the 10/ 5/ 1 percent level;

Source: Own calculations

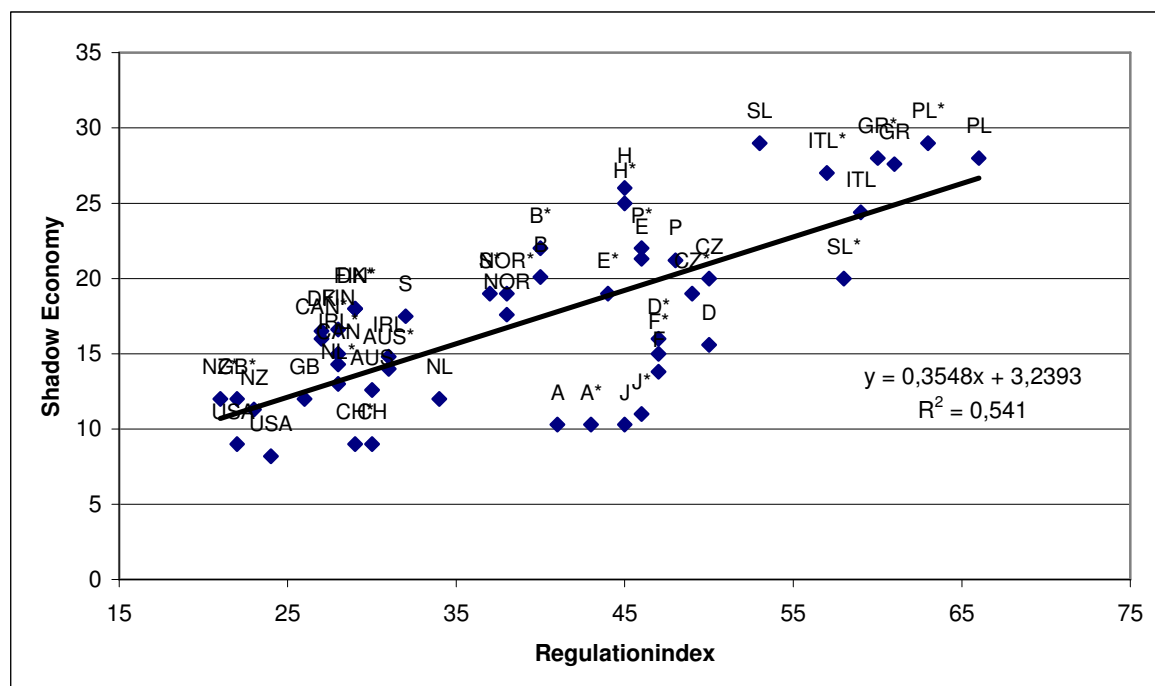
Table 3: Effects of Deregulation in Germany

	Regulation index	Difference to Germany	* Factor 0,355 (simple correlation)	Minus 1/3 for illegal goods and services	Minus 2/3 for non transferable goods*)
	Regulation Points		In relation to official GDP		
Germany	50	0	0	0	0
OECD average	38	- 12	+ 4,26	+ 2,84	+ 0,95
Anglo-Saxon Cluster	26	- 24	+ 8,52	+ 5,68	+ 1,90

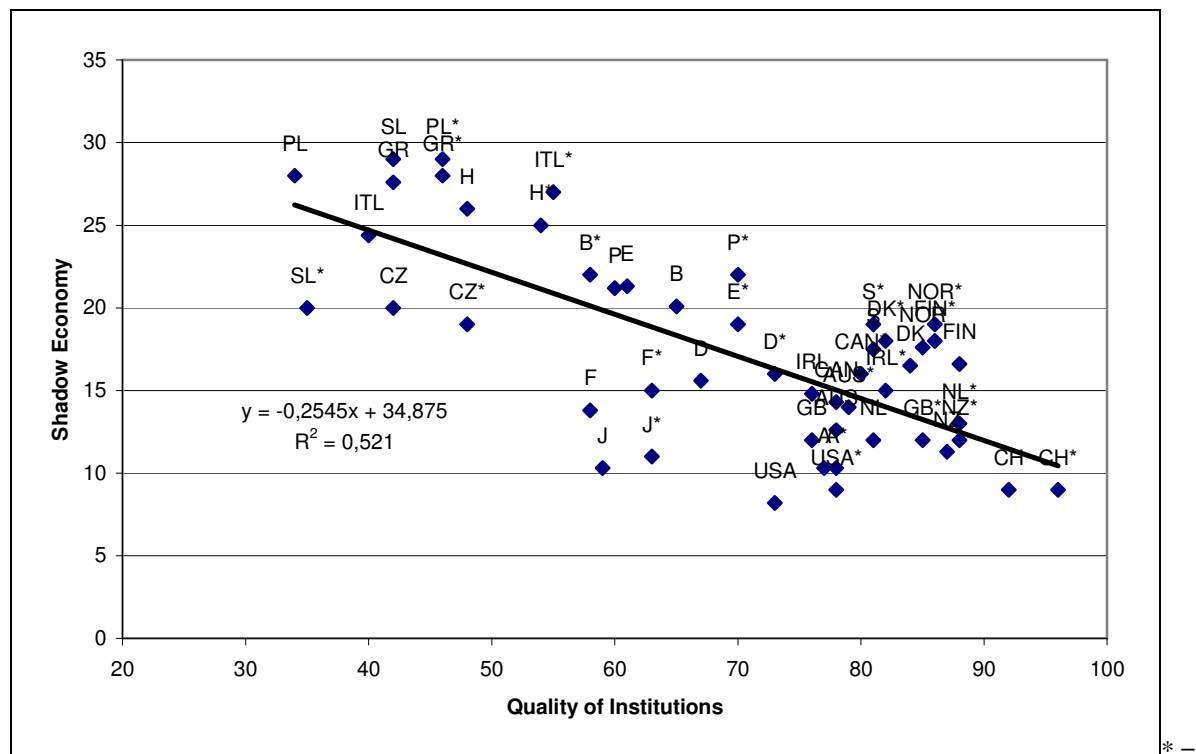
*) According to survey data, only one third of the goods and services can be transferred into the official sector, because the rest would be done by “yourself” or not be bought due to higher official prices. Source: own calculations

7 Appendix

Figure 1: Overall Regulation and Shadow Economy (1995-2000/ 2001-2005)



* = Country in period 1995-2000; Sources: Shadow Economy 1995-2000 and 2001-2005 in percent of GDP (Currency Demand and DYMIMIC Approach – Schneider 2005); Regulation based on IW Regulation index (0 = no regulation; 100 highest regulation 1995-2000/2001-2005) Enste/ Hardege (2006a). Own calculations

Figure 2: *Quality of Institutions and Shadow Economy (1995-2000/ 2001-2005)*

Country in period 1995-2000; Sources: Shadow Economy 1995-2000/ 2001-2005 in Percent of GDP (Currency Demand and DYMIMIC Approach – Schneider 2005); Good Governance Index (Quality of Institutions) based on IW-Regulation index 1995-2000/ 2001-2005; Enste/ Hardege, (2006a) (0=Worst Institutions; 100=Best Institutions); Own calculations

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