OECD Economics Department Working Papers No. 873

Towards a Better Understanding of the Informal Economy

Dan Andrews,
Aida Caldera Sánchez,
Åsa Johansson

https://dx.doi.org/10.1787/5kgb1mf88x28-en

OECD

Unclassified **ECO/WKP(2011)42**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **30-May-2011**

English - Or. English

ECONOMICS DEPARTMENT

ECO/WKP(2011)42
Unclassified

TOWARDS A BETTER UNDERSTANDING OF THE INFORMAL ECONOMY

ECONOMICS DEPARTMENT WORKING PAPERS No.873

By Dan Andrews, Aida Caldera Sánchez and Åsa Johansson

All Economics Department Working Papers are available through OECD's internet web site at www.oecd.org/eco/workingpapers

JT03302658

Document complet disponible sur OLIS dans son format d'origine
Complete document available on OLIS in its original format

English - Or. English

ABSTRACT/RESUMÉ

Towards a better understanding of the informal economy

It is important to understand the nature and drivers of informality, as its social and economic consequences are wide-ranging. This paper critically reviews the current state of cross-country research on informality and discusses how existing data sources can be more effectively employed and extended to shed light on the link between public policies and informality. A number of interesting findings emerge. The informal economy is multi-faceted and a wide range of definitions and measures are required to capture its diverse activities. However, most existing – and widely used – cross-country estimates of informality suffer from large measurement problems, which reduce the reliability of existing empirical evidence on the extent and drivers of informality. Accordingly, future research on informality should be closely linked to obtaining better data, particularly at the household and firm levels.

JEL classification codes: O17; H26; H11; J53; K0.
Keywords: Informal economy; measurement issues; property rights; regulations; tax evasion.

++++++++++

Vers une meilleure compréhension de l'économie informelle

Il est important de comprendre la nature et les déterminants de l'économie informelle, tant ses conséquences sociales et économiques sont vastes. Ce document examine d'une façon critique l'état actuel de la recherche sur l'économie informelle, et examine la façon d'utiliser plus efficacement les données existantes et d'étendre les bases de données pour mieux établir un lien entre les politiques publiques et l'informalité. Quelques conclusions intéressantes se dégagent de cette étude. L'économie informelle présente de multiples facettes et un large éventail de définitions et de mesures sont nécessaires pour saisir ses diverses formes. Cependant, la plupart des indicateurs disponibles - et largement utilisés - souffrent de problèmes de mesurabilité, qui réduisent la fiabilité des données empiriques existantes et les résultats sur l'ampleur et les déterminants de l'informalité. Ainsi, les futures recherches sur l'informalité devraient recueillir de meilleures données, en particulier sur les ménages et les entreprises.

Classification JEL : O17 ; H26 ; H11 ; J53 ; K0.
Mots-clés : Économie informelle ; mesurabilité ; droits de propriété ; régulations ; évasion fiscale.

Copyright OECD 2011
Application for permission to reproduce or translate all, or part of, this material should be made to: Head of Publications Service, OECD, 2 rue André-Pascal, 75775 Paris CEDEX 16, France.

TABLE OF CONTENTS

TOWARDS A BETTER UNDERSTANDING OF THE INFORMAL ECONOMY 5

1. Introduction 5
2. Why care about the informal economy? 6
   2.1 How to define informality 7
   2.2 Different types of informality 8
3. Measuring informality 9
   3.1 Broad measures of informality 9
   3.2 Proxy measures of informality 13
   3.3. Assessing the various measures of informality 22
4. Understanding the drivers of informality 23
   4.1 Property rights and quality of governance 26
   4.2 Regulations 28
   4.3 Fiscal and social policies 30
5. Informality and economic performance 32
6. Discussion 32

ANNEX 1: DATA SOURCES 34

ANNEX 2: CORRELATION ANALYSIS 36

BIBLIOGRAPHY 38

Boxes

Box 1. Model based estimates of the size of the informal economy 10
Box 2. Measuring the non-observed economy in national accounts 11
Box 3. Previous OECD evidence on the size and drivers of the informal economy 19
Box 4. Simple framework for the informal economy 24
Box 5. Problems with using proxy variables of informality in empirical work 26

TOWARDS A BETTER UNDERSTANDING OF THE INFORMAL ECONOMY

By Dan Andrews, Aida Caldera Sánchez and Åsa Johansson[1]

1. Introduction

1. The informal economy warrants attention for several reasons. From a social perspective, informal workers lack social protection and insurance, which may adversely affect their income prospects, and have broader consequences for inequality and poverty. Informality also affects labour market outcomes, productivity and growth through several channels, although the net effect is unclear. Finally, there are fiscal implications associated with tax revenue losses, which makes the informal economy particularly relevant for OECD countries faced with a period of fiscal consolidation.

2. With this background in mind, the paper critically reviews the current state of research on informality, from a cross-country – as opposed to country-specific – perspective. Since the informal economy is not directly observable, considerable attention is paid to the various approaches to estimating the extent of informality, and the pros and cons of existing measures are highlighted. To understand the potential drivers of informal activity, a simple theoretical framework is developed. With the limitations of existing measures of the informal economy in mind, the paper discusses results from existing cross-country empirical studies on the link between public policies and informality. Simple cross-country correlations – based on some relatively new estimates of the informal economy extracted from micro data – are provided to aid this discussion, and highlight the limitations of using data at the aggregate level. In turn, the empirical issues involved in identifying the impact of informality on economic growth are discussed. Finally, the paper suggests some ways in which existing data sources could be more effectively employed and extended to shed light on the link between public policies and informality.

3. The main findings include:

- Estimates of the size of the informal economy should ideally take into account both the extent of participation (*e.g.* share of workers participating, number of transactions etc.), and the intensity of participation (*e.g.* hours worked, value of transactions etc.). As it turns out, most measures of the informal sector only take into account one of these margins, while the few measures which capture both margins are affected by other problems. Moreover, many variables used to proxy the extent of informal activity – such as the share of self employed in the labour force – also capture largely formal behaviour (*e.g.* entrepreneurial and start-up activities).

[1] Corresponding authors are: Dan Andrews (Dan.Andrews@oecd.org), Aida Caldera Sánchez (Aida.CalderaSanchez@oecd.org) and Åsa Johansson (Asa.Johansson@oecd.org) all at the OECD Economics Department. The authors would like to thank Jørgen Elmeskov, Giuseppe Nicoletti, Friedrich Schneider and Jean-Luc Schneider for their valuable comments and Catherine Chapuis for excellent statistical work, as well as Irene Sinha for excellent editorial support. The views expressed in this paper are those of the authors and do not necessarily reflect those of the OECD or its member countries.

- Given the problems in identifying a single complete indicator of the size of the informal economy, the preferred measure adopted by researchers will likely depend on the particular angle from which they approach the issue of informality. This is consistent with the idea that informality is multi-faceted, which makes it difficult to make general statements about the factors which influence the extent of informality within an economy.

- While the idea that public policies and institutions affect informality is plausible, existing cross-country analysis is far from convincing on this question and more credible empirical approaches are required. For instance, there is a clear cross-country correlation between the fundamental drivers – as proxied by indicators of the rule of law and social inclusion – and informality at the aggregate level.[2] However, clear links between public policies – such as taxation and labour market policies – and measures of the size of the informal sector are more difficult to detect. Accordingly, there may be some scope to better utilise existing micro data sources to model the behavioural responses of households and firms to public policies, but there is a limit to how far this approach can be taken without better data. Moreover, better micro data would be useful to establish whether the link identified between stricter product market regulations – as measured by administrative burdens on start-ups – and higher informality at the aggregate level is truly causal.

- Thus, a more nuanced understanding of the informal economy is difficult without better data. While recent micro data sources, such as the Eurobarometer Survey on Undeclared Work are promising, they currently lack the longitudinal dimension required to control for the considerable heterogeneity in household behavior with respect to the informal economy. At the aggregate level, there may be some merit in considering whether some of the information that National Statistical Offices use to generate estimates of the non-observed economy could be used more effectively to shed light on the informal economy.

2. Why care about the informal economy?

4. The consequences of informal activities are wide-ranging and warrant attention from a number of policy perspectives:

- *Lack of social protection and insurance:* Informal workers are subject to high levels of insecurity and vulnerability as they often lack access to social, employment protection and insurance systems, which can mitigate the impact of adverse shocks and provide income security in old age (Perry *et al*., 2007). In addition, they are in a poor bargaining position *vis-a-vis* their employer and have lower access to on-the-work-training hindering their productivity.

- *Growth and productivity:* The informal sector can influence economic performance through several channels, although the net effect is unclear. First, production in the informal sector often generates inefficiencies, either because firms – in order to avoid detection – limit their size to below their optimal efficiency scale – or because they use backward production technologies, partly reflecting their sub-optimal size (Dabla Norris *et al.,* 2007). In addition, informal firms may fail to comply with intellectual property rights, undermining incentives for formal sector firms to engage in innovation, develop new products, and invest in branded products (OECD, 2009b). The relative cost advantages enjoyed by informal firms through tax evasion and avoiding the costs of regulatory compliance may allow them to stay in business despite their low productivity and potentially give rise to inefficient competition (Perry *et al.,* 2007). Second, firms operating in the unofficial sector may find it difficult to access finance through traditional

[2] To the extent that some of the indicators analysed are judgement-based (*e.g.* social inclusion, sanctions), there is some risk that respondents may take into account the extent of informality when forming their judgements.

channels – leading to under-investment in physical capital, as well as research and development – and to attract qualified workers.

By contrast, informality may provide a pressure-valve in the face of overly excessive barriers in the formal economy, which – in absence of the informal sector – would have resulted in a far greater waste of resources (Loayza, *et al*, 2010). This is likely to be particularly relevant for small firms, which tend to be disproportionately affected by poorly designed regulations (OECD, 2001). For example, if start-up costs are binding, the informal sector may be beneficial for growth - to the extent that it allows small entrepreneurial firms – which may grow to be successful formal sector firms – to avoid paying the costs of being formal (*e.g.* taxes, social security contributions, minimum wages etc; see Djankov *et al.*, 2002; Antunesa and de V. Cavalcanti, 2007).[3] Another positive "side effect" of the informal economy is that incomes generated in the informal sector – to the extent that these incomes would not have been generated otherwise – are spent in the formal sector and, thus, provide a boost for the formal economy (*e.g.* Frey and Schneider, 2000).

- *Erosion of tax revenues:* All else being equal, a high degree of informality implies that a given level of public spending will require higher tax rates on the income and profits of formal businesses (Spiro, 2005). Moreover, if investments in public infrastructure are growth-enhancing and informal activities utilise already congested public infrastructure without helping to replenish it, a larger informal sector will imply lower growth (Loayza, *et a*l, 2010).

- *Integrity and the trust in public institutions:* Non-compliance with tax collection and market-supporting regulation erodes the rule of law and the integrity of public institutions. This can limit a society's ability to address collective needs and undermine social norms, increasing the cost of law enforcement. The resulting loss of social capital/trust may also reduce the ease and certainty of doing business and adversely affect growth (*e.g.* Aghion *et al.*, 2011; Knack and Keefer, 1997).

- *Economic measurement:* The informal economy implies that certain transactions are omitted from official economic statistics. This may affect the accuracy of estimates of the value of transactions and the price indices used to produce measures of real activity, possibly leading to sub-optimal economic policy decisions.

2.1 How to define informality

5. There is no unique definition or measure of the informal economy. It typically refers to economic activities and transactions that are sufficiently hidden so that they are unmeasured or untaxed, and it is presumed that economic agents are at least passively aware that bringing these activities to the attention of authorities would imply tax or other legal consequences. In addition, the focus tends to be limited to only marketable activities involved in the production and transaction of legal goods and services. Home production is excluded since it is generally non-marketable and illegal activities are also excluded as their characteristics, drivers and consequences are of a different nature. In practice, the definition that is most useful depends on the policy concern that motivates the analysis and data availability (*e.g.* Feld and Schneider, 2010; Easton, 2001). Policymakers and researchers who approach the informal economy from a social protection perspective tend to focus on employment, where one or more of the legal requirements are not complied with (*e.g.* mandatory contributions to social security and pension schemes). By contrast, if the potential tax revenue losses associated with informality are of concern, a definition of informality

[3] The impact of start-up costs on aggregate productivity is unclear, however, since high start-up costs will prevent the entry of inefficient firms in the first place (Bartelsman *et al*., 2004).

that focuses on the types of firms and individuals having greater scope to be engaged in untaxed activities may be more useful.[4] Finally, if the aim is to more accurately estimate GDP or identify the impact of informality on growth, a broader conception of informality is required.

2.2 Different types of informality

6. Until recently, the informal economy was conventionally viewed as an exploitative, low-paid and organised form of fraudulent activity (*e.g.* Williams, 2005). However, recent studies have established that most informal work is not undertaken by marginalised workers and that some workers or firms choose informality (*e.g.* Fields, 2005; OECD, 2008; Williams and Renooy, 2008). For example, a recent study based on survey data on undeclared work shows that around 60% of undeclared work in European countries (EU27) was conducted on a voluntary basis, whereas only 18% was related to exclusion from the formal economy (Williams and Renooy, 2008). The emerging view is that the informal economy consists of various heterogeneous markets with different groups of individuals and firms engaged in a variety of informal activities, for diverse reasons and at varying pay/incomes. From a policy perspective, it is important to understand the exact nature of informality, as the policies shaping its different types may differ considerably.

7. As a first approximation, the informal economy might include – but not necessarily be limited to – the following actors:

i. *Informal workers employed by firms:* Employees on an informal basis for a firm that undertakes all or part of its production informally (*i.e.* both formal and informal firms; see *iii*) below). This classification includes jobs for which labour regulations are not applied, enforced or complied with, or jobs which are not declared to tax authorities. It includes illegal immigrant workers as well as workers who would prefer to work in the formal sector but cannot find such a job, and those who are satisfied with informal employment.

ii. *Informal self-employed:* Consists of own-account workers (*i.e.* self-employed without employees) who operate completely informally. It also includes self-employed workers that derive part of their income from undeclared (cash-in-hand) work to avoid taxation, such as VAT. This group includes (but is not limited to): unlicensed street traders, individuals operating informally to balance home and income-raising responsibilities, self-employed tradespeople and household service workers performing cash-in-hand work for friends, family and acquaintances.

iii. *Informal production by firms:* This type of informality comprises formal or informal firms (with employees) doing all or part of their business "off-the-books"; for instance, by avoiding paying VAT, under-reporting of revenues and employing the types of workers outlined in group *i*). This group consists of both firms that tend to engage in informal activities in a continuous way as a strategy or means of "getting by" and entrepreneurial start-up firms that use informality as a low-cost means to test a business venture or to establish the firm.

8. There is very little cross-country evidence on the relative importance of different informal activities. Looking at undeclared work across European OECD countries, the majority is conducted on a self-employed basis, while waged employment for informal businesses accounted for a smaller share (*e.g.* Williams and Renooy, 2008). In emerging economies, informality is widespread, (OECD, 2010c). In India, it comprises mainly self-employed workers (*e.g.* sub-contracted by firms) and, to a lesser extent, waged employment (Arnal and Forster, 2010). In Brazil, informal workers are mainly concentrated in low-skilled

[4] In this case, assessing the extent to which firms do not report part or all of their revenues to tax authorities, avoid paying VAT or self-employed do not declare wages could help understand the presence of this type of informality.

sectors, while in China, undeclared rural migrants and workers laid off from State-owned enterprises constitute the largest part of informal employment. In Mexico, informal employment tends to be concentrated among small firms. While 86% of firms with only one employee do not pay social security contributions, 71% of those with five workers report paying social security for at least some of their employees (Perry *et al.*, 2007).

3. Measuring informality

9. Reflecting the difficulty in defining the informal economy in a single, self-contained, way many techniques are used to measure the size of informal activities (*e.g.* Schneider, 2002 for an overview). Ideally, estimates of the size of the informal sector should take into account both the extent of participation (*e.g.* share of workers participating, number of transactions etc.), and the intensity of participation (*e.g.* hours, value of transactions etc.). Broad measures of informality – such as model-based estimates *(e.g.* Schneider and Enste, 2000; Feld and Schneider, 2010) and estimates of the non-observed economy in national accounts – are likely to encompass both factors. By contrast, measures that use proxies – such as workers not covered by social security contributions – tend to only capture participation in one aspect of the informal economy. The remainder of this section discusses the main approaches to measuring informality and comments on their reliability.

3.1 Broad measures of informality

Estimates derived from model-based methods

10. Model-based methods use statistical tools to estimate the informal economy as an "unobserved" variable. Three such methods are most widely used in the literature: *i)* the currency demand method (Feld and Schneider, 2010; Schneider and Enste, 2000); *ii)* the electricity consumption method (*e.g.* Kaufmann and Kaliberda, 1996; Johnson *et al.*, 1997); and *iii)* the multiple indicators and multiple causes (MIMIC) model (*e.g.* Schneider, 2007; Vuletin, 2008) (Box 1):

i. *The currency demand method* assumes that cash transactions account for the bulk of informal transactions (*e.g.* Schneider, 1997 and Johnson *et al.*, 1998). The crucial assumption underlying this method is that a change in the size of the informal economy (or the amount of money demand) is caused by changes in taxation and government regulations. As a first step, a money demand equation – where the dependent variable is typically the ratio of cash holdings to current and deposit accounts – is estimated as a function of the most known determinants of money demand (*e.g.* real income, interest rates, payment habits etc.), as well as the tax burden and government regulation. In turn, an estimate of the size and development of the informal economy can be calculated by comparing the development of cash when taxes and government regulations are at their lowest values among the countries included in the analysis, with the development of cash at the higher levels of taxation and regulations.

ii. *The electricity consumption method* relies on the fact that economic activity and energy consumption have been observed to be highly correlated. Assuming that electricity consumption can be used as a proxy for total *(i.e.* formal and informal) economic activity, the difference in the growth of official GDP and GDP predicted on the basis of electricity consumption can, therefore, yield an estimate of the informal economy *(e.g.* Kaufmann and Kaliberda, 1996; Lackó, 1998; Schneider and Enste, 2000).[5] This approach has been employed widely to measure the informal

[5] Slightly different approaches are taken in the literature. For instance, while Kaufmann and Kaliberda (1996) do not explicitly account for household consumption of electricity, Lackó (1998) assumes that a part of the shadow economy is due to household consumption, including for household production, do-it-yourself activities and other non registered production and services.

economy, particularly for countries whose data collection lags behind the rest of the world and hampers more data-intensive methods to measure informality

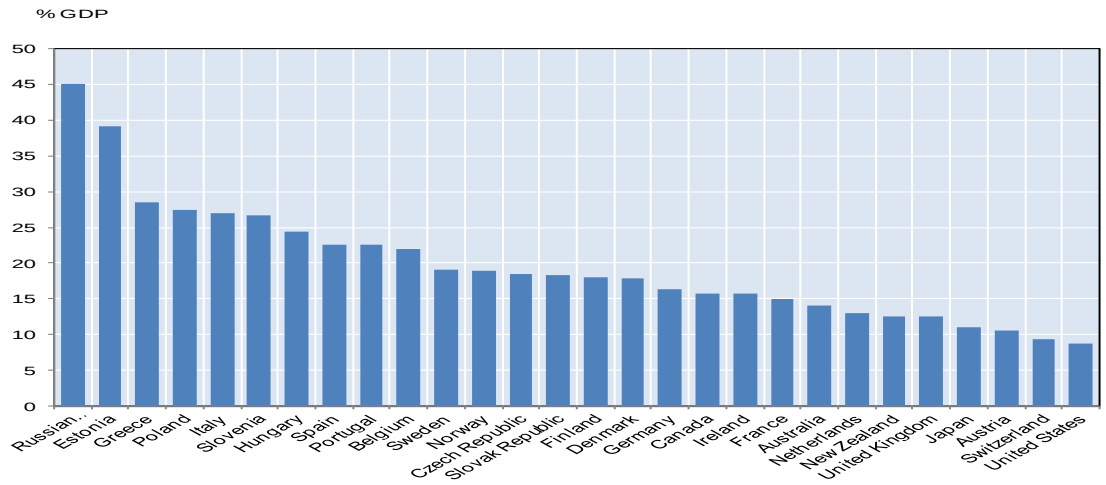
iii. *The Multiple Indicators Multiple Causes (MIMIC) method* hypothesises that the size of the informal economy can be modelled as a latent variable. Even though this variable is unobservable, its causes (*e.g.* an increase in the tax and regulatory burden) and effects (*e.g.* an increase in demand for cash or electricity) can be observed (Feld and Schneider, 2010; Dell'Anno and Schneider, 2008). In practice, the basis of the MIMIC model is a system of simultaneous equations. While one set of equations models the effects as a function of the latent (informal economy) variable, the other set of equations models the informal economy as a function of the causal variables. After estimating the system, a measure of the size of the informal economy is obtained from the fitted values of the latent variable.

11. While estimates of the informal economy based on the above model-based methods are readily available for a large number of countries and over time, they have been criticised for "having no sound scientific basis" and generating implausibly large estimates of the informal economy (OECD, 2002; Box 1). In addition, these estimates only measure the change in the informal economy, so assumptions need to be made about the initial level of the informal economy, which is typically assumed to be zero. Thus, model-based approaches are deemed not to yield credible estimates of the size of the informal economy.

Box 1. Model based estimates of the size of the informal economy

The absolute size of the informal economy based on the currency demand method (and in a few cases the MIMIC method) suggests that informality varies from close to 45% of GDP in the Russian Federation to less than 10% in the United States and Switzerland (Figure 1.1).

Figure 1.1: The size of the informal economy based on the currency demand and MIMIC methods, average 2001/02[1]



1. Estimates for Czech Republic, Estonia, Hungary, the Russian Federation, Slovenia and Slovak Republic based on the MIMIC method instead of the currency demand method.
Source: Feld and Schneider 2010

In addition to those described in the text, model based estimates share a number of methodological problems, including:

- Estimates are typically expressed as a per cent of official GDP. To the extent that national statistical authorities already incorporate an adjustment for informal activity in their published estimates, model-based estimates involve an element of double-counting (OECD, 2002).
- Since informal activity tends to be concentrated in a small number of sectors (retail trade, cafes and restaurants, trucking etc), model-based estimates imply an implausibly high degree of informal activity in these sectors (OECD, 2002).

- These approaches have been criticised for exhibiting a severe form of non-robustness, in which the results change markedly with a simple change in the units of measurement of the variables (Breusch, 2005; Buehn and Schneider, 2007), and for their lack of theoretical foundation in determining which variables to include as effects (outcome indicators), or as causes (Perry *et al.,* 2007; Schneider and Enste, 2000).

- Monetary methods typically assume a constant and equal velocity of money or constant demand for currency/money across countries, which seem unrealistic given financial innovations such as debit cards *(Lemie*ux, 2007). Monetary methods also assume that transactions in the informal economy occur only in cash. In addition, estimated money demand equations are known to be unstable.

- Electricity consumption methods can under- or over- estimate the size of the informal sector, depending on the development of the economy (*e.g.* Easton, 2001; Schneider and Enste, 2000). For example, there may be considerable differences in the elasticity of electricity to GDP both across countries and within a country over time. Furthermore, not all informal activities use electricity as an input (other energy sources such as coal, gas etc. can be used instead) or make a substantial use of electricity (*e.g*. personal services), thus leading to underestimation of the size of the informal economy. Finally, countries have experienced substantial technical progress over time, thereby increasing the efficiency of electricity use, both officially and unofficially.

Despite these drawbacks, many papers have used the currency demand, electricity consumption of MIMIC methods to explore empirically the determinants of informality. In these studies, the size of the informal sector is based on at least one of these model based estimates, which often already take into account institutional and policy settings (tax rates etc). Thus, any link that such studies uncover between the informal economy and policies may simply reflect artificial correlations (Enste, 2010), implying that these results should be interpreted with caution.

Non-observed economy in national accounts

12. The term "Non-Observed Economy" refers to those economic activities – informal, illegal and other activities omitted due to data deficiencies – which should be included in GDP but which, for one reason or another, are not covered in the statistical surveys or administrative records from which the national accounts are constructed. These activities may be initially excluded from estimates of GDP because they are carried out in a clandestine fashion in order to avoid paying taxes or to avoid the costs associated with legislation on safe working conditions or protection of consumers' rights. Their exclusion may also reflect poor statistical practices or impracticalities associated with covering every producer in the economy.

13. Statistical offices generally use various techniques to adjust GDP for the non-observed economy (OECD, 2002; Box 2). A typical approach is to compare the difference in the value of the gross domestic product measured in the National Accounts using expenditures with the estimates obtained using income.[6] A negative discrepancy between the income and expenditure approaches indicates that net purchases have been made in the non-observed economy, while a positive discrepancy indicates that net income has been generated in the non-observed economy.

Box 2. Measuring the non-observed economy in national accounts

In 2005-2006, a survey of national practices in estimating the non-observed economic activities in national accounts was carried out by the UNECE (UN, 2008). 45 countries were asked to provide estimates of the size of the non-observed economy in GDP and to elaborate on the methods used to arrive at these estimates. The definition in National Accounts of "non-observed economy" refers to all productive activities that may not be captured in the basic data sources used for national accounts compilation. The following activities are included: underground, informal (including those undertaken by households for their own final use), illegal, and other activities omitted due to deficiencies in the basic data collection programme. The term "non-observed economy" encompasses all of these activities and the related statistical estimation problems.

Eurostat has classified the non-observed activities into seven types grouped into four broad categories (N1-N7 classification) to help ensure that the non-observed economy is measured systematically, all potential areas are covered and no activities are double counted, according to:

6 GDP or other measures of national income can be obtained by calculating total expenditures in goods and services by all individuals of a country or by adding the total payments the individuals receive in the form of wages, salaries, rents etc.

1. Not registered

- **Producer deliberately not registering – underground (N1):** Producer deliberately does not register to avoid tax and social security obligations.
- **Producers deliberately not registering – illegal (N2):** Producer deliberately does not register as a legal entity or as an entrepreneur because it is involved in illegal activities. Type N2 excludes illegal activities by registered legal entities or entrepreneurs that report (or misreport) their activities under legal activity codes.
- **Producers not required to register (N3):** Producer is not required to register because it has no market output (*e.g.* non-market household producers that engage in production of goods for own consumption, for own fixed capital formation, and construction of and repairs to dwellings).

2. Not surveyed

- **Legal persons not surveyed (N4):** Legal persons not surveyed due to reasons such as: the business register is out of date or updating procedures are inadequate; the classification data (activity, size or geographic codes) are incorrect; the legal person is excluded from the survey because its size is below a certain threshold etc.
- **Registered entrepreneurs not surveyed (N5):** Registered entrepreneurs may not be surveyed due to: the statistical office does not conduct a survey of registered entrepreneurs; the registered entrepreneur is not in the list of firms available to the statistical office, or is systematically excluded from it; the registered entrepreneur is not in the survey because the classification data (activity code, size code, geographic code) are incorrect.

3. Misreporting

- **Producers deliberately misreporting (N6):** Gross output is under-reported and/or intermediate consumption is overstated, in order to evade income tax, value added tax (VAT), other taxes, or social security contributions.

4. Other

- **Other statistical deficiencies (N7):** Includes data that are incomplete, not collected or not directly collectable, and data that are incorrectly handled, processed or compiled by statisticians.

Table 2.1 provides the UNECE estimates of the non-observed economy according to the survey methodology. A *caveat* is the potential non-comparability as different countries use different methods to estimate the non-observed economy and the estimates differ in their inclusiveness of non-observed activities. Most countries made adjustments for producers deliberately not registering, producers not required to register, mis-reporting and other statistical discrepancies (Table 2.1). Some countries did not state their estimate of the size of the non-observed economy (indicated by "not stated" in Table 2.1), even though they shared the methods for estimating this sector, perhaps suggesting that the estimates are surrounded by a high degree of uncertainty.

Table 2.1: Adjustment of non-observed economy in National Accounts, around 2000

	Size of non-observed economy (% of GDP)	Activities included						
		N1	N2	N3	N4	N5	N6	N7
Australia	1.3			x			x	x
Austria	7.9	x		x	x	x	x	x
Belgium	3.0-4.0	x		x			x	x
Canada	Not stated	x	x	x			x	x
Czech Republic	4.6 (E); 6.6 (I), 9.3(O)	x	x	x	x	x	x	x
Estonia	9.6	x	x				x	x
Finland	Not stated	x		x			x	
Germany	Not stated							
Hungary	11.9	x	x	x			x	x
Ireland	4			x	x		x	x
Italy	14.8(L), 16,7(U)	x		x	x	x	x	
Mexico	12.1		x	x				
Netherlands	1						x	x
Norway	2.4(O); 1(E)			x	x	x	x	x
Poland	15.7(O), 7.8(E)	x	x	x			x	x
Russia	24.3	x		x	x	x	x	x
Spain	11.2	x			x		x	x
Sweden	1.3		x				x	x
Turkey	1.66	x		x			x	
United Kingdom	Not stated	x		x		x	x	x
United States	0.8						x	

O=Adjustment made to output; E= Adjustment made to expenditures; I= Adjustment made to income; L=Lower bound; U=Upper bound
Source: United Nations, UN, 2008

14. Although estimates of the non-observed economy provide a useful gauge of informality, these estimates are not typically available from national statistical offices, and in the event that they are available, differences in methodological approaches may hinder cross-country comparisons. Moreover, the estimates include other statistical deficiencies not related to informal activities. Nonetheless, in 2005-2006, the United Nations undertook a survey of national practices in adjusting for the non-observed economy in GDP via a questionnaire directed to the Statistical Offices in member countries (Box 2; UN, 2008). According to this study, the adjustments for the non-observed economy range from 0.8% in the United States to 24.3% of GDP in the Russian Federation, but country coverage is fairly limited and estimates are relatively out of date and tend to be only available for one point in time.

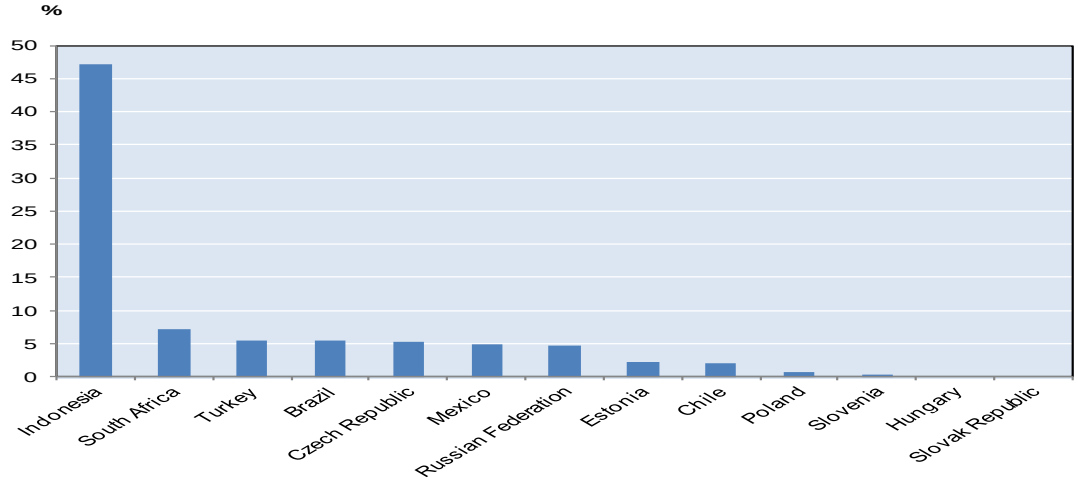
3.2 Proxy measures of informality

Estimates based on direct survey data

15. Some micro-level surveys – such as the World Bank Enterprise Survey, EBRD Business Environment and Economic Performance Survey and Euro Barometer Survey – directly ask individuals or firms whether they or their peers are engaged in informal activities. These survey data – which also contain information on the characteristics of the respondents – have been widely used to measure informality and its consequences, most notably in developing countries and transition economies (*e.g.* Dabla-Norris and Inchauste, 2008; Perry *et al.*, 2007). The data underlying each of the following figures are available online at: [http://www.oecd.org/dataoecd/50/13/48083643.xls]

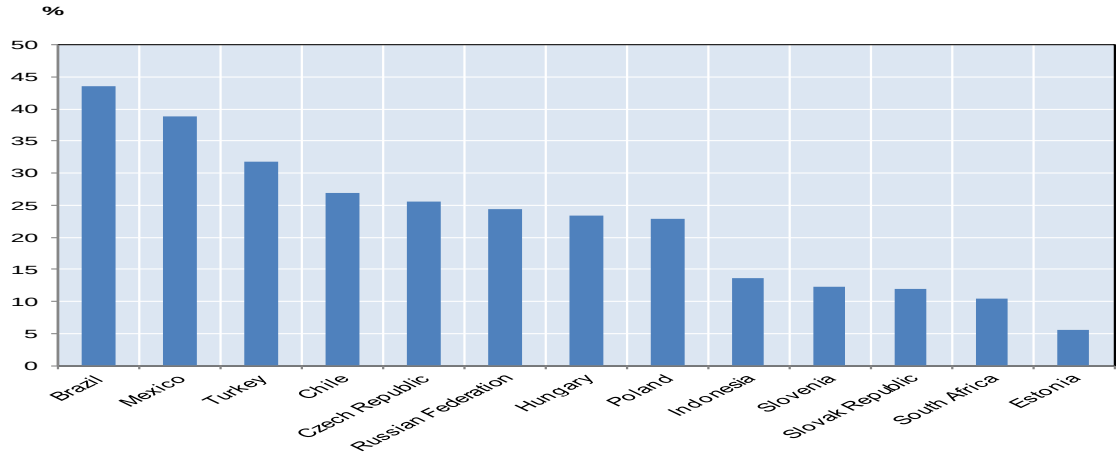
16. Firm-level survey data provide information on the share of firms not formally registered when they began operations (Figure 1); establishments for which informal firms are an important business constraint (Figure 2); and share of establishments indicating that firms in their sector of activity do not report 100% annual sales to tax authorities (*i.e.* tax evasion) (Figure 3). These measures are likely to be useful in estimating the occurrence of firm-related aspects of informality, rather than assessing the overall size of the informal sector. Since they are internally consistent – and exhibit a positive correlation (see Annex Table A2.1) – they are also useful in describing cross-country patterns of firm informality, although for a limited set of countries.

Figure 1: Establishments not formally registered when they began operations (%)



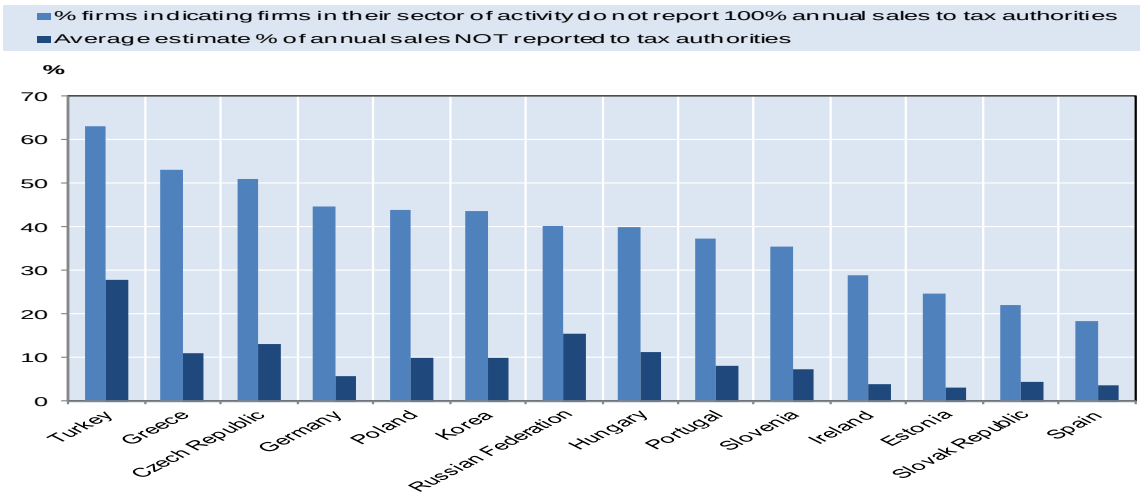
Source: OECD calculations based on World Bank Enterprise Survey (2006-2009).

Figure 2: Establishments for which informal firms are an important business constraint[1] (%)



1. Respondents are asked to rate to what extent informal sector competitors are an obstacle to the firm operations, the estimate is calculated as the % of firms that answer major and severe constraint.
Source: OECD calculations based on survey data from World Bank Enterprise Survey (2006-2009).

Figure 3: Tax evasion[1]

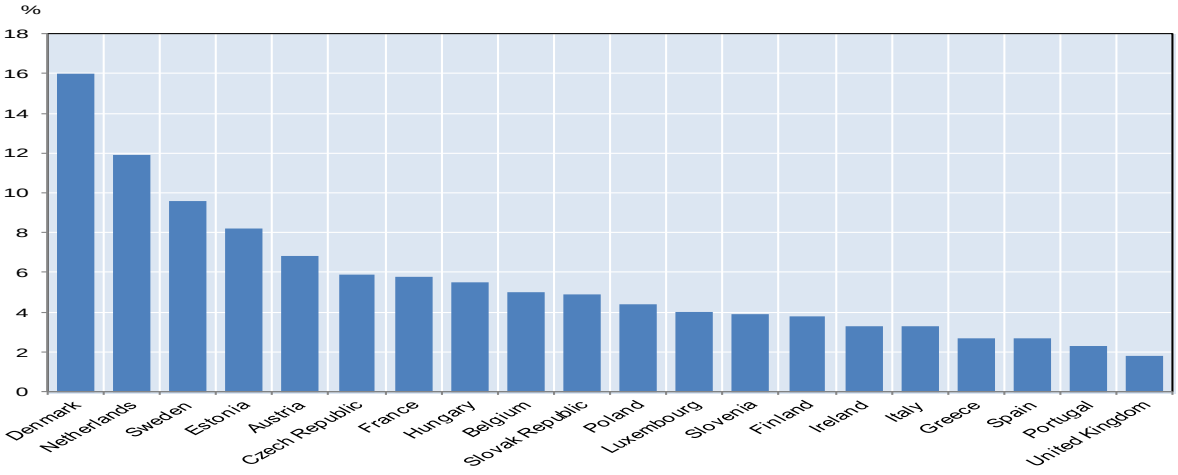


1. The share of firms indicating that firms in their sector of activity do not report 100% of their workers to tax authorities exhibit a similar pattern as the share of firms not reporting all of their sales.

Source: OECD calculations based on EBRD-World Bank BEEPS Survey (1999, 2002, 2004, 2005).

17. Household data provides information on: share of individuals who carried out undeclared work in the past 12 months (Figure 4); estimated hours per week in undeclared work (Figure 5); and share of respondents whose employers paid part or the entire wage in undeclared cash (Figure 6). Some interesting patterns emerge from the household data. The countries where more people knew somebody who works without declaring income were also the countries where more people purchased goods and services in the informal economy and carried out work in the informal economy (see Annex Table A2.2). However, across European economies, there is a negative relationship between the admitted incidence of carrying out undeclared work (*i.e.* participation) and hours worked per week in undeclared work (*i.e.* intensity). Indeed, the proportion of respondents who admitted to carrying out undeclared work is relatively high in Northern European compared to Southern European countries (Figure 4), while the average number of hours dedicated to undeclared work is much higher in Southern European countries (Figure 5).

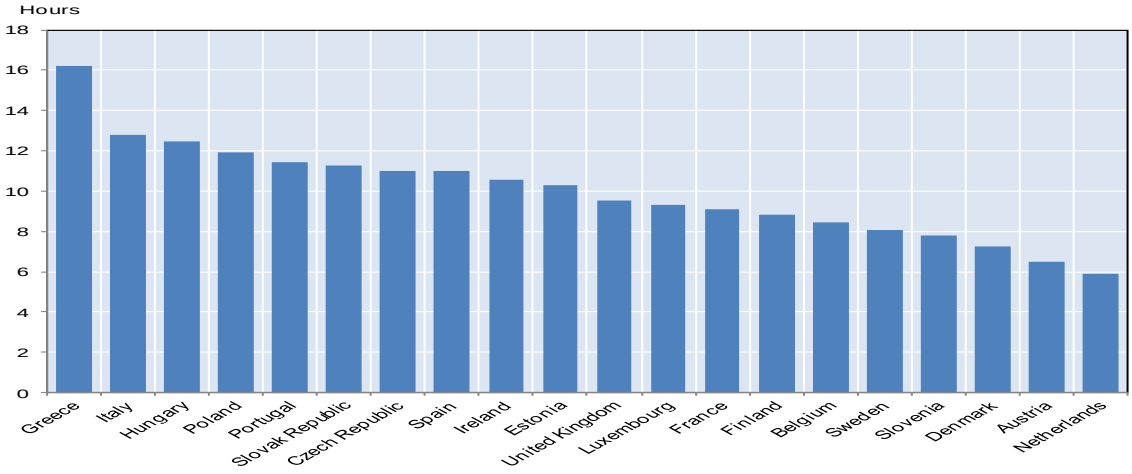
Figure 4: Share of individuals who carried out undeclared work: European OECD countries[1]



1. The chart shows the share of respondents who answered "yes" to the following question: "Did you yourself carry out any undeclared activities in the last 12 months for which you were paid in money or in kind? Herewith we mean again activities which were not or not fully reported to the tax or social security authorities and where the person who acquired the good or service was aware of this."

Source: Euro Barometer 2007 Survey of undeclared work in the European Union

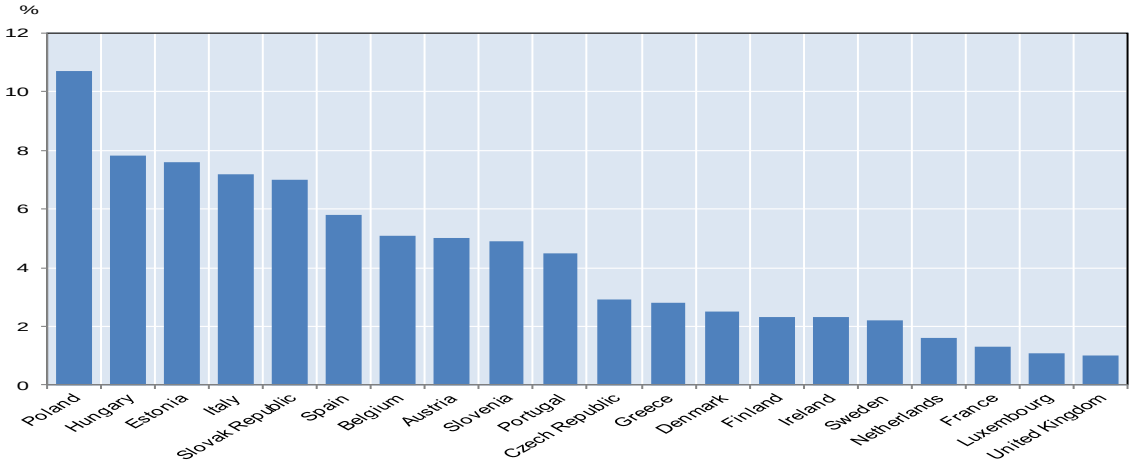
Figure 5: Hours per week in undeclared work: European OECD countries[1]



1. Respondents are asked: "In the weeks in which you worked on this activity, how many hours per week on average did you spend on this activity?", and answers are group into the following categories: 1-5 hours, 6-10 hours, 11-20 hours and at least 21 hours. The overall estimate is constructed as the share of respondents in each category multiplied by the minimum number of hours in each category (*i.e.* 1 for the 1-5 hour category, 6 for the 6-10 hour category etc) summed across all categories. Since the highest category is top-coded, the estimate should be interpreted as the minimum number of hours spent in undeclared work.

Source: Euro Barometer 2007 Survey of undeclared work in the European Union.

Figure 6: Share of respondents whose employer paid part or all of wage in undeclared cash in past 12 months: European OECD countries[1]



1. The chart shows the share of respondents who answered "yes" to the following question: "Sometimes employers prefer to pay all or part of the regular salary or the remuneration for extra work or overtime hours cash-in-hand and without declaring it to tax or social security authorities. Did your employer pay you all or part of your income in the last 12 months in this way?"

Source: Euro Barometer 2007 Survey of undeclared work in the European Union.

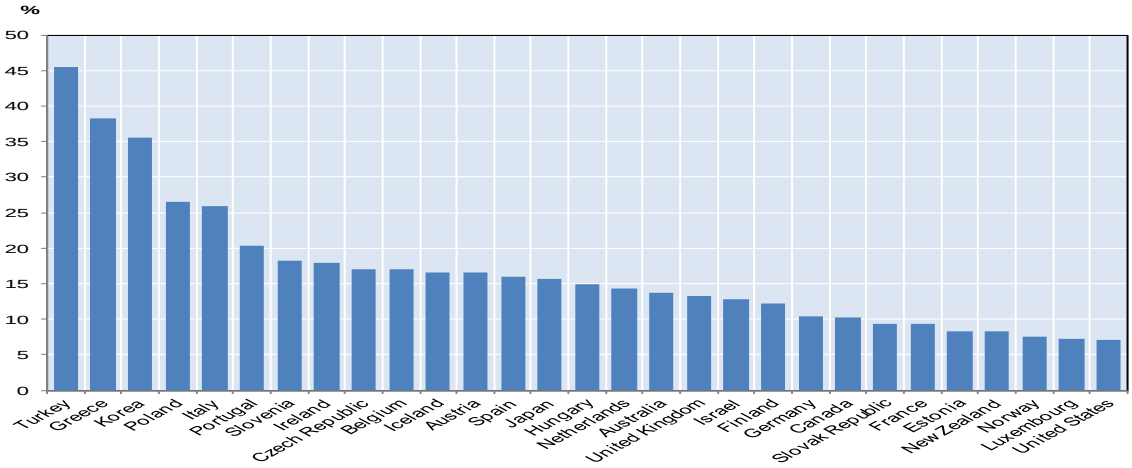
18. An important drawback of using survey data to measure the informal economy is that the sample is not necessarily stratified along the dimensions that are potentially relevant for informality (*e.g.* sectoral breakdown). Like all surveys, these measures may also be sensitive to the way the survey is constructed. Firms and individuals may also be inclined to under-report the true extent of informal activity, to the extent they are uncomfortable admitting to engaging in activity that contradicts social norms or are concerned about the potential legal consequences if the information is made public. For instance, a Norwegian study found that survey participants were almost twice as likely to admit involvement in the informal economy when they responded to an anonymous mail-in written questionnaire, as when they participated in a face-to-face interview (Isachsen and Strom, 1989).

Self-employment

19. The share of self employment in the labour force (or in total employment) is commonly used to proxy the size of the informal economy (ILO, 1993; OECD, 2008; Figure 7). It is often argued that the self-employed are likely to engage in informal activities – or at least have greater scope to do so (*e.g.* under declaring of wages and revenues) – given the nature of their business operations.[7] While data on self-employment are widely available, a main drawback of using the share of self-employed is that it is likely to pick-up a host of formal activities in addition to informal activities. As discussed in Box 5, this gives rise to problems for analysts using self-employment to study the effects of public policies on informality.

7 Although self-employment or autonomous work is outside labour legislation, it is normally obligatory to declare it to the authorities and it has broad protection in social security systems (Daza, 2005).

Figure 7: Share of self employed in total non-agricultural employment
Average: circa 1995 to latest available



Source: OECD, STAN database

Number of employed not covered by legal employment requirements

20. A recent OECD study investigating informal employment in seven lower-income countries focused on the share of employed persons not covered by legal employment requirements, such as social security or pension coverage or a written employment contract (OECD, 2008 and Box 3). Extending this approach to a wider set of countries – based on the EU-SILC household survey covering European OECD countries – suggests that using the share of workers whose employer is not paying social security contributions as a proxy for informal employment is not reliable.[8] The share of respondents reporting that their employer does not pay social security contributions appears implausibly high – on average around 32% (ranging from 13% in Norway to 67% in Poland in 2007; see Table 1). This could possibly reflect that respondents misunderstood the survey question. Even though these data could be cross-checked using country-specific household surveys, this would be highly time-consuming and is unlikely to yield reliable estimates for a large number of countries.

8 For example, OECD, 2008 found that 19.4% of employees in Hungary are not registered for mandatory social security, whereas EU-SILC yields an estimate twice as large (OECD, 2008).

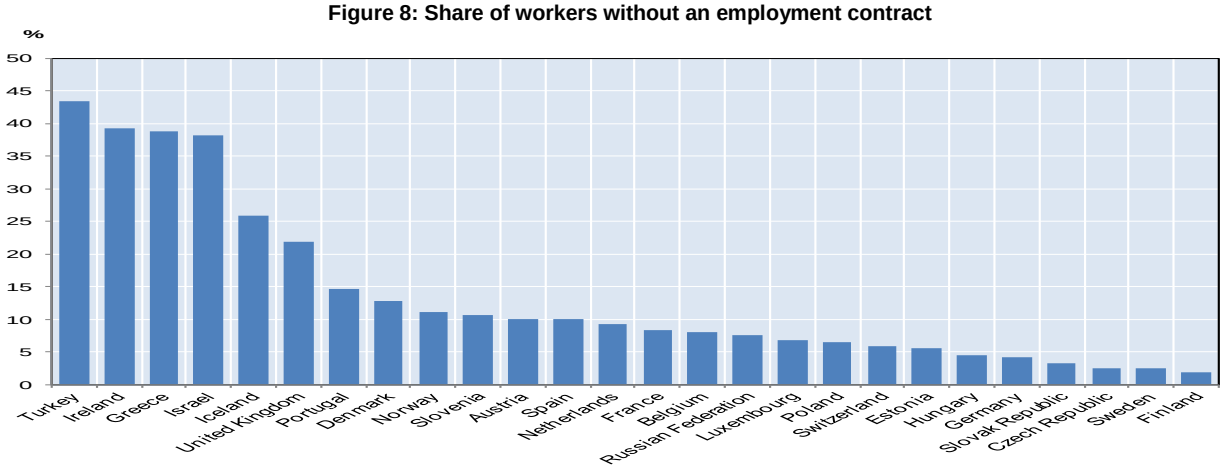
Table 1: Share of employees not covered by social security contributions

	2007	2008
Austria	35.4	34.5
Belgium	38.8	36.2
Czech Republic	40.8	40.4
Estonia	34.6	33.9
Finland	23.0	23.5
France	51.9	..
Greece	37.1	37.3
Hungary	40.6	42.4
Iceland	13.4	13.3
Ireland	39.8	40.3
Italy	40.0	39.3
Luxembourg	34.6	32.6
Netherlands	17.7	21.6
Norw ay	12.2	13.2
Poland	65.3	57.0
Portugal	35.1	38.5
Slovak Republic	39.1	38.5
Slovenia	24.7	25.2
Spain	41.5	41.4
Sw eden	22.7	22.0

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

21. The share of employees without a written employment contract ranges from 44% in Turkey to 2% in Finland (Figure 8). To provide reliable measures of informal employment, this information would need to be cross-checked against whether a written employment contract is a legal requirement. However, this information is not readily available for all countries. Nevertheless, this measure may shed some light on informality in Hungary, Czech Republic, Estonia, Sweden and Russia, where a written employment contract is required (ILO NATLEX database). By contrast, in Ireland and Finland there is no requirement of a written employment contract while in Greece a written contract is only required in the cases of contract duration longer than one year.

Figure 8: Share of workers without an employment contract

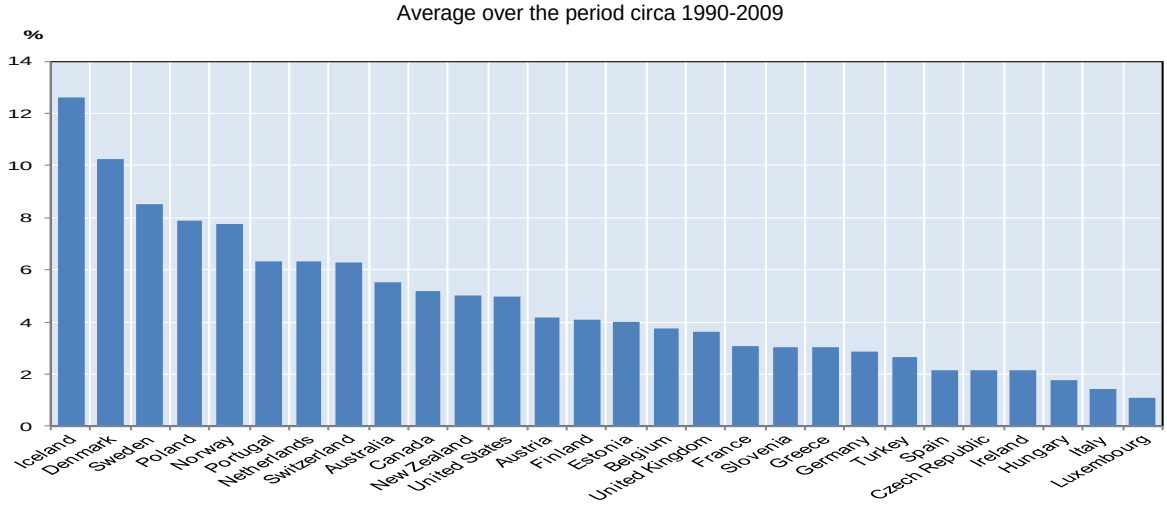


Source: European Social Survey (ESS).

Multiple job holders

22. Another proxy for informality is multiple job-holders (Figure 9). Disguising secondary income may be relatively easy, particularly if employment is irregular or seasonal, and could prove difficult for enforcement agencies to detect. Existing evidence shows that levels of informality amongst multiple job holders are higher than for workers with only one job (*e.g.* Averett, 2001; Guariglia and Kim, 2006; Sarzalska and Szydlowski, 2007). However, multiple job holders are not necessarily informally employed, and in many cases their main job is completely formal (OECD, 2008).

Figure 9: Share of multiple job holders in total employment
Average over the period circa 1990-2009



Source: Eurostat and national statistical agencies.

Box 3. Previous OECD evidence on the size and drivers of the informal economy

Existing OECD work on the informal economy mostly focuses on a limited set of countries. For instance, OECD (2008) focused on informal employment in seven lower-income OECD countries (the Czech Republic, Hungary, Korea, Mexico, Poland, the Slovak Republic and Turkey). It examined several different types of informal employment – ranging from employees who are not registered for social security contributions to those who declare only part of their income for tax purposes (Table 3.1). According to this study, informal employment is most widespread in Mexico and Turkey where 40-60% of the workforce is either employed without social security coverage or runs its own business. It also discusses the effects of various drivers of informality, such as household characteristics and policies (notably taxation and labour regulations), on the development of the informal economy.

One distinguishing feature of the Brazilian, Indonesian, Indian and Chinese labour markets is a high degree of informality, with many workers remaining outside the scope of labour market regulations and social protection systems (OECD, 2010c). Various measures suggest that informality is particularly high in India and Indonesia and more moderate in Brazil and China (Figure 3.1). OECD (2010d) analysed the relationship between pension systems and labour informality in four Latin American countries (Bolivia, Brazil, Chile and Mexico). The study found that pension coverage rates of informal workers are very low and strongly linked to individual income levels in all four countries, implying that informal workers are likely to suffer from poverty in old age.

OECD (2009a) examines patterns of informal employment in developing and transition countries. The levels of informal employment vary widely across countries, reaching the highest shares in sub-Saharan Africa, where close to 80% of all employed people work informally, followed by Southeast Asia and Latin America. Most informal workers in the developing world are self-employed and either work independently or own and manage very small enterprises.

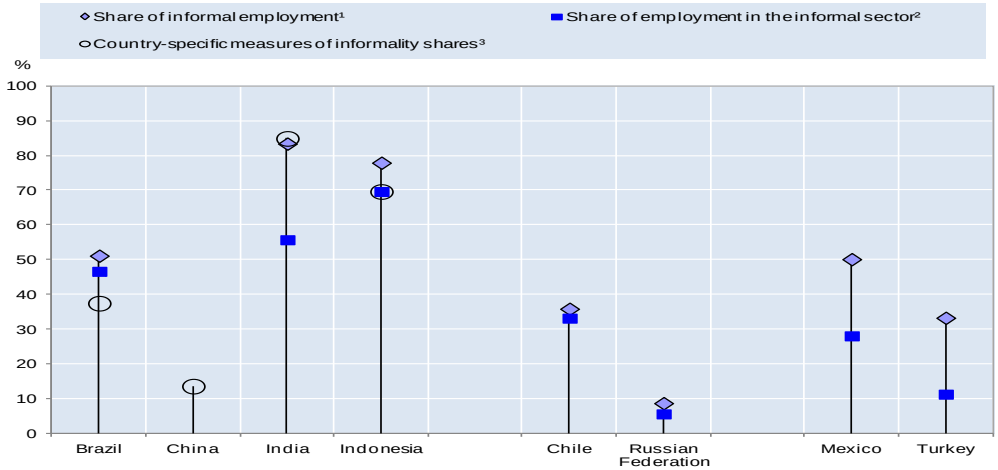
Table 3.1 Alternative measures of informal employment and undeclared work

	Employees in informal jobs		Own account workers	Unpaid family workers	Multiple jobs holders	Undeclared income	
	employees not registered for mandatory social security	employees without work contract	% of non-farm employment	% of non-farm employment	% of total employment	% of workforce typically not reported for tax purposes[2]	% of employees receiving wages cash-in-hand[3]
	% of non-farm employment[1]						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Czech Republic	..	1.8	11.4	0.7	2.1	10.1	3.0
Hungary	19.4	2.6	6.4	0.3	1.8	8.6	8.0
Korea	25.8	..	17.1	4.7	1.7	7.0	..
Mexico	31.5	26.9	20.6	5.1	3.3	30.9	..
Poland	..	4.9	7.0	0.7	7.5	10.6	11.0
Slovak Republic	..	2.2	9.2	0.1	1.2	5.6	7.0
Turkey	21.7	..	16.6	3.3	3.1	24.6	..

Source: OECD (2008).

Informality has also been addressed within the context of country-specific OECD economic surveys. For instance, in Hungary the informal economy is estimated to account for close to 20% of GDP, and informal activities most commonly take the form of unregistered employment, un-invoiced services and underreporting of wages (OECD, 2007a). In Mexico, most indicators suggest that informal activities are pervasive and have been expanding over the past decade (OECD, 2007b). A number of factors are found to contribute to informality in Mexico, such as strict employment protection legislation and low human capital which makes it difficult for many workers to take up more productive jobs (OECD, 2011). Likewise, in Turkey informality and semi-formality is common – largely caused by costly and strict labour and product market regulations which are found to distort competition, restrain productivity growth and burden public finances (OECD 2010b). In Greece tax evasion is substantial and incentives for this arise from many sources, including a high tax wedge on labour income (OECD 2009d). The Indonesian economy is characterised by a very large informal sector - according to some estimates, it represents around 70% of total employment (OECD, 2010a). Informality is also wide-spread in Chile where about 20% of the working-age population did not have a formal labour contract in 2006 and nearly 11% of the potential value added tax base is estimated to have been undeclared in 2005. These outcomes have been attributed to high taxes and a restrictive regulatory framework in both labour and product markets (OECD 2007c).

Figure 3.1: Indicators of informality in selected countries



1. The share of informal employment refers to jobs that do not comply with national labour legislation, income taxation, social protection or lack of entitlement to certain employment benefits. Latest available estimate shown: 2000-2007 (Brazil, Russia, Mexico, Turkey); 1995-1999 (India, Indonesia and Chile); unavailable for China.

2. Share of employment in the informal sector refers to the legal status of the firm and covers employment in unregistered enterprises. Definition for Brazil: unincorporated urban enterprises employing five or less employees and producing for sale, excluding agriculture. India (2000): all unincorporated proprietary and partnership enterprises producing all or some of their goods or services for sale, excluding agriculture and utilities. Indonesia (2004): all own-account and unpaid family workers and employees in agriculture, and own-account workers (unless professional, administrative or clerical workers) not assisted by other persons.

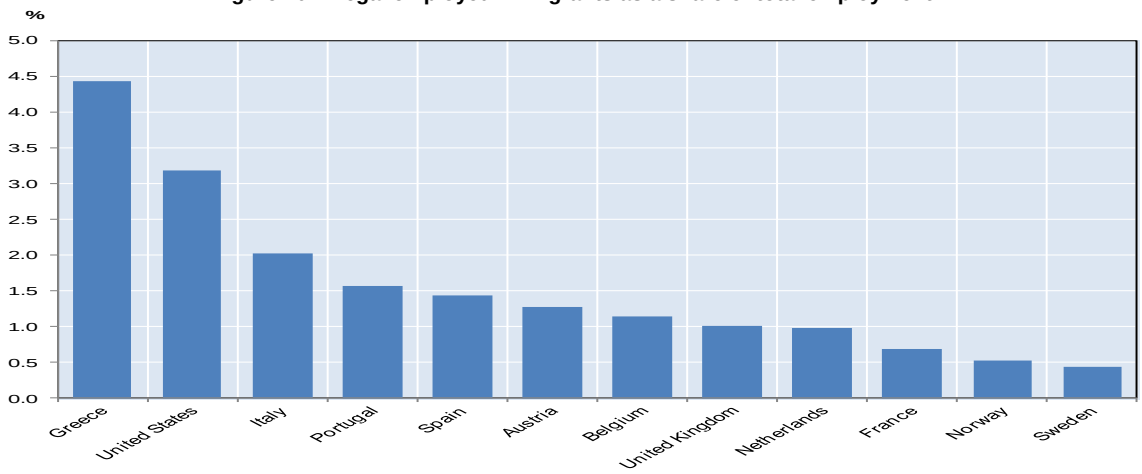
3. Country-specific measures of informality shares. Definition for Brazil (2009): own-account workers and employees without social contributions. China (2008): self-employed. India (2004): workers not covered by the employee's provident fund. Indonesia (2004): own account workers and unpaid workers.

Source: OECD (2010c).

Illegal immigrants

23. The size of the informal economy may also be gauged by the share of illegal immigrants in the workforce, given that this group is likely to have a higher propensity for undeclared work by virtue of their legal status (Reyneri, 2003).[9] However, these estimates are only available for a small number of OECD countries (Figure 10). According to this measure, informal workers are common in southern European countries and the United States, while less common in some Nordic countries.

Figure 10: Illegal employed immigrants as a share of total employment[1]



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

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

Tax evasion

24. Audit methods use tax returns from individuals and firms to identify those who are misreporting or hiding their actual income. Fiscal auditing programmes designed to measure the amount of undeclared income have been used to calculate the share of informal economy in the United States (IRS 1979, 1983). One main complication with using tax compliance data is that individuals selected for auditing are more likely to engage in tax evasion, which may result in an over-estimation of informality (Schneider and Enste, 2000), though using randomised experiments may address this issue (see Pomeranz, 2010 for a recent example in Chile). Furthermore, such information is not readily available and it is likely to be difficult to obtain through national tax authorities.

25. Another potential measure of tax evasion is the *so-called* VAT revenue ratio (VRR). The VRR measures the difference between the VAT revenue actually collected and what would theoretically be raised if VAT was applied at the standard rate to the entire potential tax base and all revenue was collected (OECD, 2010e for details). The VRR is unlikely to provide a pure measure of the tax collection shortfall – and of the size of the informal sector – since it also measures deviations from a single tax rate due to zero ratings, reduced rates and exemptions.

9 This is supported by data showing that illegal immigrant workers are concentrated in sectors where rates of informality tend to be higher – such as agriculture, construction, food processing, hotels and restaurants and household services (OECD, 2009e).

3.3. Assessing the various measures of informality

26. While there are a range of approaches to estimate the extent of informal activity, existing estimates generally suffer from a number of common shortcomings:

- *Limited country coverage:* The different estimates of firms' participation in informal activities (*e.g.* share of annual sales and workers not reported to tax authorities etc.) cover only up to 15 countries. Estimates of informality based on household data (*e.g.* number of hours in undeclared work etc.) cover most European countries. The proportion of self-employed and multiple job holders in total employment cover the largest set of countries, but they are relatively poor measures of the informal economy.

- *Lack of time dimension:* Most of the measures of informality are only available at one point in time, with the exception of self employment, which precludes convincingly analysing the drivers and consequences of informality.

- *Measurement problems:* Proxy measures of informality, such as self-employed, multiple job holders and estimates based on survey data (*e.g.* share of workers carrying out undeclared work), capture a host of formal activities in addition to informal activities. These measures are also generally incomplete since, at best, they only capture participation in informal activities (and do not account for the intensity of participation) and also suffer from measurement problems (*e.g.* related to sample stratification, mis-reporting etc.).

- *Consistency across measures:* A positive correlation is to be expected between the various measures of informality. While this expectation is borne out in some cases, the cross-country correlation is low, or in some cases even negative, for others (Table 2). For instance, hours spent in undeclared work is positively correlated with the share of self employment, the size of the non-observed economy and workers without a written employment contract, while it is negatively correlated with the proportion of households who admitted to carrying out undeclared work and the share of multiple job holders. These findings might reflect the tendency for proxy variables to capture different aspects of informality (Box 5), as well as differences in the participation and intensity of participation in the informal economy across countries.

27. It is not easy to distinguish the more reliable estimates of the informal economy from the poorer ones, in part because this assessment will depend on the particular aspect of informality that is of interest. Keeping this in mind, a broad measure of informality based on the non-observed economy in national accounts appears promising, given that it encompasses both participation and intensity of participation in the informal economy. But, at the same time this measure is a "black box" which is difficult to relate to the effect of specific policies on individual behavior. Household and firm survey measures that directly ask about informality – particularly those concerning the intensity of participation (*e.g.* undeclared hours worked) – seem useful in capturing specific aspects of informality. As mentioned above, these measures also generally reveal similar cross-country patterns as the non-observed economy estimates.

Table 2: Correlation between various measures of the size of the informal economy[1]

21 European Economies, 2007

	Carried out undeclared work in past 12 months	Share of self employed in total employment (average: circa 1995 to latest), non-agricultural business sector	Size of Non-Observed economy as % of GDP	Share of multiple job holders in total employment, averaged over the period circa 1990-2009	Share of workers without an employment contract
Estimated minimum hours per week in undeclared work	-0.51	0.75	0.69	-0.35	0.41
Carried out undeclared work in past 12 months		-0.42	-0.52	0.67	-0.25
Share of self employed in total employment (average: circa 1995 to latest), non-agricultural			0.41	-0.45	0.71
Size of Non-Observed economy as % of GDP				-0.61	-0.34
Share of multiple job holders in total employment, averaged over the period circa 1990-2009					-0.05

1. Includes the estimates for which the country coverage is sufficient for undertaking a correlation analysis.

Source: OECD calculations based on Euro Barometer 2007 Survey of undeclared work in the European Union; STAN database; United Nations 2008 Survey to National Statistical Offices; Eurostat; European Social Survey.

4. Understanding the drivers of informality

28. From a behavioural point of view, participation in the formal economy by firms, workers and consumers can be seen as a decision driven by an assessment of the relevant benefits and costs, including those related to the probability of incurring sanctions. A number of factors may influence the decision, including: individual and firm characteristics, market structure, social norms, institutional and policy settings, as well as how these factors interact in different circumstances. A simple framework illustrating individuals' and firms' choices to operate in the formal or the informal economy is presented in Box 4.

Box 4. Simple framework for the informal economy

Individuals will be willing to (or indifferent to) work in the formal sector when the net benefits of formality exceeds (or are equal to) the net benefits of informality:

$$\underbrace{w^F{}_i(1-t_i)-C^F{}_i+B_i{}^F}_{\text{Net income formal}} \geq \underbrace{(1-p)(w^{IF}{}_i+\alpha B_i{}^F)}_{\text{Net income informal, not detected}} + \underbrace{p(w^{IF}{}_i+\alpha B_i{}^F-Pen_i)}_{\text{Net income informal, detected}} \quad (1)$$

where $w^F{}_i$ are the earnings of an individual in the case of working in the formal economy, t_i is the tax rate applied on incomes, $C^F{}_i$ is other costs associated with formality (*e.g.* professional license requirements and other entry costs etc.), $B^F{}_i$ are the benefits associated with being formal (*e.g.* access to education and health services, coverage of employment and safety regulations, legal protection, job security, accumulation of pension rights etc.). $w^{IF}{}_i$ are the earnings in the case of working in the informal economy, *p* denotes the probability of being detected working informally and Pen_i is the fine paid in the case of being detected. α denotes the share of benefits an individual receives in the informal economy. $0 < \alpha < 1$ as it is likely that the benefits received when being informal are less than when being formal, although non-zero as even informal workers have access to some general government provided goods such as education and health services. For the individual, the labour supply decision could also reflect different probabilities of employment in the formal and informal sectors, as well as income in case of non-employment.

Likewise, firms' decisions as to whether to produce in the formal or informal sector can be thought to be driven by the same kind of rule:

$$\underbrace{Y^F{}_j(1-t^p{}_j)-w^F{}_j-CF^F{}_j+BF_j{}^F}_{\text{Net revenues formal}} \geq \underbrace{(1-p^F)(Y^{IF}{}_j-w^{IF}{}_j+\lambda BF_j{}^F)}_{\text{Net revenues income informal, not detected}} + \underbrace{p^F(Y^{IF}{}_j-w^{IF}{}_j+\lambda BF_j{}^F-PenF_j)}_{\text{Net revenues informal, detected}} \quad (2)$$

where $Y^F{}_j$ is the revenue of a firm in the formal economy which depends on the production technique and price in the formal sector, $t^P{}_j$ is the tax rate applied on profits, $w^F{}_j$ is the wage paid to formal workers, $CF^F{}_j$ is other costs associated with formality (*e.g.* social security contributions, regulatory burdens, entry costs, minimum wage requirements etc), $BF^F{}_j$ is benefits associated with being formal (*e.g.* access to credit, legal protection, property rights etc.). $Y^{IF}{}_j$ is the revenue in the informal economy which depends on the production technique and price in the informal sector, $w^{IF}{}_j$ is the wage paid to informal workers. p^F denotes the probability of being detected operating informally and $PenF_j$ is the fine paid in the case of being detected. λ denotes the share of benefits a firm receives in the informal economy, where $0 < \lambda < 1$.

Once wages and prices are determined, individuals make consumption (and savings) decisions, and decide whether to consume goods and services provided through the formal or the informal market. The decision to purchase goods and services in the informal market would also reflect a cost-benefit decision, taking into account the probability of being detected and fined, tax payments and any benefits that may be forgone by purchasing a good informally (e.g. warranties, quality control *etc*).

Governments set policies to address a number of objectives, including those related to the informal sector. With respect to its monitoring of the informal sector, governments make a cost-benefit decision as to which workers and firms are worth monitoring, essentially defining the boundaries of the informal sector (*e.g.* the government creates enforcement thresholds based on firm size, income or sector).

Given government policies, each individual and firm chooses to be partially or completely informal by weighing the costs and benefits a legal status entails, as described in equation (1) and (2) and considering their particular institutional setting, resource constraints and individual characteristics (*e.g.* risk aversion, education and skill level, production technique etc., (see Perry *et al.,* 2007). In the presence of excessive regulations and costs, low productive individuals or firms may simply be forced to operate in the informal sector (*e.g.* Loayza, 1996), while others voluntarily choose informality. For example, a firm with inherently low productivity may have little demand for formal finance and contract enforcement mechanisms and will, thus, place more weight on the costs of formality. By contrast, risk averse

individuals may choose to remain in the formal sector even if the costs of remaining therein are high. In some cases, firms may also constrain individual choice by only offering employment on an informal basis.

Differences between firms and individuals will generate differences in their choice of informality for a given policy mix (*e.g.* benefits, taxes and regulation). Across countries, differences in the level of informality will arise from variation in the extent of heterogeneity within countries, as well as cross-country differences in policy mixes. An additional complication is that the overall level of heterogeneity in a country depends in part on policies in place as they shape the behaviour of economic agents.

The overall level of informality can generate externalities which can also influence individuals' and firms' decisions. For instance, a large overall informal sector – all else being equal – implies that a given level of public services require higher taxes on income and profits of formal firms and workers, reinforcing the relative attractiveness of the informal sector (Enste, 2010) (and reducing the probability of detection by constraining the amount of administrative resources that are put into monitoring and auditing). Moreover, high levels of informality can reduce trust in government institutions and services and lead to social norms where free-riding on public services and tax evasion is accepted, which can further increase informality. As a result of these mechanisms, countries can find themselves in self-sustaining equilibria of either low or high levels of informal employment (OECD, 2004; Bovi and Dell'Anno, 2010). For countries in between the two extremes, measures reducing the extent of informality may have a multiplier effect, leading to improved finances and lower corruption, which triggers a further reduction in informality.

29. While the theoretical framework discussed in Box 4 is stylised, it demonstrates that the factors influencing the decision to go informal are complex, and are intimately linked to the heterogeneous behaviour of individual firms and households. In turn, this has important implications for the researcher interested in identifying the impact of policies and institutions on informality. First, in order to adequately capture the behavioural responses of firms and households to policies, an analysis at the micro, firm and household levels - as opposed to the country level - is desirable. Second, longitudinal data is preferable to cross-sectional data, in order to control for the influence of (time invariant) unobserved household/firm characteristics – such as the degree of risk aversion – which are likely to condition the impact of a given policy on informality.[10] Firm and household level datasets, which contain variables capturing at least some aspect of informality, have recently become available for a limited number of countries (see Section 3). These micro surveys, however, are either purely cross-sectional, or include longitudinal data which are not comparable across countries.

30. Partly reflecting these data constraints, much of the existing literature is based on aggregate measures of informality, where time series data are more readily available. These studies often relate public policies to model-based estimates of the informal economy. As discussed in Box 1, these estimates – by construction – already take into account institutional and policy settings (tax rates etc.) and are hampered by other measurement problems. An alternative approach is to relate policies to the share of self-employment in total employment, but this approach also entails methodological shortcomings (see Box 5). Accordingly, the methodological foundation that much of the existing literature stands on is questionable and the results should, therefore, be interpreted with caution.

31. With this *caveat* in mind, this section discusses the results from existing empirical studies on the link between public policies and informality. This discussion is complemented with some illustrative bi-variate correlations. It should be noted that no causality can be inferred from these illustrations as both informality and policies can be driven by other omitted factors, and in addition data outliers may influence the correlations. Most of these correlations are based on relatively new country-level estimates of the number of hours worked in the informal economy, which are aggregated from micro data (see Section 3). To improve country coverage, the share of self-employment in total employment is also used to gauge the

[10] Moreover, since many policies relevant to informality are set at the national level (*e.g.* taxes, labour regulations etc.), it is important to focus on changes over time in order to abstract from unobserved (time invariant) country-specific factors that may be correlated with national policy settings.

extent of informality. Since the size of the informal sector and public policy settings may be a product of the extent of economic development, it is important to note that each of bi-variate cross-country correlations presented below remains intact after controlling for differences in the level of GDP per capita. Of course, simple country averages can conceal as much as they reveal – for instance, nuanced incentive effects at the individual or firm level stand a much better chance of being identified using micro data. Some preliminary thoughts about how researchers might better use existing data sources to more credibly identify the impact of public policies on informality are also provided.

Box 5. Problems with using proxy variables of informality in empirical work

Since informality is difficult to measure, many papers use the share of self employment in total employment to proxy informality activity since self employed persons have more scope to hide sales and evade taxation. While it is likely that some proportion of the self employed engage in informal activity, it is also likely that among certain workers, the choice to become self-employed reflects entrepreneurial ambitions and little desire to engage in informal activity.

This distinction potentially becomes problematic when considering the impact of government policies on informality. For instance, an increase in tax rates may lead to an increase in the number of workers who are looking to evade taxation, which may be reflected in an increase in the share of self employed. But, the rise in tax rates may also trigger a decline in entrepreneurial activity – as higher taxes reduce the net gain of a successful entrepreneur – which could be reflected in an outflow of people from self-employment. Accordingly, the impact of tax rates on self employment is potentially ambiguous. From a practical perspective, this could make it difficult to empirically identify a positive relationship between self-employment and tax rates, which one would expect if the share of self-employed was solely proxying informality.

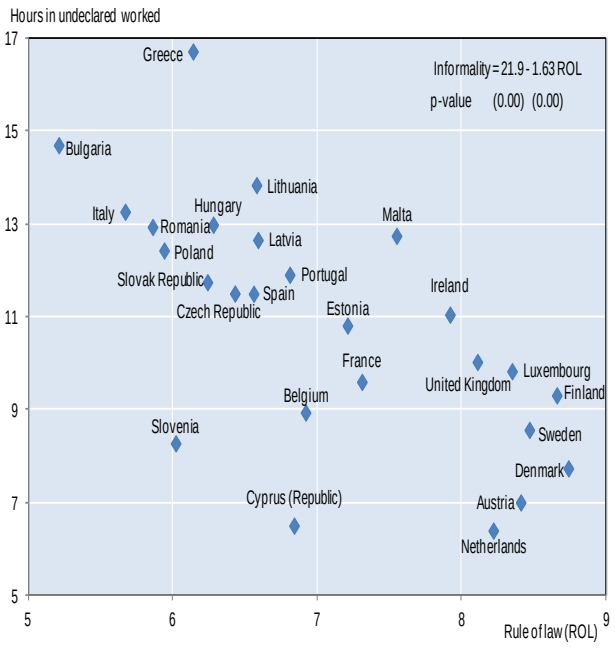
Policy changes may also affect the *intensity* of under-reporting of income by the existing self-employed people, which typical measures – such as the share of self-employed in total employment – cannot pick-up. Indeed, studies using tax return data in the United States show that the extent of underreporting of income is influenced by the marginal tax rate (Clotfelter, 1983), but higher tax rates might also induce existing self-employed to consume more leisure and work fewer hours (see Heim, 2010). Therefore, more detailed data on the hours worked and/or incomes of self-employed workers are also required but such data is not readily available on a cross-country basis.

4.1 Property rights and quality of governance

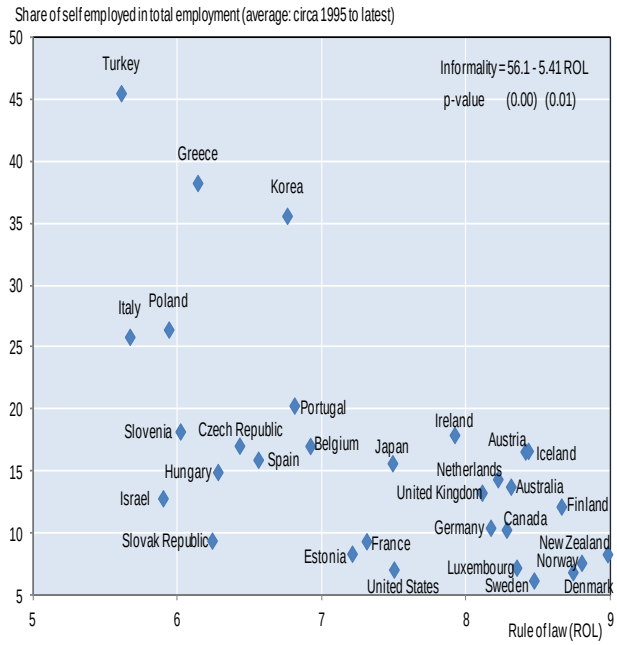
32. As discussed in Box 4, households and firms are willing to participate in the formal sector when the net benefits of formality exceed those of informality. Sound public institutions that can adequately secure property rights, establish an impartial judiciary and reduce corruption are perhaps the most fundamental contributions that public policy can make to promoting participation in the formal sector (Loayza, 1996; de Soto, 1989). Indeed, countries with a strong rule of law – proxied by a legal system that protects property rights, have an independent judiciary and an impartial court system – tend to have a smaller informal sector (Figure 11).

Figure 11: Informality and rule of law: selected countries[1]

Panel A: Hours worked undeclared



Panel B: Share of self-employed



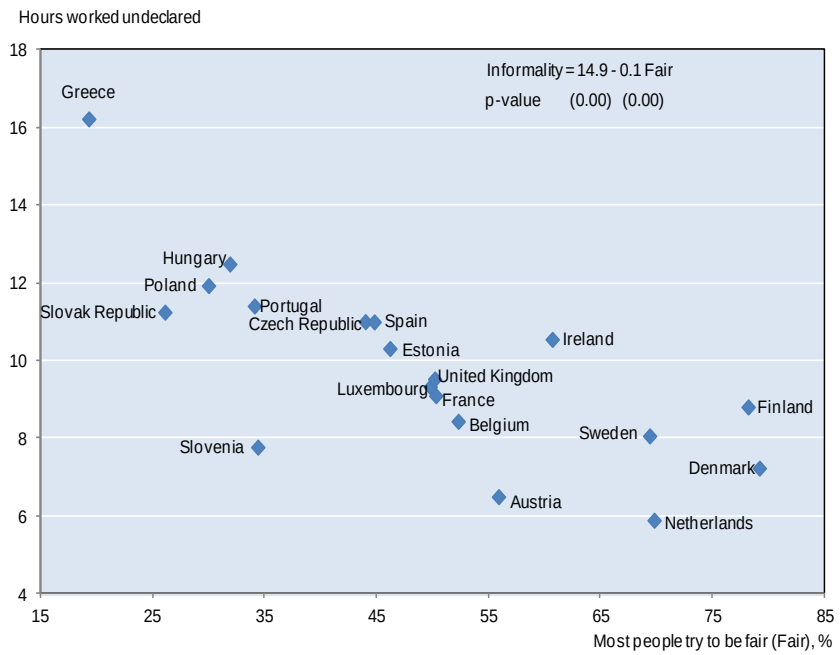
1. Rule of law refers to Area 2 (Legal Structure and Security of Property Rights) of the Economic Freedom of the World Index. This index is based on seven components: judicial independence, impartial courts, protection of property rights, military interference in rule of law and the political process, integrity of the legal system, legal enforcement of contracts and regulatory restrictions on the sale of real property. These indicators were assembled from three primary sources: the International Country Risk Guide, the Global Competitiveness Report, and the World Bank's Doing Business project.

Source: Euro Barometer 2007 Survey of undeclared work in the European Union, OECD STAN Database, and Economic Freedom of the World, Annual Report 2010.

33. The quality of governance – the way in which public institutions perform their functions – and the degree of trust between citizens and public authorities will affect informality (*e.g.* Aghion *et al.*, 2010; Torgler and Schneider, 2007; Johnson *et al.*, 1999; Lackó, 2006; Kuehn, 2010).[11] In line with this, hours in undeclared work tend to be higher in countries where there is a perception that few citizens try to be fair (Figure 12).

11 Operating informally implies that firms cannot enforce property rights over their capital and output and their property is poorly protected by the police and judicial court system. An inability to undersign legally binding contracts creates further uncertainty and increases transaction and monitoring costs in all business dealings relative to formal firms. Partly as a result of this, their access to capital markets, finance and insurance for their property is limited. Research has linked poor governance to, among other things, discretionary administration of tax systems, corruption, lack of trust in authorities and other inefficiencies (*e.g.* Johnson *et al.*, 1999).

Figure 12: Informality and social cohesion: selected countries



1. The horizontal axis shows the proportion of respondents who answered that they expect that most people try to be fair.

Source: Euro Barometer 2007 Survey of undeclared work in the European Union and the European Social Survey.

4.2 Regulations

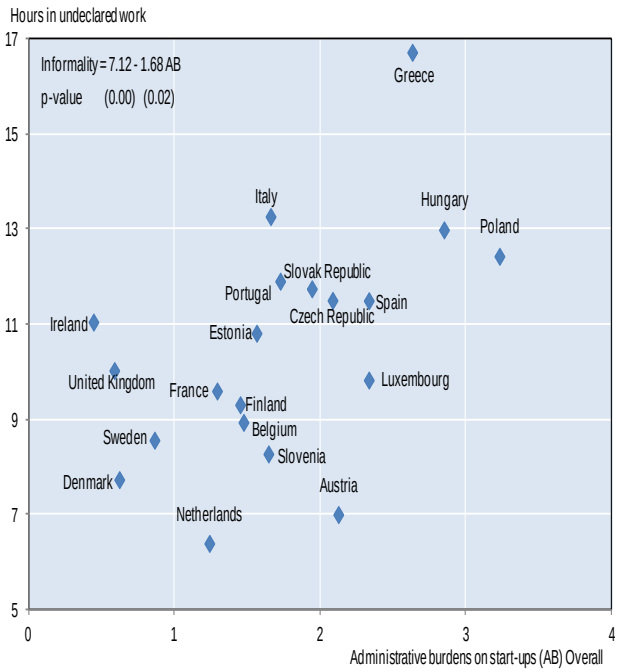
34. While regulations are implemented to serve specific purposes (*e.g.* provide job security, health and safety, environmental protection, intellectual property rights etc.), they can also unintentionally raise costs and barriers to investment and employment in the formal economy. Thus, in the absence of perfect monitoring and compliance, it will prove advantageous for some individuals or firms to evade regulations and their associated costs and operate informally (Loayza *et al.*, 2006).

35. Regulations in product markets – such as entry barriers, strict licensing requirements, costly administrative procedures and other measures impeding competition – raise costs and barriers for firms to operate in the formal sector (Loayza *et al.*, 2006; Djankov *et al.*, 2002). Existing empirical evidence suggests that there is a positive correlation between the overall regulatory burden on firms and the share of the informal economy (*e.g.* Enste, 2010; Loayza *et al.*, 2006; Johnson *et al.*, 2000). Friedman *et al.*, (2000) argue that entrepreneurs are more likely to go "informal" in order to avoid bureaucracy (and corruption), as opposed to official taxes. Similarly, studies based on 30 Mexican cities found that the simplification of registration procedures to allow firm registration to be completed in a shorter time was linked to higher rates of firm registration (Bruhn, 2006; Kaplan *et al.*, 2006). These patterns are also evident in Figure 13, which shows that in countries with more cumbersome overall administrative burdens on start-ups, the number of hours in undeclared work and the share of self-employed are greater. This relationship is also

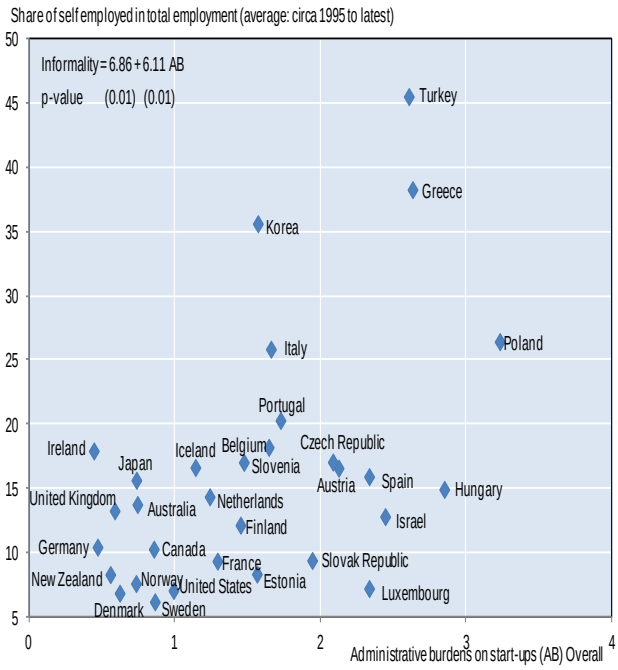
robust to simple panel estimation – using the share of self-employment to proxy informality – to control for time-invariant omitted factors.[12]

Figure 13: Administrative burdens on start-ups and informality[1]

Panel A: Hours worked undeclared



Panel B: Share of self-employed



1. Overall administrative burdens on start-ups.
Source: OECD Product market regulation database and Euro Barometer 2007 Survey of undeclared work in the European Union

36. Employment protection legislation (EPL) – through its impact on firing costs – may increase uncertainty about firms' capacity to adjust their workforce in response to economic fluctuations, and increase their incentives to hire labour informally (OECD, 2008). For example, in Turkey the low level of formal job creation is likely linked to labour market regulation, which provides incentives for informal arrangements (OECD, 2010b). Existing empirical studies also suggest that stricter EPL is associated with a larger informal economy (*e.g.* Almeida and Carneiro, 2006; Loayza *et al.*, 2006; Botero *et al.*, 2004), although strong enforcement of labour laws moderates this effect.

37. Likewise, regulations on statutory minimum wages can lead to rigidity in labour costs in the formal economy because they limit the ability of firms to shift such costs onto employees, providing another incentive to hire informal workers (*e.g.* OECD, 2010b). Empirical studies focusing on developing economies suggest that higher minimum wages are associated with lower formal-economy employment – at least in countries where the minimum wage is binding – and higher informal employment (*e.g.* Comola and De Mello, 2009; OECD, 2008).

12 Cross-country panel estimation – covering 1998, 2003 and 2008 respectively – confirms the positive relationship between administrative burdens and informality proxied by self-employment. The regression controls for the level of GDP per capita, average tax wedge, EPL and country-fixed effects.

4.3 Fiscal and social policies

Taxes and their enforcement

38. The level of taxes affects the relative attractiveness of the informal sector in several ways (*e.g.* Johnson *et al.*, 1998 and 1999; Enste, 2010 for an overview). High taxes on labour income, including employee social security contributions (particularly if the link between contributions and benefits is weak), reduce the benefits of supplying labour in the formal economy (*e.g.* Davis and Henrekson, 2005; OECD, 2008). High taxation of labour earnings can also encourage self-employed workers not to declare at least part of their earned income (OECD, 2008). Furthermore, the effect of taxes on informality depends on the extent of individual risk aversion, for example, individuals who are strongly concerned about the risk of being caught may not necessarily evade taxes (*e.g.* Trandel and Snow, 1999; Pencavel, 1979). Under certain conditions high employer social security contributions may encourage firms to hire low-skilled labour informally, to the extent that the associated costs cannot be shifted onto employees in the form of lower net wages.[13] Similarly, high effective tax rates on profits may induce firms to hide output and profits in order to reduce their tax burden. Finally, high consumption taxes may induce households and firms to shift expenditure towards goods and services that are provided informally and therefore non-taxed.

39. Many existing empirical studies consider the effects of tax systems on various types of model based estimates of informality.[14] These studies tend to find that higher personal income and consumption taxes encourage households to substitute away from the legal market in favour of untaxed and informal activities (*e.g.* Enste, 2010; Davis and Henrekson, 2005), but the relationship ceases to be significant once *per capita* income levels (and, thus, the possibility that richer countries can better enforce taxes) are taken into account. Nonetheless, more sophisticated studies using detailed micro data generally confirm this link. For instance, Lemieux *et al*., (1994) – using a randomised survey carried out in Quebec City, Canada – found that taxes distort labour-market activities away from the formal to the informal sector, though this effect is small for the average worker.

40. While most of the literature agrees that tax levels are important in explaining incentives for informality, the extent of monitoring and enforcement[15] of the tax system also plays a crucial role for tax evasion. A higher propensity to be audited, coupled with stricter penalties for non-compliance, lowers the incentives to evade taxes (*e.g.* Andreoni *et al.*, 1998) and, thereby, informality. Across countries, the incidence of informality – measured by hours undeclared – tends to be higher in countries where the expected penalty for not declaring earned income to tax or social security authorities is less severe (Figure 14). Some studies also find that the impact of taxes on informality varies with the quality of governance, as proxied by corruption. Torrini (2005) finds that at low levels of corruption, higher taxes tends to be associated with lower rates of informality, as proxied by the share of self-employment. This reflects the idea that in countries where there are fewer opportunities of evading taxes, higher taxation will result in a lower rate of self employment to the extent that the income of self-employed workers is more sensitive to individual effort – and thus more responsive to tax rates – than wage workers (Torrini 2005; Robson and Wren 1999). When corruption is high, however, the probability of being caught and punished for evading taxes is lower, and increases in taxes tend to be associated with higher rates of self-

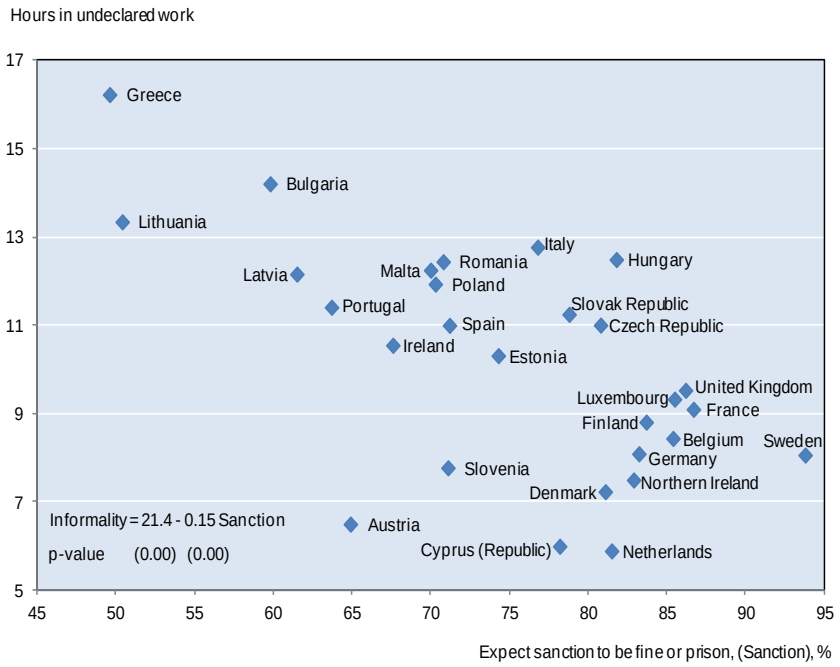
13 The ability to do so will depend on the nature of the bargaining system and the existence of minimum wages.

14 In many of these studies, the size of the informal sector is based on some type of model-based estimate, which often already takes into account institutional and policy settings (tax rates etc.) (Box 1). Thus, any link that such studies uncover between the informal economy and policies may simply reflect artificial correlations (Enste, 2010), implying that these results should be interpreted with caution

15 Enforceability refers to the extent to which tax authorities are empowered to fulfil their objective of accurately assessing tax liability and collecting tax revenue, as well as their capacity to do so.

employment (informality; see Torrini 2005). Violations of social norms and perceptions, such as "morale in paying taxes", are also likely to be associated with higher costs of operating in the informal sector.

Figure 14: Informality and enforcement: selected countries



1. The horizontal axis shows the proportion of respondents who expect the sanction to be prison or a fine, in the instance that authorities find out that someone has an income from work that is not declared to tax or social security authorities.

Source: Euro Barometer 2007 Survey of undeclared work in the European Union

41. The design of the tax system can also influence informality, to the extent that a more complex tax system increases compliance costs and incentives to evade tax (OECD, 2008). Measuring the complexity of the tax system is not easy and no representative cross-country tax indicator exists. Of course, tax expenditures, such as tax credits for domestic services, reduced tax rates for small firms and/or VAT exemptions for easily hidden goods and services, may add to tax complexity, but also potentially encourage formalisation.

Social benefits

42. Due to the withdrawal of benefits as earned income increases, the interaction of social benefit and tax systems can generate high effective marginal tax rates on declared labour income. This can create disincentives to search for work in the formal economy since the net income is higher if benefit recipients receive these transfers while working informally. Consistent with this, Lemieux *et al.*, (1994) – in their study of Quebec City – found that high effective marginal taxes (partly induced by the social-transfer system) created particularly strong incentives for welfare recipients to work informally. Effective marginal tax rates are also likely to influence the extent to which second income earners and lone parents participate in the informal economy.

43. Incentives to go "formal" are also likely to depend on the link between benefits and contributions to welfare systems. For instance, a weak link between pension rights and contributions increases incentives to work in the informal economy. If pensions are strictly deferred wages, workers may not perceive

pension contributions as taxes, and the system may come close to being actuarially fair. But, the larger the perceived tax component the greater is the incentive to work informally.

5. Informality and economic performance

44. The overall effect of the informal sector on economic growth and productivity is of interest to policymakers, but as discussed (Section 2), the direction of this effect is unclear and, thus, becomes an empirical issue. A few studies attempt to estimate the impact of informality on economic growth and in general, a negative cross-country correlation is observed between the level of GDP *per capita* and indicators of informality (Loayza, Serven and Sugawara, 2010; Dell'Anno, 2008; Loayza, 1996). However, this relationship may not be causal since the level of economic development affects the quality of institutions, which in turn contribute to determine the extent of informality.

45. At a more micro level, it is likely that low productivity firms will self-select into the informal sector since they have relatively less to lose by operating informally, or may be crowded-out from the formal sector by minimum wages set above the marginal product of their labour.[16] If such self-selection cannot be controlled for – by using instrumental variables or other approaches – the negative impact of informality on growth and productivity will likely be overstated. However, in assessing the impact of informality on growth, it is very difficult to think of an instrumental variable for informality that satisfies the exclusion restriction – that is, a variable that affects growth only through its impact on informality. Put differently, most of the drivers of informality discussed in Section 4 – such as rule of law, product and labour market regulations and taxation settings – are also likely to exert an independent influence on economic growth. From this perspective, it may be more appropriate to attribute the costs associated with the informal economy to, in fact, the forces that generated them, such as cumbersome regulations in labour and product markets (Lemieux, 2007) than to seek to identify the impact of informality on economic performance.

46. More fundamentally, an important constraint for empirical studies estimating the effects of informality on firm productivity is that only productivity, output and characteristics of formal (registered) firms can be observed in firm level datasets. While this may capture part of the informal activity in an economy, insofar as these registered firms hide sales or under-report labour input, the activity of firms operating solely in the informal sector will not be measured. This greatly complicates the analysis since many of the purported channels through which informality affects firm performance (*e.g.* access to finance, access to formal contract enforcement etc.) are more relevant to the latter group of firms.

6. Discussion

47. The informal economy is complex as it involves a number of different activities, making measurement a challenge. With few exceptions, existing empirical research into the impact of policies on informality tends to be conducted at the national level, and can be criticised for relying on unreliable proxy variables – such as self employment – or model based estimates that already take into account the impact of tax and regulatory settings. Moreover, as this paper demonstrates, it is unclear whether an aggregate approach is sufficient to identify the behavioral responses of households and firms to public policies. Accordingly, research conducted at the microeconomic level would be useful in order to confirm some of the suggestive findings from the cross-country analysis, though the quality of existing micro data presents an important constraint.

[16] On the other hand, high productivity firms may have more to gain from operating informally (in terms of revenue), though this would reduce scope for future expansion since access to formal credit markets would be limited.

48. Regarding the effects of policies on informality, some progress could be made with existing micro data sources if it were possible to identify a benchmark group of individuals/firms whose decisions as regards formality are relatively more or less affected by public policies than other groups. This would allow a difference-in-difference estimation framework to be applied to pooled cross-sectional firm/household-level data to identify the effect of policies on informality. For instance, one possibility is to use the World Bank firm-level data and to hypothesize that the cost of complying with government regulations disproportionately impacts smaller-sized firms (OECD, 2001). Then the impact of employment protection legislation and product market regulation on informality could be identified by interacting these policy variables with firm size. Similarly, the decision of the self-employed to supply labour in the informal economy may be more sensitive to income taxation than that of wage earners, since the pre-tax income of the former is more sensitive to individual effort (Robson and Wren, 1999; Torrini, 2005). In this case, the impact of taxation on hours in undeclared work could be estimated through the interaction between self-employment and various types of taxation variables. It is important to note that while the differences-in-differences method could identify the extent to which policies influence behavior, it would not itself lead to an overall estimate of the impact of the policy in question.[17]

49. To enhance future research on informality, obtaining cross-country comparable micro data, preferably with a longitudinal dimension, will be necessary. One way forward would be to add a question related to informal activities (such as whether respondents are registered for any social security programmes – *e.g.* health and unemployment insurance, pensions etc.) to the labour force survey (OECD, 2008a). Another option is inclusion of a question about participation in the informal economy in standard household surveys, although this may lower response rates and/or accuracy of answers, potentially undermining the usefulness of the survey. Alternatively, stand-alone surveys directly asking about informality – such as the Eurobarometer or the World Bank Enterprise Survey – could be conducted for a broader set of countries and with a time dimension (*e.g.* OECD, 2008a). In any event, the design of the question, the survey procedures and the sample strata are clearly important, given the significant measurement error evidenced in the responses to the EU-SILC question regarding whether employees are covered by social security contributions (see Table 1). At the aggregate level, there may be some merit in considering whether some of the information that National Statistical Offices use to generate estimates of the non-observed economy could be utilised more effectively to shed light on the informal economy.

[17] Put differently, this approach would only yield an estimate of the differential impact of policies, as opposed to an average impact. Moreover, by using a specific group to identify the impact of policies on informality (*i.e.* self-employed, small firms etc.), the number of observations may decrease significantly, reducing the precision of the estimates.

ANNEX 1: DATA SOURCES

A number of different data sources have been explored in order to obtain estimates of the size of the informal economy for OECD countries, including:

Household surveys

The EuroBarometer Survey (2007) is a household survey, covering 21 European OECD countries (plus six non-OECD countries), asking households their perception of the informal economy. It assesses the extent of undeclared work in the EU and includes questions on whether an individual has purchased goods or services or supplied labour in the informal economy. The survey also includes information on envelope wages – that is, additional off-the-books payments made to workers in the formal sector (*e.g.* overtime payments in cash). In addition, respondents are also asked about the penalties for being caught performing undeclared work. Finally, the survey includes the usual personal control variables such as age, income, employment status etc.

World Values Survey and European Values Survey: these surveys contain indirect measures of the informal economy, such as whether respondents can justify cheating on taxes and paying cash to avoid taxes. They also provide measures of respondents' confidence in a country's institutions and social services, which may influence the decision to act informally.

The European Social Survey (2004, 2006, 2008) covers 24 European OECD countries and includes questions on whether interviewed people paid cash with no receipt so as to avoid VAT or tax over last five years. It is also possible to identify from this survey the share of workers without a written employment contract. The survey also includes questions on whether respondents believe their fellow citizens act fairly, the degree of trust in national institutions and corruption.

International Social Survey Programme (ISSP): The ISSP contains similar variables to the WVS and EVS, plus information on whether the respondent does any additional work for income. The survey also contains measures of corruption.

Firm-level surveys

The World Bank Enterprise Survey and Productivity and Investment Climate surveys collect information about the business environment within a country, based on interviews of a random sample of firms in manufacturing and business sectors representative of the population of firms in each country. The firms are legal firms, but there are questions in the survey that indicate whether they were informal in the past - which can be used as a proxy for the informal economy. The survey also gives information on the business environment faced by firms and whether crime, access to credit, competition from informal competitors etc. is a threat to their operation. It contains information for ten OECD countries (Chile, Czech Republic, Estonia, Hungary, Mexico, Poland, Russia, Slovak Republic, Slovenia and Turkey), Brazil, Indonesia and South Africa.

The EBRD Business Environment Survey is a survey of over 10 000 firms in 27 countries in 1999, 2002, 2004 and 2005 respectively. Based on face-to-face interviews with firm managers and owners, it asks questions concerning corruption, judiciary, lobbying, and the quality of the business environment, which

can be related to specific firm characteristics and performance. More specifically, it contains information on firms' estimates of the percentage of total annual sales, work force and annual wage bill a typical firm in the same area of business reports for tax purposes. In addition, it also includes information on regulatory and legal constrains (tax and regulatory, financing, legal, corruption, labour, quality of courts). The surveys contain information for 14 OECD countries (Czech Republic, Estonia, Germany, Greece, Hungary, Ireland, Luxembourg, Poland, Portugal, Russia, Slovak Republic, Slovenia, Spain and Turkey).

Other data sources

Share of self employment in labour force or employment: *i)* Data on self employment in the labour force is available from the ILO covering most OECD countries from the late 1980s or early 1990s; *ii)* self-employment by sector is available for most OECD countries in the OECD STAN database, covering varying time periods often from mid-1970s to 2007 and *iii)* household information on self-employed individuals from the EU-SILC household survey (2007).

Share of employees with multiple jobs: i) Data on multiple job holders are available from Eurostat for most European countries since 1990, and these data can also be obtained from national statistical agencies in Australia, Canada, New Zealand and the United States. *ii)* Household information on individuals with more than one job is available in the EU-SILC household survey, HILDA survey (2001-2009) etc.

Share of illegal immigrants over total employment: Data on estimates of the number of illegal immigrants in each country is obtained from the OECD International Migration Outlook (2009). Using this information, an estimate of the number of illegal immigrants in employment has been calculated assuming the same employment rate as for legal foreign residents.

Administrative burdens on start-ups: OECD Product market regulation Database, link: http://www.oecd.org/document/1/0,3746,en_2649_34323_2367297_1_1_1_1,00.html

Average tax wedge on labour: OECD Taxing Wages, link: http://www.oecd.org/document/34/0,3746,en_2649_34897_44993442_1_1_1_1,00.html

Implicit tax on continued work: OECD *Going for Growth* 2010.

Minimum cost of labour: OECD *Going for Growth* 2010.

Employment protection legislation: OECD Indicators Employment Protection; link: http://www.oecd.org/document/11/0,3746,en_2649_37457_42695243_1_1_1_37457,00.html

Tax complexity: Doing Business Report 2011; Paying Taxes – item number of payments per year; World Bank, link: http://www.doingbusiness.org/

Rule of law: Economic Freedom of the World Index - Area 2: Measuring the Legal Structure and Security of Property Rights; *Economic Freedom of the World, 2010 Annual Report*, by J. Gwartney, J. Hall and R. Lawson.

ANNEX 2: CORRELATION ANALYSIS

This Annex provides analysis of correlation between the various measures of informality. Table A2.1 shows there is a positive correlation between the different measures of informality sourced from firm-level surveys. In particular, in countries where firms tend to underreport their sales, there is also a higher amount of informal work. Also, in those countries where a large share of firms underreports their sales, formal firms feel a greater threat from informal competitors, possibly because a larger number of firms benefit from the lower costs of being "informal".

Table A2.1: Correlation between firm-based measures of the size of the informal economy

Selected economies, various years[1].

	% of establishments for which informal firms are an important business constraint	% firms indicating firms in their sector of activity do not report 100% sales to tax authorities	% firms indicating firms in their sector of activity do not report 100% workers to tax authorities
% establishments not formally registered when began operations	0.58	0.67	0.52
% of establishments for which informal firms are an important business constraint		0.91	0.66
% firms indicating firms in their sector of activity do not report 100% sales to tax authorities			0.89

1. Correlations based on the eight countries for which there is available information for all four variables: seven OECD countries, including Czech Republic, Estonia, Hungary, Poland, Slovak Republic, Slovenia and Turkey, and the Russian Federation. Most of the correlations are robust to including a larger set of countries.

Source: OECD calculations based on data from World Bank Enterprise Survey and the EBRD-BEEPS Survey.

Table A2.2 shows the correlation between various household-based measures of informality. Countries where more people knew somebody who works without declaring income were also those where more people purchased goods and services and carried out work in the informal economy. However, across European economies, there is a negative relationship between the admitted incidence (*i.e.* participation) of informal activity and average hours spent in undeclared work (*i.e.* intensity).

Table A2.2: Correlation between household-based measures of the size of the informal economy

21 European Economies, 2007

	Bought goods and services embodying undeclared work	Employer paid part or all of wage in undeclared cash in past 12 months	Carried out undeclared work in past 12 months	Estimated minimum hours per week in undeclared work
Know someone who works without declaring income	0.84	-0.07	0.74	-0.36
Bought goods and services embodying undeclared work		-0.07	0.79	-0.31
Employer paid part or all of wage in undeclared cash in past 12 months			-0.09	0.40
Carried out undeclared work in past 12 months				-0.51

Source: OECD calculations based on Euro Barometer 2007 Survey of undeclared work in the European Union.

BIBLIOGRAPHY

Aghion, P., P. Cahuc, Y. Algan and A. Shleifer (2010), "Regulation and Distrust", *Quarterly Journal of Economics*, August, Vol. 125, No. 3: pp. 1015–1049.

Aghion, P., P. Cahuc and Y. Algan (2011), "Can Policy Interact with Culture? Minimum Wage and the Quality of Labor Relations", forthcoming in the *Journal of European Economic Association.*

Almeida, R. and P. Carneiro (2006), "Enforcement of Regulation, Informal Labour, Firm Size and Firm Performance", Centre for Economic Policy Research Working Paper No. 5976, London.

Antunesa, A.R. and T.V. de V. Cavalcanti (2007), "Start Up Costs, Limited Enforcement, and the Hidden Economy", *European Economic Review*, Vol. 51.

Andreoni, J., B. Erard and J. Feldstein (1998), "Tax Compliance", *Journal of Economic Literature*, Vol. 36. No. 2.

Arnal, E. and M. Fõrster (2010), "Employment and Inequality in Brazil, China, India and South Africa: An Overview", OECD, Paris.

Averett, S. (2001), "Moonlighting: Multiple Motives and Gender Differences", *Applied Economics*, Vol. 33, No. 11, pp. 1391-1410.

Bartelsman, E., J.C. Haltiwanger and S. Scarpetta (2004), "Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries", IZA Discussion Paper No. 1374.

Botero, J., S. Djankov, R. La Porta, F. Lopez-de-Silanes and A. Shleifer (2004), "The Regulation of Labor", *Quarterly Journal of Econometrics*, Vol. 119(1), pp. 91-134.

Bovi, M. and R. Dell'Anno (2010), "The Changing Nature of the OECD Shadow Economy", *Journal of Evolutionary Economics*, Vol 20.

Bruhn, M. (2006), "License to Sell: The Effect of Business Registration Reform on Entrepreneurial Activity in Mexico", Photocopy. Massachusetts Institute of Technology, Cambridge, MA.

Breusch, T. (2005), "Australia's Cash Economy: Are the Estimates Credible?", *Economic Record*,Vol. 81(255), pp. 394-403.

Buehn, A. and F. Schneider (2007), "Shadow Economies and Corruption All Over the World: Revised Estimates for 120 Countries", *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 1, 2007-9 (Version 2). doi:10.5018/economics-ejournal.ja.2007-9, http://dx.doi.org/10.5018/economics-ejournal.ja.2007-9.

Clotfelter, C.T. (1983), "Tax Evasion and Tax Rates: An Analysis of Individual Returns", *Review of Economics and Statistics* Vol. 65 No. 3, pp. 363–373.

Comola, M. and L. de Mello (2009), "How Does Decentralised Minimum-Wage Setting Affect Unemployment and Informality? The Case of Indonesia", *OECD Economics Department Working Papers* No. 710, OECD, Paris.

Dabla-Norris, E., M. Gradstein and G. Inchauste (2007), "What Causes Firms to Hide Output? The Determinants of Informality", *Journal of Development Economics.*

Dabla Norris, E. and G. Inchauste (2008), "Informality and Regulations: What Drives the Growth of Firms?", IMF Staff Papers Vol. 55, No. 1.

Davis, S. J. and M. Henrekson (2005), "Tax Effects on Work Activity, Industry Mix and Shadow Economy Size: Evidence from Rich-Country Comparisions", in R. Gomez Salvador *et al.* (Eds.), Labour Supply and Incentives to Work in Europe (pp. 44–111), Cheltenham: Elgar.

Daza, J.L. (2005), "Informal Economy, Undeclared Work and Labour Administration", Paper No. 9, International Labour Organisation, Geneva.

De Soto, H. (1989), "The Other Path", Harper and Row, New York.

Dell'Anno, R (2008), "What is the Relationship between Unofficial and Official Economy? An Analysis in Latin American Countries", *European Journal of Economics*, Issue 12.

Dell'Anno, R. and F. Schneider (2008), "The Shadow Economy of Italy and other OECD Countries: What do We Know?", *Journal of Public Finance and Public Choice, forthcoming*.

Djankov, S., R. La Porta, F. Lopez-de-Silanes and A. Shleifer (2002), "The Regulation of Entry", *Quarterly Journal of Economics*, Vol. 117, No. 1, pp. 1-37.

Easton, S. (2001), "The Size of the Underground Economy: A Review of the Estimates", *Mimeo*, Simon Fraser University.

Enste, D.H. (2010), "Regulation and Shadow Economy: Empirical Evidence for 25 OECD Countries", *Constitutional Political Economy*, Vol. 21.

Frey, B.S. and F. Schneider (2000), "Informal and Underground Economy", in Orley Ashenfelter: International Encyclopedia of Social and Behavioral Science, Elsevier Science Publishing Company.

Feld, L.P and F. Schneider (2010), "Survey on the Shadow Economy and Undeclared Earnings in OECD Countries", *German Economic Review*, Blackwell Publishing, Vol. 11.

Fields, G. (2005), "A Guide to Multisector Labour Market Models", World Bank Social Protection Discussion Paper, No. 0505, World Bank, Washington.

Friedman, E., S. Johnson, D. Kaufmann and P. Zoido-Lobaton (2000), "Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries", *Journal of Public Economics*, Vol. 76, pp. 459-493.

Guariglia, A. and B. Kim (2006), "The Dynamics of Moonlighting in Russia: What is Happening in the Russian Informal Economy?", *Economics of Transition*, Vol. 14, No. 1, pp. 1-45.

Heim, B.T. (2010), "The Responsiveness of Self-Employment Income to Tax Rate Changes", *Labour Economics*, Vol. 17, pp. 940-950.

ILO (1993), "Resolutions Concerning Statistics of Employment in the Informal Sector Adopted by the 15th International Conference of Labour Statisticians", January.

ILO, NATLEX Database, http://www.ilo.org/dyn/natlex/natlex_browse.home

IRS (1979),"Estimates of Income Unreported on Individual Tax Returns", Washington D.C.: IRS, US Treasury. Dept.

IRS (1983), "Income Tax Compliance Research: Estimates for 1973–81", Washington D.C.: IRS, US Treasury. Dept.

Isachsen, A.J. and S. Strom (1989), "The Underground Economy in Norway with Special Emphasis on the Hidden Labor Market", in Edgar L. Feige, ed. The Underground Economies: Tax Evasion and Information Distortion. (New York: Cambridge University Press).

Johnson, S., D. Kaufmann, A. Shleifer (1997), "The Unofficial Economy in Transition", *Brookings Papers on Economic Activity* 2 (Fall), pp. 159–239.

J Johnson, S., D. Kaufmann, and P. Zoido-Lobatón (1998), "Regulatory Discretion and the Unofficial Economy", *American Economic Review*, 88:2, pp. 387–92.

ohnson, S., D. Kaufmann and P. Zoido-Lobatón (1999), "Corruption, Public Finances and the Unofficial Economy", Washington, D.C.: The World Bank, *Policy Research Paper* No. 2169.

Johnson S., D. Kaufmann, J. McMillan and C. Woodruff (2000), "Why do Firms Hide? Bribes and Unofficial Activity after Communism*", Journal of Public Economics*, Vol. 76, Issue 3.

Kaplan, D., E. Piedra and E. Seira (2006), "Are Burdensome Registration Procedures an Important Barrier on Firm Creation? Evidence from Mexico", Photocopy, Instituto Tecnológico Autónomo de México, Mexico City.

Kaufmann, D. and A. Kaliberda (1996), "Integrating the Unofficial Economy into the Dynamics of Post Socialist Economies: A Framework of Analyses and Evidence", World Bank Policy Research Working Paper No. 1691.

Knack, S. and P. Keefer (1997), "Does Social Capital Have an Economic Payoff, A Cross-Country Comparison", *Quarterly Journal of Economics*, Vol. 112, pp. 1251-1288.

Kuehn, Z. (2010), "Tax Rates, Governance, and the Informal Economy in High-Income Countries", Imdea Working Paper Series in Economics and Social Sciences, 2010/07.

Lemieux, T., B. Fortin and P. Fréchette (1994), "The Effect of Taxes on Labor Supply in the Underground Economy", *American Economic Review*, Vol. 84, No. 1.

Lemieux, P. (2007), "Underground Economy: Causes, Extent, Approaches", Montreal Economic Institute Working Paper.

Lackó, M. (1998), "The Hidden Economies of Visegrad Countries in International Comparison: A Household Electricity Approach in Hungary: Towards a Market Economy", L. Halpern and C. Wyplosz, eds. Cambridge, MA: Cambridge U. Press, pp. 128–52.

Lackó, M. (2006), “Tax Rates with Corruption: Labour-market Effects Empirical Cross-country Comparisons on OECD Countries”, Institute of Economics, Hungarian Academy of Sciences Discussion Papers 2006/4.

Loayza, N. (1996), “The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America”, Carnegie-Rochester Conference Series on Public Policy 45

Loayza, N., A.M. Oviedo and L. Serven (2006), “The Impact of Regulation on Growth and Informality Cross-Country Evidence”, In B. Guha-Khasnobis, R. Kanbur, and E. Ostrom (Eds.), Linking the Formal and Informal Economy, Concepts and Policies, Oxford: Oxford University Press.

Loayza, V., L. Serven and N. Sugawara (2010), “Informality in Latin America and the Caribbean”, Policy Research Working Paper Series 4888.

OECD (2001), *Business Views on Red Tape: Administrative and Regulatory Burdens on Small and Medium-Sized Enterprises*, OECD, Paris.

OECD (2002), "Measuring the Non-Observed Economy", OECD, Paris.

OECD (2004), *Employment Outlook*, OECD, Paris.

OECD (2007a), OECD Economic Survey of Hungary, OECD, Paris.

OECD (2007b), OECD Economic Survey of Mexico, OECD, Paris.

OECD (2007c), OECD Economic Survey of Chile, OECD, Paris.

OECD (2008), “Declaring Work or Staying Underground: Informal Employment in Seven OECD Countries", *OECD Employment Outlook*, Chapter 2, OECD, Paris.

OECD (2008a), “Declaring Work or Staying Underground: Informal Employment in Seven OECD Countries – Further Material”, available online www.oecd.org/employment/outlook, Paris.

OECD (2009a), “Is Informal Normal?: Towards More and Better Jobs in Developing Countries”, *OECD Development Centre Perspective*, OECD, Paris.

OECD (2009b), Policy Roundtables, Competition Policy and the Informal Economy, OECD Paris

OECD (2009c), OECD *Economic Survey of Brazil*, OECD, Paris.

OECD (2009d), OECD *Economic Survey of Greece*, OECD, Paris.

OECD (2009e), *International Migration Outlook*, OECD, Paris.

OECD (2010a), *OECD Economic Survey of Indonesia*, OECD, Paris.

OECD (2010b), *OECD Economic Survey of Turkey*, OECD, Paris.

OECD (2010c), *Going for Growth*, OECD, Paris.

OECD (2010d), “Latin American Economic Outlook, 2011: How Middle Class is Latin America?,” OECD Publishing.

OECD (2010e), *Consumption Tax Trends 2010*, OECD, Paris.

OECD (2011), OECD *Economic Survey of Mexico*, OECD, Paris.

Pencavel, J.H. (1979), "A Note on Income Tax Evasion, Labor Supply, and Nonlinear Tax Schedules", *Journal of Public Economics*, Vol. 12.

Perry, G., W. Maloney, O. Arias, P. Fajnzylber, A. Mason and J. Saavedra-Chanduvi (2007), "Informality: Exit and Exclusion", World Bank, Washington.

Pomeranz, D. (2010), "No Taxation Without Information: Deterrence and Self-Enforcement in the Value Added Tax", Harvard University Mimeo.

Reyneri, E. (2003), "Illegal Immigration and the Underground Economy", ANU National Europe Centre Paper No. 68, paper presented to the conference The Challenges of Immigration and Integration in the European Union and Australia, 18-20 February 2003, University of Sydney. (www.anu.edu.au/NEC/reyneri.pdf)

Schneider, F. (1997), "The Shadow Economies of Western Europe", *Journal of the Institute of Economic Affairs*, Vol. 17/3, pp. 42-48.

Schneider, F. and D.H. Enste (2000), "Shadow Economies: Size, Causes, and Consequences", *Journal of Economic Literature*, Vol. 38.

Schneider, F. (2002),"Shadow Economy", An International Survey, Cambridge University Press, Cambridge, UK.

Schneider, F. (2007), "Shadow Economies and Corruption All Over the World: New Estimates for 145 Countries", Economics - The Open-Access, Open-Assessment E-Journal, Kiel Institute for the World Economy, Vol. 1(9),

Spiro, P. (2005), "Tax Policy and the Underground Economy" in Size, Causes and Consequences of the Underground Economy. Edited by C. Bajada and F. Schneider, Ashgate Publishing, Aldershot, UK.

Sarzalska, M. and A. Szydlowski (2007), "Labour in the Non-Observed Economy" in A. Baranowska, M. Bukowski, M. Bober, P. Lewandowski, I. Magda, M. Sarzalska, A. and J. Zawistowski, *Employment in Poland 2006: Productivity For Jobs*, Institute for Structural Research, Ministry of Labour and Social Policy of Poland, pp. 163-199.

Torgler B., and F. Schneider (2007),"The Impact of Tax Morale and Institutional Quality on the Shadow Economy", IZA Discussion Paper No. 2541.

Torrini, R. (2005), "Cross-Country Differences in Self-Employment Rates: The Roles of Institutions", *Labour Economics*, 12(5), pp. 661-683.

Trandel, G., and A. Snow (1999), "Progressive Income Taxation and the Underground Economy", *Economics Letters*, No. 62.

Vuletin, G. (2008), "Measuring the Informal Economy in Latin America and the Caribbean," *IMF Working Paper* WP/08/102.

Williams, C.C. (2005), “Small Business in the Informal Economy: Making the Transition to the Formal Economy”, Small Business Council, London, the United Kingdom.

Williams, C.C. and P. Renooy (2008), “Measures to Tackle Undeclared Work in the European Union", Eurofund.

UN (2008), “Non-Observed Economy in National Accounts, Survey of National Practices, United Nations, Geneva.

WORKING PAPERS

The full series of Economics Department Working Papers can be consulted at www.oecd.org/eco/workingpapers/

872. *Tax competition between sub-central governments*
(May 2011) Hansjörg Blöchliger and José-Maria Pinero-Campos

871. *The growth effects of current account reversals: the role of macroeconomic policies*
(May 2011) Luiz de Mello, Pier Carlo Padoan and Linda Rousová

870. *Les politiques du logement en France*
(May 2011) Bénédicte Rolland

869. *How important is wealth for explaining household consumption over the recent crisis?An empirical study for the United States, Japan and the Euro Area*
(May 2011) Clovis Kerdrain

868. *Adjusting fiscal balances for asset price cycles*
(May 2011) Robert Price and Thai-Thanh Dang

867. *Improving the functioning of the housing market in the United Kingdom*
(May 2011) Christophe André

866. *An analysis of demand for foreign exchange reserves*
(May 2011) Peter Vujanovic

865. *Episodes of large capital inflows and the likelihood of banking and currency crises and sudden stops*
(May 2011) Davide Furceri, Stephanie Guichard and Elena Rusticelli

864. *The effect of episodes of large capital inflows on domestic credit*
(May 2011) Davide Furceri, Stephanie Guichard and Elena Rusticelli

863. *Medium-term determinants of international investment positions: the role of structural policies*
(May 2011) Davide Furceri, Stephanie Guichard and Elena Rusticelli

862. *French social housing in an international context*
(May 2011) Kathleen Scanlon and Christine Whitehead

861. *Making the French housing market work better*
(May 2011) by Hervé Boulhol

860. *Surveillance by international institutions: lessons from the global financial and economic crisis*
(April 2011) by Kumiharu Shigehara and Paul Atkinson

859. *France's environmental policies: internalising global and local externalities*
(April 2011) by Balázs Égert

858. *Bringing French public debt down: the options for fiscal consolidation*
(April 2011) by Balázs Égert

857. *Policy frameworks in the post-crisis environment*
(April 2011) by Nigel Pain and Oliver Röhn

856. *Global imbalances, exchange rate pegs and capital flows: a closer look*
(April 2011) by Paul van den Noord

855 *Interest rate pass-through during the global financial crisis: the case of Sweden*
(April 2011) by Niels-Jakob Harbo Hansen and Peter Welz

854 *What drives inflation in the major OECD Economies*
(April 2011) by Diego Moccero, Shingo Watanabe and Boris Cournède

853 *Mitigation potential of removing fossil fuel subsidies: A general equilibrium assessment*
(April 2011) by J.M. Burniaux and J. Chateau

852 *Enhancing labour utilisation in a socially inclusive society in Australia*
(April 2011) by Vassiliki Koutsogeorgopoulou

851 *Meeting infrastructure needs in Australia*
(March 2011) by Claude Giorno

850 *Restoring fiscal sustainability in Spain*
(March 2011) by Pierre Beynet, Andrés Fuentes, Robert Gillingham and Robert Hagemann

849. *Drivers of homeownership rates in selected OECD countries*
(March 2011) by Dan Andrews and Aida Caldera Sánchez

848. *How efficient are banks in Hungary?*
(February 2011) by Margit Molnár and Dániel Holló

847. *Strengthening the macroeconomic policy framework in South Africa*
(February 2011) by Tatiana Lysenko and Geoff Barnard

846. *To move or not to move: what drives residential mobility rates in the OECD?*
(February 2011) by Aida Caldera Sánchez and Dan Andrews

845. *Reforming the labour market in Spain*
(February 2011) by Anita Wölfl and Juan S. Mora-Sanguinetti

844. *Macroeconomic Impact of Basel III*
*(*February 2011) by Patrick Slovik and Boris Cournède

843. *The policy and institutional drivers of economic growth across OECD and non-OECD economies: new evidence from growth regressions*
by Romain Bouis, Romain Duval, and Fabrice Murtin

842. *Limiting Long-Term Unemployment and Non-Participation in Sweden*
(February 2011) by Niels-Jakob Harbo Hansen

841. *Enhancing the cost-effectiveness of climate change mitigation policies in Sweden*
(February 2011) by Stéphanie Jamet