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Abstract

Since there are no broadly accepted macro-level estimations for the size of the hidden economy, the interrelationships of the hidden economy with different segments of the labor market have to be approached in a number of different ways. In our cross-country analysis, in parts 2 and 3 we use indirect estimations of the hidden economy and show that the size of the hidden economy and the size of self-employment can be explained by similar explanatory variables, tax rates and corruption being prominent among them. In part 4 we set up and quantify a model to analyze the interrelationships among the hidden economy and the pools of self-employed and non-employed people. For this model we use a specific direct indicator of the hidden economy, the concealed consumption share which is derived from the notion of the non-observed economy used by statistical agencies. We show that the size of this part of the hidden economy is determined by the tax rate related to the consumption and the level of corruption. We also demonstrate that the concealed consumption share plays an important role in the determination of the size of various segments of the labor market, while the developments of these segments also have their impact on this specific part of the hidden economy.

JEL: H 26, D 73, J 2, E 26

Keywords:
Hidden economy, labor market, taxation, corruption

A rejtett gazdaság és a munkaerőpiac egyes látható szegmenseinek összefüggései

Összefoglaló

A rejtett gazdaság nagyságáról nem rendelkezünk széles körben elfogadott makroszintű becslésekkel, ezért ennek és a többi munkaerőpiaci szegmensnek az egymásra hatását többféle megközelítésben tárgyaljuk. A dolgozat 2. és 3. részében országok közötti keresztmetszeti elemzésben a rejtett gazdaság nagyságának indirekt becsléseit használjuk, és megmutatjuk, hogy a rejtett gazdaság és az önfoglalkoztató szektor méretének országok közötti különbségei több azonos magyarázó változóval, köztük kiemelten az adóráták és a korrupció szintjével magyarázhatók. A 4. részben felállítunk és számszerűsítünk egy modellt, amely a rejtett gazdaság, az önfoglalkoztatók és a nem-foglalkoztatottak szektorainak egymásrahatását elemzi. Ebben a modellben a rejtett gazdaságot egy speciális indikátorral, a be nem vallott fogyasztás arányával jellemezzük, amelyet kidolgozói a statisztikai hivatalok által becsült un. nem-megfigyelt gazdaság fogalmából vezettek le. Megmutatjuk, hogy a rejtett gazdaságnak ez a része is szoros kapcsolatot mutat a fogyasztással kapcsolatos adóráták és a korrupció szintjeivel. Azt is felvázoljuk, hogy a be nem vallott fogyasztás aránya fontos szerepet játszik a különböző munkapiaci szegmensek alakulásában, míg ez utóbbiak maguk is hatással vannak a be nem vallott fogyasztásra.

Tárgyszavak:
Rejtett gazdaság, munkapiac, adózás, korrupció

1 INTRODUCTION

The working of hidden, shadow or non-observed economies is reflected in the respective labour markets; these (partly overlapping) invisible parts of the national economy do not leave the various segments of the labour market untouched. The relationship between the hidden economy and the various segments of the labour market is very complex. The hidden economy is mostly associated with hidden employment, but this hidden employment can be found not only among the officially inactive and unemployed people, but among the self-employed people and the employees as well. While we experience these features in our own everyday life, an exact, rigorous investigation of this relationship is very difficult to carry out. The analysis is difficult at the micro level, because here the researcher has to put sensitive questions to representatives of various groups engaged in the labour market. It is rather difficult to ask all people (unemployed, self-employed, employees or inactive) about activities they are carrying out without declaration at the different offices and without paying taxes.

The macro investigation of the relationship between the size of the hidden economy and the size of the different segments of the labour market is also difficult, because due to its invisible feature and heterogeneity a good and comprehensive definition and method of measurement of the hidden economy are missing. In the literature we can find various macro-estimations for the size of the hidden economy in many countries, but these results are rather unreliable, and many of them contradict to each other. This lack of reliable indicators of the hidden economy is the reason why so far very few empirical investigations have been carried out about the direct relationships between the size of the hidden economy and various segments of the visible labour market.

Recently, in the investigation of the above mentioned relationships statistical estimations of *the non-observed economy in the GDP*[1] have gained priority. The

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[1] Non-observed economy includes:
• *underground production*, defined as those activities that are productive and legal but are deliberately concealed from the public authorities to avoid payment of taxes or complying with regulations;
• *illegal production*, defined as those productive activities that generate goods and services forbidden by law or that are unlawful when carried out by unauthorized producers;
• *informal sector production*, defined as those productive activities conducted by unincorporated enterprises in the household sector that are unregistered and/or are less than a specified size in terms of employment, and that have some market production;

problem is that despite the fact that national statistical offices make their estimations about the non-observed economy, we have little information about the exact size of the non-observed economy *already taken into account* of in the published figures of GDP. It is interesting that although the statistical offices of many countries make estimations for the non-observed economy in different branches, they do not know, or do not make it public, what the size of the GDP they consider as non-observed at the macro level. Recently different international projects made calculations on how much is the exact non-observed economy part in the GDP in certain countries. UNECE (2002) presents some results of its own international project. The results are presented in Table 1.

[Table 1]

While one may question the reliability and comprehensiveness of these indicators for the size of the hidden economy in the given countries, in this paper in the introductory section we will make use of these very data. The justification for this is that most of the other available estimations for the hidden economy suffer from a built-in dependency on the tax rates and employment patterns; therefore they could not be used for the analysis of taxes and labour markets without the risk of arriving at tautological relationships.

We carry out a cross-country macro level investigation. The first logical hypothesis is that a larger non-observed economy in the GDP is likely to be associated with a lower registered employment rate, because from among the different categories of employment, formally employed people have the least time to work in a hidden way. There are countries, however, where an unusually large number of employed people are declared as working for a minimum wage. This, as a rule, implies that they work partly in the formal economy (for the minimum wage) and partly in the hidden economy (for undeclared compensation). This is the case, for example, with the so called grey economy in Hungary. If this phenomenon is widespread across countries, then the above mentioned hypothesis may not receive a very strong support.

When investigating the relationship between the share of non-observed economy in the GDP and total employment rate in 12 countries (7 transition and 5 developed market economies), we find a rather strong correlation with a negative sign. As can be seen in Figure 1 a higher share of non-observed economy in the GDP is associated with lower

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• *production of households for own final use*, defined as those productive activities that result in goods or services consumed or capitalised by the households that produced them.

employment rate in the formal economy. (Due to lack of data, here we excluded Russia, Kazakhstan and Kyrgyzstan from among the countries listed in Table 1. Data are for various years in the period 1995-2000.)

[Figure 1]

This relationship is especially strong for the employment rate of the low-skilled: see Figure 2. (Here we have only 9 countries in our sample, but we can confirm that the stronger relationship for data in Figure 2 is not due to the smaller sample, because the R^2 between the *total* employment rate and the share of non-observed economy in this sample would be 0.595, very similar to the one experienced for data in Figure 1.)

[Figure 2]

While the negative relationship between employment rates and the share of the non-observed economy in GDP is rather clear in Figure 1 and 2, we have to admit that the number of observations does not provide enough evidence to support our hypothesis. At the same time the association of high non-observed economy with low employment and vice versa does not necessarily prove a causal relationship between the two variables.

Nevertheless, due to lack of credible data for the hidden economy we need this type of direct relationship as guidance to further investigations. The same problem of lack of data induced researchers to try finding *indirect* relationships between the size of the hidden economy and different indicators about various segments of the labour market. The investigation of the indirect relationships between the hidden economy and different segments of the labour market usually tries to show that the factors influencing the hidden economy simultaneously influence employment, and the structure of employment, including unemployment as well. These investigations analyze the effect of the hidden economy indirectly, i.e. without any robust information about the size of the hidden economy (see Lackó, 2004, 2005, 2006, Boeri and Garibaldi, 2000).

In section 2 the effects of tax rates and corruption on the size of the hidden economy is analyzed based on different indirect estimations of the hidden economy. Section 3 investigates the international evolution of self-employment rates with partly similar explanatory factors as it was done for the hidden economy in section 2. Section 4 sets up and quantifies a model to analyze the interrelationships among the hidden economy, the pool of self-employed and non-employed people. In this section we use a specific

indicator of the hidden economy, the *concealed consumption share* which is closely related to the non-observed economy. We show that the size of this part of the hidden economy is determined by the tax rate related to the consumption and the level of corruption. We also demonstrate that the concealed consumption share plays an important role in the determination of the size of various segments of the labor market, while the developments of these segments also have their impact on this specific indicator of the hidden economy.

2 TAX RATES AND CORRUPTION EXPLAINING THE SIZE OF THE HIDDEN ECONOMY

The above mentioned limited exact knowledge about the size of the hidden economy in different countries has induced researchers to investigate, both theoretically and empirically, the relationships between some possible explanatory factors (tax rates, corruption, other institutional factors) of the evolution of the hidden economy and the development of different segments of the visible labour market.

In the respective literature the most universally accepted inquiry is the investigation of the role of the tax rates in the explanation of the cross-country differences in the employment rate and the unemployment rate: see Layard et al., 1991; Scarpetta, 1996; Elmeskov, Martin and Scarpetta, 1998;Leibfritz et al., 1997; Nickell, 1997; Blanchard and Wolfers, 2000; Jackmann, 2002; Daveri and Tabellini, 1997; Planas et al., 2003; Belot and Van Ours, 2001, Nickell, Nunziata and Ochel, 2002, Nickell, 2003. Taxes on labor influence both workers' decisions about how much labor they supply and firms' decisions about how much labor they employ. Higher personal income taxes and employee social security contributions tend to reduce the return to working, which may discourage labor supply and depress potential output. Not only employment, but also wages may respond to the variation in labor taxes. The size and pattern of this response, however, depend on the institutional structure of wage bargaining, labor market policies and the degree of competition in the product markets. In the presence of rigidities on both labor and product markets, workers' resistance to taxes on their labor efforts can boost wage demands, thereby raising the labor costs for employers. At the same time, an increase in

employer payroll taxes will raise labor costs directly, i.e. employers will not be able to offset them by lowering wages. Such shifting of taxes onto labor costs, in turn, decreases the demand for labor, as it decreases profitability and investment.

In the investigations of the development of different visible segments of the labour market, i.e. employment, self-employment and unemployment, the direct effect of corruption has usually been neglected. The impact of corruption has been seriously taken into account only in the investigation of the hidden (unofficial) economy. Theoretically the relationship between corruption and the hidden economy may be either complementary[2] or substitutive[3]. The empirical evidence so far has been mostly in favour of complementarities. A recent paper by Dreher and Schneider (2006), however, offers a more subtle relationship: it shows that in high income countries corruption and the hidden economy are substitutes, while in low income countries they are complements.

Loayza (1997) investigates the emergence of the hidden (informal) economy assuming that excessive taxes and regulations on the on hand, and a government unable to enforce these, on the other, are together important explanatory factors for hidden activities. His proxies for weak tax enforcement are the quality of bureaucracy and corruption. Using data for Latin American countries in the early 1990s he tests some of the implications of the model, and estimates the size of the informal sector in these countries. He uses a MIMIC (Multiple-Indicator, Multiple-Cause) model of latent variable, where exogenous causes determine the latent variable, and the latent variable determines a set of endogenous indicator variables. The causal variables are the corporate income tax rate, a proxy for labour market restrictions, and a proxy for the strength of the enforcement system. The results of the calculations show that the size of the informal sector depends positively on proxies used for the tax burden and for labour market restrictions, and negatively on a proxy for the quality of government institutions.

Johnson et al. (1997), using a sample of the transition countries, examine how the interplay between politics and economic and institutional incentives influences the growth of the unofficial economy and, in turn, how the unofficial economy affects economic performance. The authors set up a simple model of tax and regulatory

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[2] See Choi and Thum (2004) and Rose-Ackermann (1997).
[3] See Friedmann et al. (2000) and Johnson et al. (1998).

incentives that lead firms to choose between operating in the official or in the unofficial sector. A higher unofficial economy leads to a loss in public revenues, less public goods, such as law and order, a decrease in the productivity of firms, as well as to a further boost to the unofficial economy. Firms in the unofficial sector neither pay official taxes nor share in public goods. Instead, they pay private agencies – the 'mafia' – for contract enforcement and protection from thieves. A multiple equilibrium model ensues.

The empirical analysis in Johnson et al. (1997), based on data from a wide variety of sources, offers support to the model. As the output of the unofficial sector is not recorded in the official GDP, the authors use the estimation method of total GDP from total national electricity consumption.[4] The results suggest substantial variation in the size of the unofficial sector across the transition economies, as well as significant differences in both the levels and growth rates of total GDP compared to the official GDP.

To quantify the relative costs and benefits for businesses of their choice in operating in the official economy Johnson et al. (1997) use an array of indicators including measures of liberalization, privatization, deregulation, corruption, and tax fairness, as well as characteristics of the legal environment. The latter are the public goods most relevant to the theoretical model developed by the authors. Better performance in terms of these institutional and legal environment measures is associated with a smaller unofficial economy and higher official GDP. In turn, a large unofficial sector and less official output are associated with larger budgetary deficits and higher inflation.

Friedman et al. (2000) raise the question: what drives entrepreneurs and large businesses underground? They bring up two competing hypotheses: (1) high taxes, (2) special political and social institutions that govern the economy, such as excessive bureaucracy and corruption, and a weak legal environment. When testing the two hypotheses the authors use data from 69 countries for the 1990s for variables such as tax rates, bureaucratic hindrances, corruption, the legal environment, and the size of the unofficial economy. The analysis reveals no evidence that higher direct or indirect tax rates are associated with a larger unofficial economy. In fact, the authors find some support to the relationship that higher direct tax rates are associated with a smaller

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[4] This method was developed by Kaufmann and Kaliberda (1996).

underground sector. However, when per capita income levels are controlled for (in order to allow for the possibility that richer countries have a better-run administration, and operate with higher tax rates), this paradoxical relationship ceases to be significant. By contrast, Friedman et al. find that more bureaucracy, greater corruption and weaker legal environment are all associated with a larger unofficial economy, even (in most cases) when per capita income is controlled for. These findings are confirmed not only for the whole sample, but also for different groups of countries, such as the OECD countries, the transition economies, and Latin American states.

Johnson et al. (1999) also investigate the relationship between taxes and the unofficial economy. After building a theoretical model, they empirically show that the tax burden on the agents depends much more on the extent of bribery and corruption, than on the tax rates per se.

Lackó (2006) used three types of explanatory variables, tax rates, the extent of corruption and various institutional aspects of the labour market, for the explanation of the relative size of the visible segments of the labour market in developed market economies and in some transition countries. The novelty of that analysis was that it asserted that the role of corruption was closely connected with tax rates, and the two effects were combined in an indicator of their interaction term.

There are numerous definitions for the concept of corruption. The simplest definition is that it is the abuse of public power for private gains. While accepting this general definition we should not exclude the possibility that corruption-like behaviour exists in exclusively private sector activities as well. In large private enterprises, particularly when the managers are not the same as the owners, this phenomenon can also exist, but here the usual conflict between public and private interest transforms to the conflict between company and personal private interest.

The two forms of corruption (small and grand) Lackó (2006) can be considered as extra taxes. More pervasive small corruption means that the nominal, statutory tax rate will be complemented with an additional cost or tax related to this corruption. In the case of grand corruption (occurring on the higher levels of the political hierarchy) this

connection is more indirect: a strong grand corruption signals that in the given country public revenues are less likely to be used for the necessary public services, and also that the risk of conducting orderly business is high. Under extensive grand corruption the main functions of the public sector are distorted: the allocative function (allocation between social and private goods), the redistributive function (redistribution between the rich and poor), as well as the stabilization function (the use of the budget policy to maintain a sufficient level of employment, the stability of prices, budget deficit, and so on).

As Lackó (2006) emphasizes, members of the society are not blind, sooner or later they perceive the extra-tax nature of corruption and respond in their own way. In the literature about tax compliance we find propositions, based both on theory and on results from controlled experiments, about people's reaction to corruption. Spicer and Lundstedt (1976) and Smith (1992) hypothesize that a taxpayer will feel 'cheated' if he believes that his tax dollars are not well spent, and may respond by refusing to pay his full tax liability. Alm et al. (1992) perform experiments to test this idea. They find a greater willingness to comply with tax obligations when participants perceive that they will receive benefits in public goods funded by the taxes collected. Using experimental methods Webley et al. (1991) also examine what role taxpayers' satisfaction with the operation of the government plays in the compliance to pay taxes. The authors find that those participants, whose responses to a survey taken several months before the experiments indicated alienation from government or a negative attitude towards laws, are significantly more likely to engage in tax evasion during the experiments. In their theoretical model Pommerehne et al. (1994) find that the greater the deviation between the individuals' optimal choice of public goods provision and the actual level, the more they, as taxpayers, underpay their taxes; the higher the level of squander by the government in the previous period, the less the individual is willing to contribute in the present. In their survey investigation for the Czech and Slovak Republics, Hungary and Poland, Hanousek and Palda (2002) show that those, who believed that they were getting quality government services also tended to evade taxes much less than those, who did not believe getting the services they expected. The authors find that governments are constrained in their actual tax collection by the perceptions people have about the quality of government services that they receive.

Lackó (2006) stated: a simple comparison of statutory tax rates across countries to analyze the tax burden may be misleading, since in this case one does not take into account *the environment* in which tax rates let their impact be felt. In this context "environment" means the way taxes are set and collected (coherence, transparency and the orderliness of the tax system and tax collection), as well as the way taxes are used in the provision of government services (again transparent, orderly and economical utilization). For a proper cross-country comparison of the tax burden one has to take into account not only the traditional tax rates, but the level of corruption, too. We illustrate these two kinds of burden on Figure 3.

[Figure 3]

Data points in the figure show how the traditional tax wedge and the burden due to corruption press the employers and employees in the OECD countries in 2004[5]. Here, and in the further investigations, the tax wedge is defined as follows: the sum of employees' and employers' social contributions, plus personal income tax, less transfer payments, all as a percentage of gross labour costs, paid by a one-earner married couple at the so called APW (average production worker) level. [6]

On Figure 3 we can see that Sweden has the highest traditional tax wedge, but with respect to the level of corruption, it is positioned at a much lower (better) level than the average of the OECD countries. Germany, the Netherlands and Denmark have also higher traditional tax wedges than the average, and levels of corruption below the OECD average. From among the Central and East European transition economies in the sample Poland and Hungary have both higher than average traditional tax wedges and higher than average levels of corruption, while in Czech Republic the higher level of corruption goes together with an average size of tax wedge. Similarly to the Hungarian and Polish cases, some more developed market economies (such as Italy, Greece and Turkey) have relatively high tax wedges and high levels of corruption.

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[5] *The burden or level of corruption k,* may be derived from the corruption index in two ways. We can apply $k = (10/\text{corruption index})$ or $k = (10 - \text{corruption index})$, since the corruption index calculated by Transparency International gives values practically between 1 and 10, where the value of 10 represents the corruption-free environment. In Figure 3, as well as in the relevant regression calculations the second form of k is used .

[6] This corresponds to the use of the concept of tax wedge in OECD analyses and statistics.

We can show – for taxes related to different tax bases – that tax rates, when combined with corruption, do exert a strong influence on the size of the hidden economy. We use two country samples: for each different tax indicators are available. For both sample we use data for the size of the hidden economy taken from already available estimations. Sample I covers 31 countries, including 18 developed, 8 developing and 5 transition countries. Here the tax indicators used are the income tax rate and the corporate tax rate. We estimate a regression equation explaining the share of the hidden economy in a slightly different way as Friedmann at al. (2000) did: we exclude two "outlier countries" (Poland and Slovakia), and we analyze the impact of the main explanatory variables (tax rates and corruption) both separately and jointly. (Friedmann at al. investigated the effects of these explanatory variables only separately.) The results are presented in Table 2.

[Table 2]

We find, similarly as Friedman et al. (2000), that the income tax rate has no significant relationship with the size of the hidden economy (see column [1] in Table 2). If we add the corruption index to the explanation (column [2]), the size of the hidden economy is significantly influenced by the extent of corruption, but the impact of the income tax rate and the corporate tax rate are significant only at the 90% level. In column [3] we show the results from a specification including the interaction of tax rates and the level of corruption in the explanation of the share of the hidden economy. The results show that this interaction term is significant. With the usual interpretation we can assert that the impact of the changes in the tax rates on the size of the hidden economy depends on the level of corruption.

Sample II contains 21 OECD countries, and here we make calculations with the tax wedge. The results of the calculations are shown in the second block of Table 2. As it turns out, in this sample the tax wedge and the corruption index explain the size of the hidden economy both separately and jointly. Here we also experience that the interaction term of the tax rate and the level of corruption is significant: the effect of the tax wedge on the hidden economy depends on the level of corruption.

The calculations on the two samples of countries above give a preliminary indication that the tax rates and corruption are relevant explanatory variables in the context of the hidden economy. However, the results have to be taken with caution in view of a certain

problem with the data used here but having been generated by previous estimations procedures. In the calculations outlined above the values for the size of the hidden economy (the left hand side variable) were taken from sources which, given the nature of the hidden economy, produced these values based on certain estimation procedures. These procedures, in turn, usually already assume the impact of different tax rates on the hidden economy. For this reason, when we use the estimated values of the size of the hidden economy, with the aim of investigating the impact of tax rates, we can easily arrive at a tautological relationship.

Partly for the above reason, we carry out further investigations to show to what extent tax rates and corruption are relevant explanatory variables in an important visible segment of the labour market. We focus on the determination of participation of the active population as self-employed. The investigation of the self-employment rate is important because it is better recorded than hidden employment, but the behaviour of the self-employed segment of the labour market shows much similarity with the hidden employment. In the literature, especially in analyses dealing with developing countries, the self-employed are usually defined as part of the informal economy.

3 TAX RATES AND CORRUPTION EXPLAINING THE SELF-EMPLOYMENT RATES

The sector of self-employed is, as a rule, a poorly recorded and somewhat mysterious part of the national economies. As a consequence, the determination of the size of self-employment is far from straightforward.

In most countries the agricultural sector uses a relatively high proportion of self-employed workers; therefore, in a cross-country perspective a higher share of agricultural employment is usually associated with a higher share of self-employment in total employment. During the 1990s, however, in most OECD countries non-agricultural self-employment grew faster than civilian employment as a whole, with the effect of increasing the share of non-agricultural self-employed. Various, to some extent overlapping, explanations have been put forward for this recent renaissance in self-employment (c. f. OECD, 2000a):

It may have been a reaction to the overly rigid labour and product markets and to the high level of taxation. The opportunities that self-employment offers in paying less tax to the state could have been partly responsible for the recent reallocation of employment to this sector.

The growth of the self-employed sector reflected changes in the industrial organization. Greater stress on outsourcing non-core activities may have increased the amount of work subcontracted to the self-employed, due to the experience that self-employment business has shown greater flexibility and speed of response than traditional firms.

Cross-country studies traditionally emphasize that there is a strong negative correlation between the level of GDP per capita and the share of non-agricultural self-employment without unpaid family workers (Kuznets, 1966, Schultz, 1990, Bregger, 1996). This empirical finding is usually substantiated with the argument that a low level of prosperity coincides with a low level of wages, implying little pressure to increase efficiency, or to increase the average scale of enterprise activities. At this stage of development a major route for ambitious wage earners to increase their incomes is to set up an own shop and become an entrepreneur. Economic development subsequently leads to rising wages, which stimulates enterprises to work more efficiently and to reap economies of scale and scope. An additional effect of rising wage levels is the increased attraction of wage-employment: the high and secure income of wage-earners increase the opportunity cost of becoming self-employed (cf. Iygun and Owen, 1998).

Empirical investigations, including cross-sectional econometric investigations usually try to find out which of these two tendencies – traditional, income-related or/and the more recent, organization- and regulations-related trends – is dominant in the determination of the size of the self-employed sector. The usual explanatory factors used are the level of development, the unemployment rate, the proportion of women in the labour force, the share of GDP produced in the service sector, as well as average and marginal tax rates (see Acs et al., 1994, Staber and Bogenhold, 1993, Robson and Wren, 1999).

In these models the sign of the coefficient of the unemployment rate is *a priori* uncertain, since with the growth of the self-employment rate the unemployment rate may either increase or decrease depending on the segments of the labour market from which people move to the self-employment sector. Estimates on the effect of growing unemployment on self-employment vary from study to study. Investigations at the micro-level, however, show that most self-employed people were previously in wage and salary employment, and a substantial proportion of self-employed leave their self employed status for entering or re-entering the segment of wage- and salary-employment. Only a very small proportion of the unemployed people find employment through self-employment.

As for the other variables in the regressional equations explaining self-employment, the proportion of women in the labour force is usually expected to have a negative coefficient, while the share of the service sector in GDP a positive one. While these are plausible assumptions, not all the relevant econometric estimations could confirm them.

With respect to the role of the average tax rate, most of the investigations arrived at the result that the tax rate has a positive coefficient: an environment characterized by higher average tax rates provides more incentive to find ways of avoiding and evading taxes through self-employment, and people tend to utilize these opportunities. This was found, for instance, by Robson and Wren (1999), OECD (2000a) and Scharle (2002). However, one can find a few such investigations as well which could not confirm this assumption.

Following this brief survey we turn to our own investigation of the determinants of the self-employment rate in 28 OECD countries in 1995-2004. In Table 3 the results of the estimation are presented. The explanatory variables are the tax wedge, the corruption index, and the share of agricultural employment in the given country. The method is the random-effects GLS regression.

[Table 3]

The results in Table 3 indicate that in all the regression calculations the agricultural employment rate has a very strong positive effect. After the brief review of literature of self- employment above this comes as no surprise. In the calculation where the impact of

corruption as an extra tax is not taken into account (column [1]) we find that the tax wedge has a positive but insignificant parameter, which means that higher traditional tax rates alone do not induce, ceteris paribus, higher rates of self-employment. In the regression calculation incorporating corruption (column [2] in Table 3) we find that, while the coefficient for the tax wedge is insignificant, the coefficient of corruption shows a significantly positive sign: higher corruption increases the share of self-employed. If, along with the tax wedge, we use the interaction term of the tax wedge and the level of corruption (columns [3]), the coefficient of this term turns out significantly positive, while the coefficient of tax wedge is negative, but insignificant. This means that a higher tax wedge with higher corruption increases the share of self-employment rate in total employment.

The likely explanation for this relationship is twofold. First, for the self-employed himself/herself, the self-employment status offers ample opportunity to evade taxes, and higher taxes with higher corruption give more encouragement to choose a status where one can evade them. Second, higher taxes with higher corruption offer more opportunities for tax-avoidance not only for the self-employed, but also for the enterprises that used to employ workers in a traditional way. By pushing some of their traditionally used employees to the self-employed sector and by keeping them working for the enterprise, they can use this outsourcing setup to avoid paying social security contributions and providing other in-kind benefits and protection to them.

When comparing the reaction of male and female self-employed to the tax wedge, we can see that a higher tax wedge alone increases the attractivity to become self-employed for the male workers, but it decreases it for the female ones (see columns [2] and [3] in Table 4 and 5). The effects of the level of corruption and the interaction term (tax wedge * corruption) are, however, similar for both genders.

[Table 4]

[Table 5]

Assuming that the environment is similar by corrupt the effect of a similar change in the tax wedge on the self-employment rate is different for the two genders: a higher tax wedge encourages men, while discourages women choosing the self-employed status.

Nevertheless, all in all, in the investigation of the behaviour of becoming self-employed we can experience the same pattern as we have seen in becoming part of the hidden economy: the interaction term of the tax wedge and corruption is an important explanatory variable explaining the size of both segments of the labour market, both time-wise within a single country, and across the investigated countries in a single year.

As mentioned above, in the investigations of the hidden economy, we considered some of our results with reservations, because the left-hand variable, the value of the indicator of the size of the hidden economy was taken from indirect estimations based partly on the size of tax rates and corruption; therefore the results, such as those in Table 2, had the possibility of containing tautological relationships.

In order to get rid of the suspicion of tautological reasoning now we return to investigation of the size of the hidden economy, but with the help a special indicator, the concealed consumption share in per cent of total consumption of taxable goods and services.

4 THE CONCEALED CONSUMPTION AND ITS RELATIONSHIP WITH THE VARIOUS SEGMENTS OF THE LABOUR MARKET

The concealed consumption share in percent of total consumption of taxable goods and services (CCS) calculated by Holzner and Christie (2006) can be seen as a kind of measure of the hidden economy. This measure is free from the problems that we could experience in various indirect estimations of the size of the hidden economy. Christie and Holzner (2006), using national account aggregates as their starting point, constructed estimates of the relevant tax bases for VAT and excise taxes. Next, they computed estimates of compliance rates for these taxes for each available year, based on tax revenue data as well as taxation laws and regulations. The indicator they arrived at is the Concealed Consumption Share which they base on the non-compliance part of the relevant taxes. Table 6 presents their results, the Concealed Consumption Share (CCS) in per cent of total consumption of taxable goods and services, and Concealed Consumption

in per cent of GDP. (For details of the method of the calculation see Christie and Holzner (2006).)

[Table 6]

The kind of hidden economy measured by the indicator of concealed consumption is connected to various taxes, but mainly to the value added tax (VAT). From the whole hidden economy this is only one part, but this part is rather broad: potentially all the consumers may participate in it, as well as those producers (especially in the service sector) who sell at the end of the vertical phases of production and whose contribution to the total value added of the product or service that they sell is particularly large. The most distinctive characteristic of the evasion of VAT is that it emerges from the collusion between sellers and buyers who traditionally have contradictory interests, but here they act in collusion against the state. For this reason the concealed consumption share is a particularly important indicator of the general tax morale of the society; therefore, the size of this indicator has implications for all kinds of hidden activities.

In this section we investigate the behaviour of this hidden-economy indicator, namely its relationship with the VAT rate combined with corruption and with various segments of the labour market.

As illustrated on Figures 4 and 5 the CCS has only a weak positive relationship with the traditional VAT rate, while it shows a stronger positive relationship with the interaction of VAT rate and corruption. These results confirm our previous experience that a tax rate influences the size of the hidden economy not by itself, but together with the level of corruption.

The size of the hidden economy represented by the CCS may hinge not only on the VAT rate, but on the differences in the employment statuses in terms of allowing more or less tax evasion. This is why it is important to investigate (in a cross-country comparison) how this kind of indicator of the hidden economy is connected with the different visible segments of the labour market. Table 7 shows cross-country correlations between the CCS and the employment rate, unemployment rate and self-employment rate in 26 European countries in the years 2000-2003. Greece, Croatia, Slovenia and Cyprus were left out from the sample on purpose. Christie and Holzner got rather low

values of CCS for these countries, which these authors attributed to the importance of tourism revenues heavily underestimated by national statistical agencies.

[Table 7]

From Table 7 we can see a clear negative relationship between the CCS and the employment rate. This relationship is not very strong, though, probably because a segment of the employed people, the self-employed, behaves differently than the rest. This can be seen from the positive correlation between the CCS and the self-employment rate: the share of concealed consumption seems larger in those countries, where the share of self-employed is larger. The unemployed people behave similarly to the self-employed: in a cross-country comparison larger CCS is associated with larger unemployment rate. From these telling correlation coefficients, however, we do not know the causal directions of the relationships: one may assume that higher CCS is explained by higher self-employment rate, because this employment status is conductive to tax evasion; but one may similarly assume that higher self-employment rate is explained by higher CCS, because the larger opportunity for tax evasion pushes people to choose the self-employed status. From the next small recursive equation system we are able to show that both types of explanation are relevant.

Equation (1) explains the concealed consumption share:

(1) $CCS_{it} = f (VAT_{it-1}*(10/ k_{it-1}) , SELF_{it-1} , U_{it-1}, AGR_{it-1})$

$\qquad\qquad\qquad\quad +\qquad\qquad +\qquad +\qquad -$

Equation (2) explains the self-employment rate:

(2) $SELF_{it}= f(CCS_{it}, SELF_{it-1})$

$\qquad\qquad\qquad +\qquad +$

Equation (3) explains the rate of non-employment (i.e. the sum of unemployed and economically inactive people):

(3) $NONEMP_{it}= f(CCS_{it}, AGR_{it-1}, U_{it-1,} SELF_{it-1})$

$\qquad\qquad\qquad\quad +\qquad +\qquad +\qquad -$

where

CCS_{it}: the concealed consumption share in percent of total consumption of taxable goods and services;

$SELF_{it}$: the share of self-employed people in total employment;

$VAT_{it} * (10/k_{it})$: interaction of the VAT rate and corruption;

U_{it}: unemployment rate;

AGR_{it} : the share of people employed in the agrarian sector in total employment;

$NONEMP_{it}$: the share of non-employed people in the working age population;

i: country index;

t: years: 2000, 2001, 2002, 2003;

+/-: positive/negative direction of the relationship between the explanatory variable and the explained variable;

In this system we take CCS, SELF, and NONEMP as endogenous, while the other variables are exogenous. Equation (1) describes that higher interaction term of VAT rate and level of corruption in year *t-1* is associated with a higher concealed consumption share in year *t*. With the same interaction term of VAT rate and corruption, however, the concealed consumption share in year *t* is higher in a country if the share of self-employed people in the total employment is higher and the unemployment rate is also higher, both in year *t-1*. In equation (1) we take into account the share of agrarian-employment, because it is especially the agrarian self-employed who tend to produce goods not for the market, but for their own consumption. GDP contains this own consumption as a part of the inputted non-observed economy, but this activity does not bring about tax revenues. This is the reason why in the explanation of concealed consumption share we control for this factor with a negative sign. Equation (2) explains the rate of self-employment with its earlier value and with the concealed consumption share in year *t*: a higher concealed consumption share is associated with a higher rate of self-employment. Equation (3) explains the share of non-employed people in the working age population. The size of this segment of the labour market depends, in a natural way, on the lagged unemployment rate, on the lagged agrarian employment rate and the lagged self-employment rate. There are certainly non-employed people who in fact work, but do not pay taxes. For this reason it is plausible to make the assumption that a higher concealed consumption share is associated with a higher share of the non-employed people. There is a chance that we will experience multicollinearity between the explanatory variables, because, according equation (1), CCS_{it} has some relationship with U_{it-1}, $SELF_{it-1}$ and AGR_{it-1}. We may assume, however, that U_{it-1}, $SELF_{it-1}$ and AGR_{it-1} has their effects felt on the share of non-employed people not only trough CCS_{it}, but also independently of it and

directly: for instance, a higher unemployment rate is associated with a higher non-employed share, because the former segment is a part of the latter.

The parameters of this small simple model are estimated with the two-stage LS method, where the instruments of all equations are the same, namely the exogenous variables of the model. (One may notice that in case of equation (1) the two-stage LS method produces the same results as the OLS method, because in that equation all the explanatory variables are exogenous variables.)

Table 8 shows the estimation results for equation (1). These results are quite interesting. First of all, the explanatory variables explain well the cross country differences of the share of concealed consumption, the R^2 is 0.72, and the signs of the parameters are as expected. This means that the lagged interaction term of the VAT rate and corruption, the self-employment rate and the unemployment rate influence the concealed consumption share with a positive sign, while the agrarian employment rate has a negative sign in this determination.

[Table 8]

Second, in this estimation we experience the same characteristic features as found in the 1 part of this paper: the VAT rate, together with the index of corruption as an extra tax, is a relevant variable: namely it has a significant effect on the size of the hidden economy (here represented by CCS).

Table 9 contains the results of the estimations for equation (2). The rate of self-employment in year *t* depends not only on its lagged value, but on the concealed consumption share experienced in year *t*, too. A higher share of concealed consumption induces a higher rate of self-employment, since high CCS makes this employment status more attractive. In the estimated equation (2c) we show that the factors (the lagged interaction of the VAT rate and corruption, the agrarian employment rate and the self-employment rate) that influence the CCS play also a significant role in the explanation of the self-employment rate in year *t*. In this estimation the lagged unemployment rate turned out insignificant, possibly because its positive effect on CCS and through it on self-employment, on the one hand, and its possible direct negative effect on the self-employment rate (experienced in Lackó,2004) on the other, neutralized each other.

[Table 9]

Table 10 contains the results of estimations for equation (3). Equation (3a) shows that in addition to the positive effect of the lagged unemployment rate and the lagged agrarian-employment rate, also the concealed consumption share in year *t* influences the share of non-employed people in the working age population in year *t*. This equation has a higher R^2 than the one without the effect of CCS (see function (3b) in Table 10).

[Table 10]

Similar relationships were experienced in the explanation of the share of the male non-employed in equations (3c) and (3d), but here the explanatory power turned out much stronger than in the total population of non-employed. This stronger relationship is understandable because female non-employment is as a rule, impacted by additional important social factors that we did not take into account in the calculations. In estimations (3e) and (3f) we explain the share of non-employed male population by the factors that influence the concealed consumption share, such as the VAT rate, the corruption index (or the joint indicator of these) and the lagged size of the other segments of the labour market (unemployment rate, self-employment rate and agrarian-employment rate). In these equations the lagged self-employment rate and the lagged agrarian employment rate have insignificant parameters, because in both cases the effect of the respective variables on the non-employment rate has two directions; a positive (negative) indirectly through CCS, and a negative (positive) through their direct effects, respectively. These opposite effects on the sign of the parameters neutralize each other in the explanation of the share of non-employed male.

Summarizing the empirical test of the simultaneous system we can show on a simple scheme (see Figure 6) how the cross-country differences of the various segments of the labour market and the concealed consumption shares (hidden economy) define a system of behavioural relationships in the countries concerned.

[Figure 6]

5 SUMMARY

The working of hidden, shadow or non-observed economies is reflected in the respective labour markets; these invisible parts of the national economy do not leave the various segments of the labour market untouched. The relationship between the hidden

economy and the various segments of the labour market is very complex. The hidden economy is mostly associated with hidden employment, but this hidden employment can be found not only among the officially inactive and unemployed people, but among the self-employed people and the employees as well. While we experience these features in our own everyday life, an exact, rigorous investigation of this relationship is very difficult to carry out.

The macro investigation of the relationship between the size of the hidden economy and the size of the different segments of the labour market is difficult, because due to its invisible feature and heterogeneity a good and comprehensive definition and reliable methods of measurement of the hidden economy are missing. In the literature we find various macro-estimations for the size of the hidden economy in many countries, but these results are rather unreliable, and many of them contradict to each other. This lack of reliable indicators of the hidden economy is the reason that so far very few empirical investigations have been carried out about the relationships between the hidden economy and the various segments of the visible labour market.

In section 2 the effects of tax rates and corruption on the size of the hidden economy were analyzed based on different indirect estimations of the hidden economy. Section 3 investigated the international evolution of self-employment rates with partly similar explanatory factors as it was done for the hidden economy in section 2. Section 4 set up and quantified a model to analyze the interrelationships among the hidden economy, the pool of self-employed and non-employed people. In this section we used a specific indicator of the hidden economy, the *concealed consumption share* which was closely related to the non-observed economy. We showed that the size of this part of the hidden economy was determined by the tax rate related to the consumption and the level of corruption. We also demonstrated that the concealed consumption share played an important role in the determination of the size of various segments of the labor market, while the developments of these segments also had their impact on this specific indicator of the hidden economy.

TABLES AND FIGURES

Table 1

The share of non-observed economy in GDP, %

Country	Share of non-observed economy in GDP, %	Year of estimation
Bulgaria	16	2000
Czech Republic	9	1998
Hungary	16	1997
Latvia	17	1998
Lithuania	18	1998
Poland	13	1998
Slovakia	22	1998
Kazakstan	27	2000
Kirgistan	48	1999
Russia	25	2000
Belgium	3-4	1997
Canada	3	1992
Ireland	4	1998
Italy	15	1998
USA	1.2	1992

Source: Non-observed Economy in National Accounts, 2002, UNECE

Regression equations explaining the size of the hidden economy
Dependent variable: Share of the hidden economy in the GDP, per cent

Table 2

Independent var.	Sample I			Sample II		
	[1]	[2]	[3]	[4]	[5]	[6]
ln GDP	-17.5	-13.4	-13.6	-11.28	-7.63	-8.15
	[-10.7]	[-4.92]	[-6.18]	[-6.04]	[-2.87]	[-3.86]
INCOMETAX	0.13	0.14				
	[1.49]	[1.74]				
CORPTAX	0.24	0.17				
	[2.55]	[1.92]				
TAXWEDGE				0.3	0.26	
				[3.26]	[3.60]	
CORRUPTION		-1.37			-0.94	
		[-2.71]			[-2.18]	
INCOMETAX* CORRUPTION			0.026			
			[2.14]			
CORPTAX*CORRUPTION			0.026			
			[1.90]			
TAXWEDGE*CORRUPTION						0.03
						[2.98]
R2	0.85	0.87	0.87	0.69	0.73	0.74
RMSE	5.39	5.13	4.98	3.64	3.5	3.41
n	31	31	31	21	21	21
Method	OLS	OLS	OLS	OLS	OLS	OLS

Sample I source of data on hidden economy: Friedman et al (2000), 31 countries,   1995
Sample II source of data on hidden economy: Schneider (2004), 21 OECD countries,   1998
OLS: Ordinary Least Square Method with Huber-White standard errors, CORRUPTION=10-corruption index
Under the coefficients the t-statistics are in parentheses

Table 3

Regression explaining the self-employment rate

Dependent variable: self-employment rate, per cent in total employment

Explanatory variables	[1]	[2]	[3]
AGR	0.95 [18.5]	0.95 [20.8]	0.97 [20.6]
TAXWEDGE*	0.012 [0.5]	0.034 [1.59]	-0.038 [-1.66]
CORRUPTION**		0.9 [7.81]	
TAXWEDGE*CORRUPTION			0.021 [6.85]
CONSTANT	10.3 [7.9]	6.94 [5.32]	9.66 [7.77]
R2 within	0.6	0.69	0.67
R2 between	0.8	0.82	0.82
R2 overall	0.81	0.84	0.84
Number of observations	220	216	216

* Average of singles and married one earner families
** CORRUPTION = (10-corruption index)

Sample: OECD countries, 1995-2004

Table 4

Regressions explaining the male self/employment rate

Dependent variable: male self-employment rate, per cent in male employment

Explanatory variables	[1]	[2]	[3]
AGR	0.8 [13.7]	0.81 [15.5]	0.82 [15.4]
TAXWEDGE*	0.046 [1.71]	0.074 [3.01]	-0.004 [-0.16]
CORRUPTION**		0.95 [7.14]	
TAXWEDGE*CORRUPTION			0.023 [6.5]
CONSTANT	12.7 [8.6]	8.93 [5.92]	11.8 [8.2]
R2 within	0.48	0.59	0.57
R2 between	0.71	0.72	0.72
R2 overall	0.71	0.74	0.75
Number of observations	209	207	207

* Average of singles and married one earner families
** CORRUPTION=(10-corruption index)

Sample: OECD countries, 1995-2004

Table 5

Regressions explaining the female self-employment rate

Dependent variable: female self-employment rate,

Explanatory variables	[1]	[2]	[3]
AGR	1.17 [21.1]	1.18 [23.6]	1.2 [23.0]
TAXWEDGE*	-0.079 [-3.1]	-0.064 [-2.71]	-0.137 [-5.36]
CORRUPTION**		0.93 [7.36]	
TAXWEDGE*CORRUPTION			0.021 [6.2]
CONSTANT	9.26 [6.4]	5.98 [4.1]	8.88 [6.37]
R2 within	0.66	0.73	0.71
R2 between	0.85	0.86	0.86
R2 overall	0.85	0.87	0.87
Number of observations	209	207	207

* Average of singles and married one earner families
** CORRUPTION= (10-corruption index)

Sample: OECD countries, 1995-2004

Table 6

Concealed consumption as a share of total consumption (CCS) and total GDP (CCGDP), Average 2000-2003,%

	CCS	CC
Croatia	14.2	11.1
Cyprus	21.2	19.4
Slovenia	24.1	17
Denmark	26.1	14.5
Greece	27.5	21.5
Germany	27.5	17.9
Netherlands	27.7	17.6
Finland	30.1	17.9
Luxembourg	30.2	18.1
Sweden	33.7	21
Austria	35.3	24.1
Estonia	36.3	28.6
Portugal	38.7	30.7
France	38.8	25.3
Malta	38.9	33.5
Spain	38.9	27.9
Belgium	39	24.9
United Kingdom	39.8	34
Bulgaria	42.7	34.1
Turkey	43.5	34.5
Lithuania	44.5	35.4
Ireland	44.8	29.8
Hungary	45.7	31.4
Slovakia	47.4	34.9
Latvia	47.4	36.1
Romania	47.4	34.5
Poland	53.7	42.1
Italy	54	38.5
Czech Republic	54.4	39.9
EU-29 average	37.7	27.5

Source: Christie and Holzner (2006)

Table 7

Correlations between the share of concealed consumption in total consumption and the size of the different segments of the labor market

26 European countries, 2000-2003

	Employment rate	Unemployment rate	Self-employment rate
Concealed consumption share	-0.59	0.49	0.52
Number of observations	104	102	86

Table 8

Regressions explaining the concealed consumption share

Equation (1)

Explanatory variable	Dependent variable:CCS $_{it}$	
	(1a)	(1b)
ln VAT$_{it-1}$	0.17	
	[3.65]	
ln k$_{it-1}$	-0.16	
	[-6.2]	
ln (VAT$_{it-1}$*(10/k$_{it-1}$))		0.16
		[7.66]
ln SELF$_{i\,t-1}$	0.082	0.082
	[4.78]	[5.25]
ln AGR $_{i\,t-1}$	-0.054	-0.053
	[-4.31]	[-4.34]
ln U$_{it-1}$	0.036	0.033
	[2.56]	[2.41]
dummy for t	yes	yes
constant	yes	yes
R^2	0.72	0.72
RMSE	0.049	0.049
Number of observations	64	64
Method	2LS	2LS

Sample: 26 European countries in 2000-2003

Table 9

Regressions explaining the self-employment rate

Equation (2)

Explanatory variable	Dependent variable :		ln SELF$_{it}$
	(2a)	(2b)	(2c)
ln VAT$_{it-1}$			
ln k$_{it-1}$			
ln (VAT$_{it-1}$ *(10/k$_{it-1}$))			0.05
			[1.99]
ln SELF$_{i\,t-1}$	0.94	0.94	0.978
	[28.5]	[28.6]	[28.8]
ln AGR $_{i\,t-1}$			-0.029
			[-2.23]
ln U$_{it-1}$			
CCS$_{it}$	0.197		
	[1.84]		
lnCCS$_{it}$		0.081	
t	yes	yes	yes
Constant	yes	yes	yes
R^2	0.976	0.976	0.976
RMSE	0.088	0.088	0.088
Number of observation	61	61	61
Method	2LS	2LS	2LS

Sample: 26 European countries, 2000-2003

Table 10

Regression explaining share of non-employed in the working age population, Equation (3)

E

Explanatory variable	Dependent variable :					
	ln NONEMP$_{it}$ total (3a)	ln NONEMP$_{it}$ total (3b)	ln NONEMP$_{it}$ male (3c)	ln NONEMP$_{it}$ male (3d)	ln NONEMP$_{it}$ male (3e)	ln NONEMP$_{it}$ male (3f)
ln VAT$_{it-1}$					0.18 [1.21]	
ln k$_{it-1}$					-0.18 [-2.36]	
ln (VAT$_{it-1}$*(10/k$_{it-1}$))						0.18 [2.78]
ln SELF$_{i\,t-1}$					0.013 [0.30]	0.014 [0.38]
ln AGR$_{i\,t-1}$	0.061 [2.47]	0.092 [4.66]	0.053 [2.83]	0.075 [5.65]	0.021 [0.76]	0.021 [0.77]
ln U$_{it-1}$	0.098 [2.79]	0.17 [4.28]	0.22 [5.52]	0.27 [7.59]	0.23 [5.29]	0.23 [5.85]
CCS$_{it}$						
ln CCS$_{it}$	0.46 [3.63]		0.32 [2.31]			
Dummy for t	yes	yes	yes	yes	yes	yes
Constant	yes	yes	yes	yes	yes	yes
R^2	0.6	0.52	0.7	0.68	0.73	0.73
RMSE	0.1384	0.1515	0.1325	0.1339	0.1263	0.1252
Number of ob.	63	63	63	63	63	63
Method	2LS	2LS	2LS	2LS	2LS	2LS

Sample: 26 European countries, 2000-2003

Figure 1

The share of the non-observed economy in GDP and the total employment rate, percent, various years from 1992-2000

USA

Ireland

Canada

Belgium

Italy

Czech Rep.

Low-skilled employment rate

Poland

Hungary

Slovakia

$y = -1.2517x + 58.406$

$R^2 = 0.7964$

Share of non-observed economy in GDP
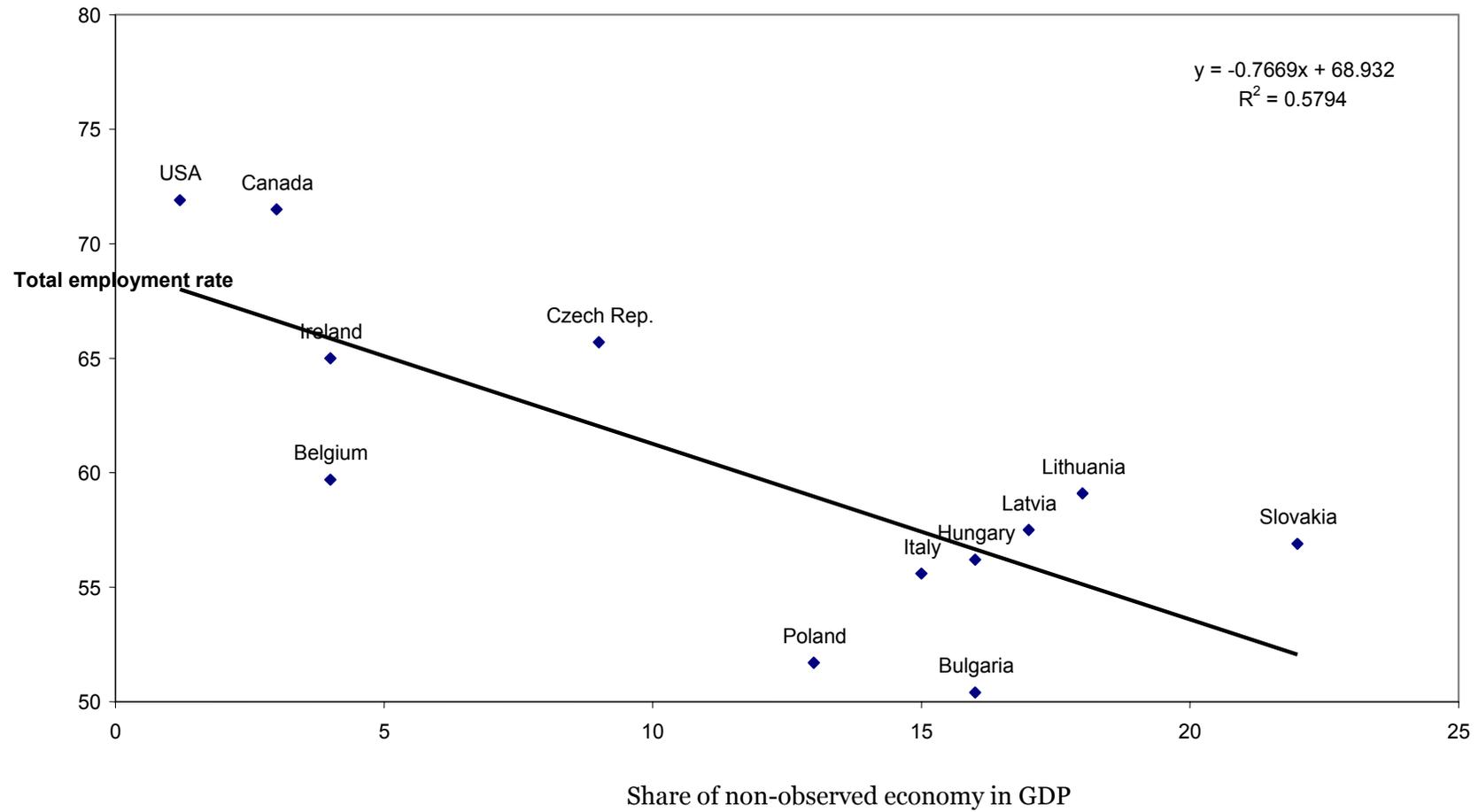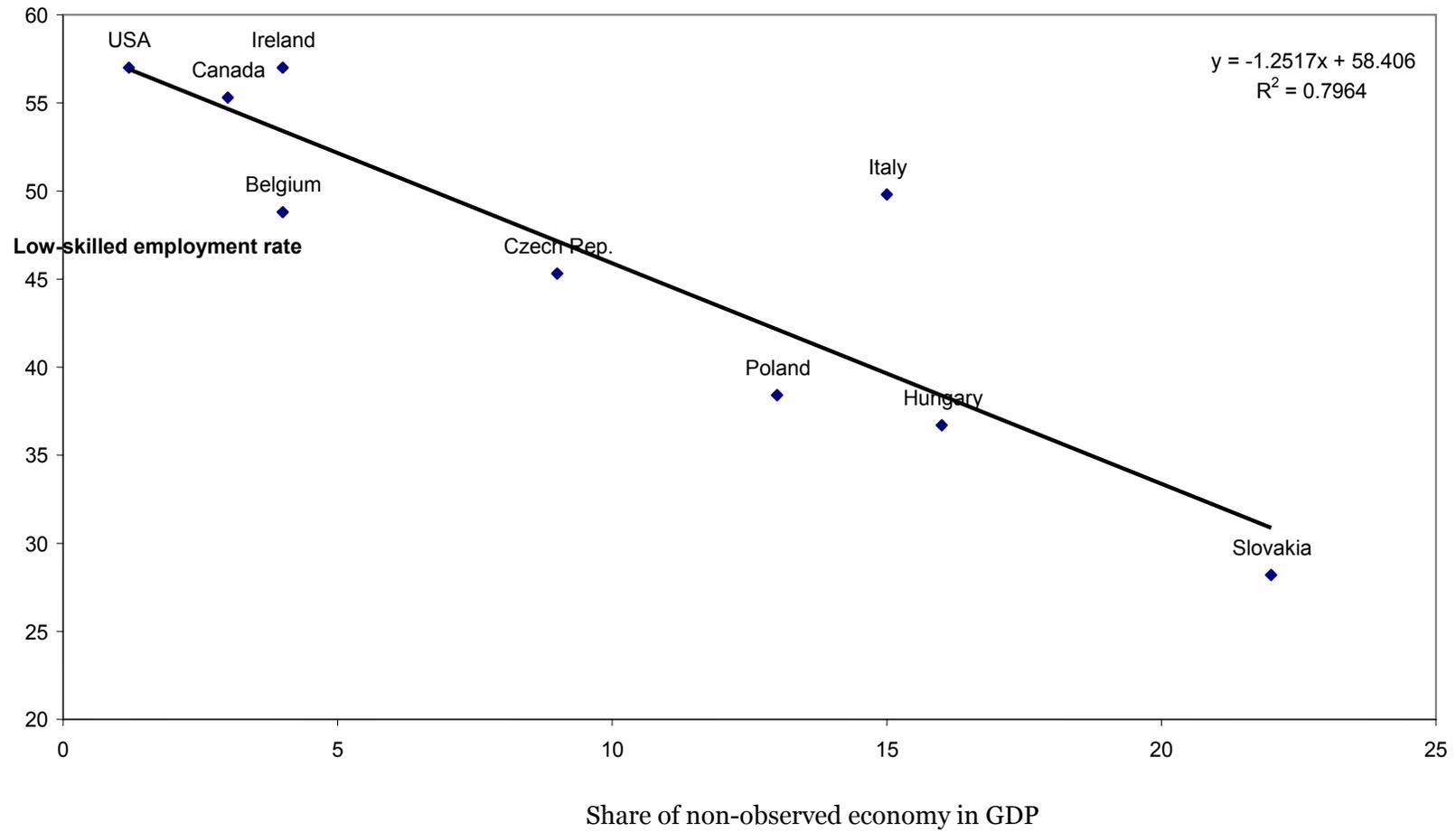
Figure 3

Tax wedge and the level of corruption in the OECD countries in 2004
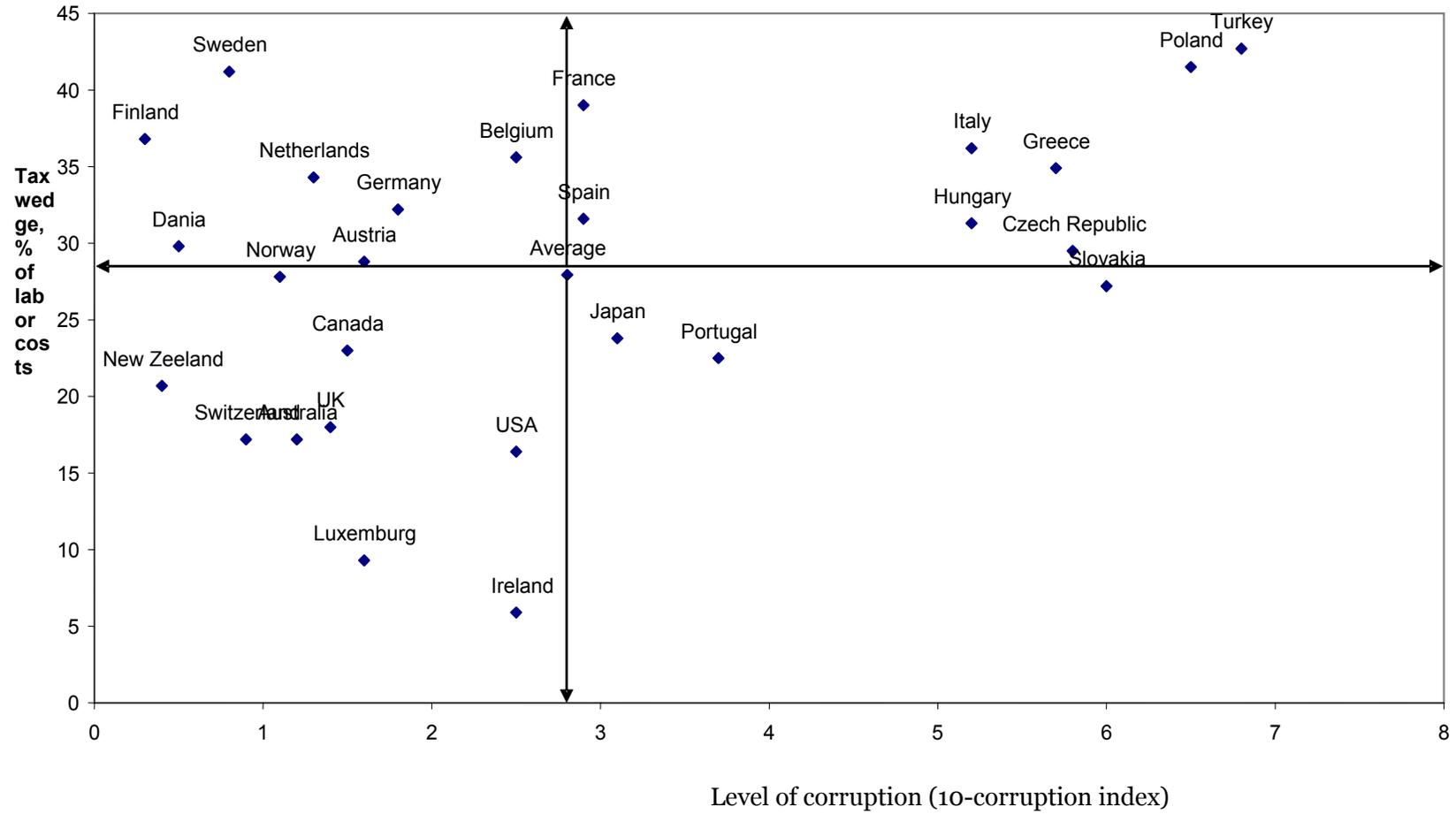
Figure 4

The VAT rate and the concealed consumption share (CCS) in 2003, per cent
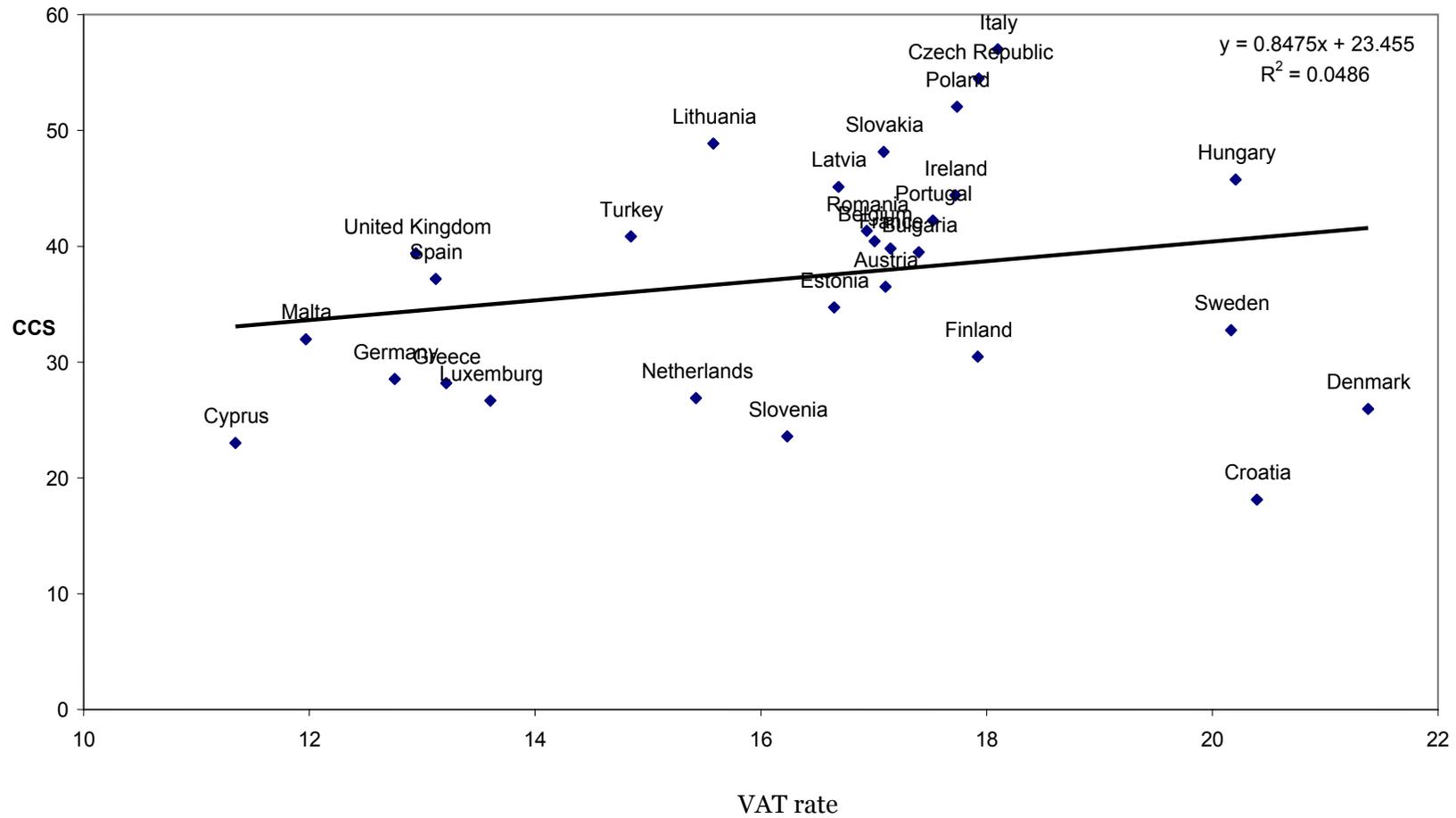
Figure 5

The concealed consumption share (CCS) and the interaction of the VAT rate with corruption

2003

Interaction of VAT rate with corruption

Figure 6

The system of behavioral relationships
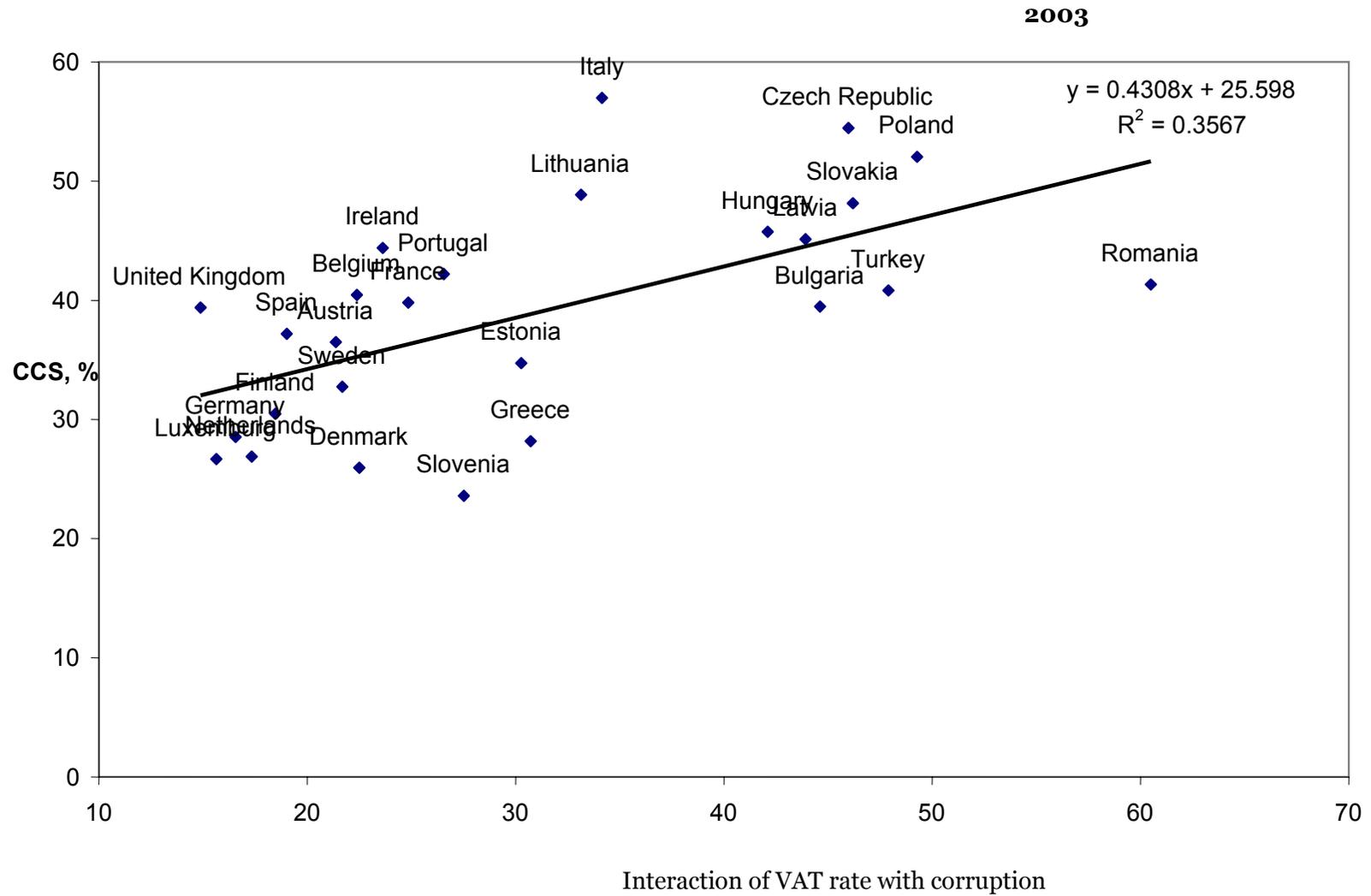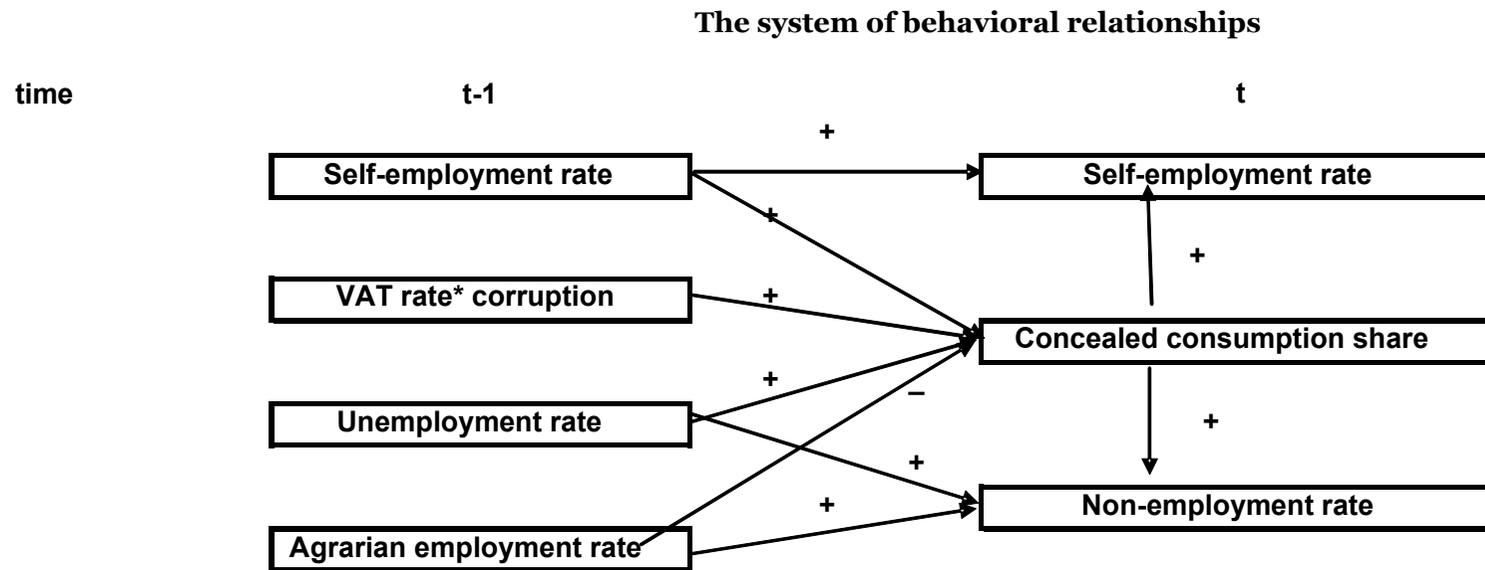
VARIABLES, DEFINITIONS AND SOURCES

Hidden economy: The size of the hidden economy, per cent of official GDP, Source: Schneider (2000, 2002), and Friedman et al (2000).

Unemployment rate: ratio of unemployed persons to the relevant labor force, per cent. Source: OECD (2004). EUROSTAT (2004)

Employment rate: ratio of employed persons to the working age population, per cent. Source: OECD (2004), EUROSTAT (2004)

Male employment rate: ratio of male employed persons to the working age population, per cent. Source: EUROSTAT (2004)

Self-employment rate: Ratio of self-employed to the total employment, per cent. Source: OECD (2004). EUROSTAT (2004)

INCOMETAX: Top income tax rate, per cent. Source: Friedman et al. (2000).

CORPTAX: Statutory corporation tax rate, per cent. Source: Friedman et al. (2000), KPMG Corporate tax database

TAXWEDGE: Tax wedge: Employees' and employers' social security contributions and personal income less transfer payment as a percentage of gross labor costs, paid by one earner married couple at APW wage level. Source: OECD (2005), Taxing Wages.

k=CORRUPTION INDEX: level of corruption ranked from a low of 10 to a high of 1. Source: Transparency International, 2006

CORRUPTION: 10-corruption index, or 10/corruption index

GDP: GDP/capita: GDP per capita expressed in US dollar at PPP, World Development Indicators, 2005

AGR: agricultural employment rate: ratio of employed persons in agriculture to the total employed people, per cent. Source: EUROSTAT (2004) World Development Indicators, 2005.

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