THE UNIVERSTIY OF HULL

WHAT DETERMINES THE SIZE OF THE INFORMAL ECONOMY?

An Empirical Evaluation of the Role of Institutions

being a Thesis submitted for the Degree of

PhD in the University of Hull

by

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October 2017

Abstract

The informal economy comprises all economic activities that are unregistered or unregulated by the state. In the past 40-50 years the informal economy has grown globally and its emergence has implications for economic development and the formal economy. In recent times, a number of perspectives have emerged to explain what determines informality. One such perspective is the neoliberal explanation of informality, which has shifted the debate about informality towards the role of institutions. This dissertation assesses the neoliberal view that the informal economy is greater in economies with higher tax rates, a higher regulatory burden and a weaker rule of law. The importance of these institutional factors in explaining the rise of the informal economy is empirically evaluated by employing two types of analysis and data sets. Firstly, panel data analysis is used to examine the relationship between macro level measures of informality and institutional factors for a sample of 90 countries. The second empirical approach uses a comprehensive firm-level data set for 43 countries to estimate an ordered probit model. The findings support the neoliberal argument that the informal economy is larger when tax rates are higher, when there is greater regulatory burden and when there is an inefficient and corrupt public sector. The solution to the problem of informality, therefore, should focus on improving aspects of governance and enhancing the quality of the regulatory framework for business.

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Chapter 1 Introduction

The concept of the informal economy was first introduced in the context of developing countries in the 1970s as formal-informal dualism. The informal sector was characterized by low capital and small scale of operations taking place outside the formal framework of the economy (ILO, 1972; Portes & Haller, 2005; Hart, 2010).

In the past few decades however, this early analysis of informality has faced criticism for several reasons. First, it is recognised that informal activities exist not only in developing countries but also in advanced capitalist economies as well as in transition countries. Secondly, there is a recognition that there is a systematic linkage between formal and informal sectors and activities and they cannot be divided into two distinct sectors. Finally, it is recognised that informal businesses are, in many cases, economic forces that have entrepreneurial energy but are held back by government regulations and weak formal property rights (Castells & Portes, 1989; De Soto, 1989).

These developments in understanding the dimensions of informality have led to a more contemporary definition of the term informal economy or informality. By excluding illegal and criminal activities, the informal economy refers to all economic activities by workers and economic units that are not covered or regulated by formal arrangements in which similar activities are regulated (ILO, 2002).

Recent recognition of the significance of informal economic activities and their effects on the functioning of the labour market, the generation of income, and on the estimates of the official economy (and the tax base and revenue), has encouraged researchers to measure the magnitude of informality across countries and regions. Various approaches have been used to measure the size of the informal economy. The extent of informality

can be estimated, for example, from direct voluntary surveys, monetary methods, or from a model-based approach (section 2.2). Nevertheless, most estimates of informality indicate that although it has grown worldwide, the informal economy is a pervasive and persistent feature of most developing countries (Thomas, 1992; Tanzi, 1999; Perry et al., 2007; Schneider et al., 2010; Charmes, 2012). Figure 1.1, for example, illustrates the estimated average size of the informal economy provided by Schneider et al. (2010) over the period from 1999-2007. On average, informality ranges from less than 20 percent of GDP in advanced economies to more than 35 percent in Latin American, Sub-Saharan Africa, and South Asia economies.

Informal economy in percentage of GDP , 1999-2007

(Data from : Schneider et al. 2010)
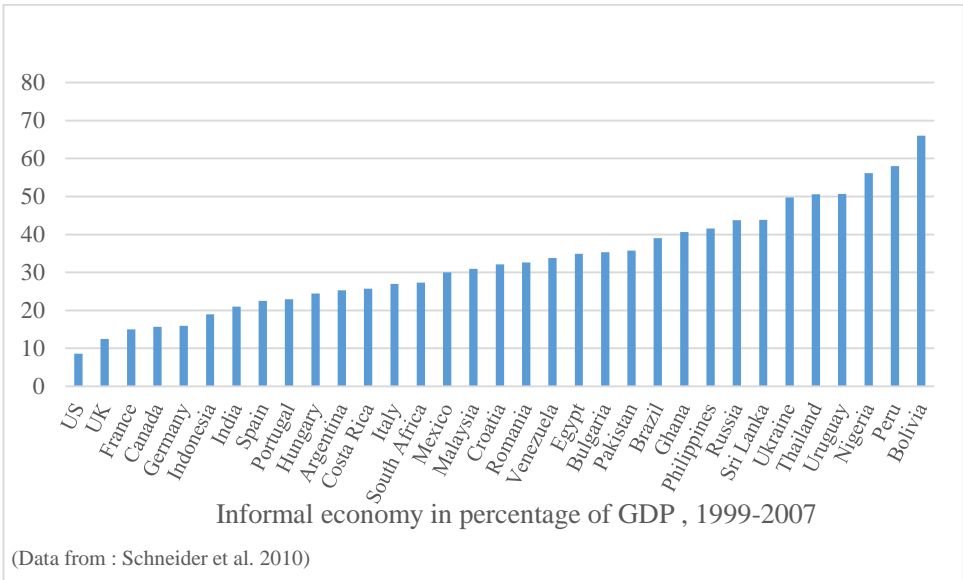
Figure 1.1 The informal economy in selected countries

Charmes (2012) provides other estimates of the size of the informal economy in terms of its share of non-agricultural employment. According to his dataset, in 2010 and across developing regions, employment in the informal economy is estimated to be as high as 76 percent of non-agricultural employment in South Asia, 65 percent in Sub-Saharan Africa, and 57 percent in Latin American countries. These are very significant

figures and indicate that informality is a substantive phenomenon that must be explained and taken into account in the design of development and taxation polices.

Due to the growth in the size of the informal economy, it has been the subject of much economic and political controversy and debate in both developing and developed economies. The next two examples reflect the relevance of informality to current economic policies which are either considered or implemented by governments around the world.

The first example shows how problematic it is for governments to implement policies that aim to tackle informality and a black money market when there is a large informal economy. The demonetisation scheme announced in India at the end of 2016 as well as the implementation of the Goods and Services Tax (GST) were bold steps taken by the government to tackle black money and to reduce the extent of non-compliance with taxation. However, there is a concern that such measures will have negative impacts on growth and erode confidence in the currency and banking system. Furthermore, given the extent of informality in India (the informal employment in India accounts for around 84.2 percent of non-agricultural employment[1]), economists recognize the costs of such measures and they warn that it would have a negative impact on a wide range of small business and the livelihood of millions of people who rely on informal economic activities. For instance, Raghuram Rajan, a former governor of the Reserve Bank of India (RBI), cautioned about the cost of formalization in a country like India where being informal is a way of life (Dugal, 2017).

The second example illustrates the prominence of tackling informality in the context of advanced economies. In July 2017, the government of the UK published a report titled

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[1] This figure is for the period 2005-2010. Source: Charmes (2012)

The Taylor Review of Modern Working Practices, in which particular attention was paid to the issue of informality in relation to the tax lost. According to the report, (Taylor et al., 2017:80), "the hidden economy cost as much as £6.2bn to the UK in 2013/14 – 18% of the total UK tax gap. Policing the hidden economy is harder where there is little or no audit route for enforcement officers to examine – which is what occurs when payment for the work of self-employed people is made in cash". The Taylor report recommends the government consider designing a range of platforms to support the move towards more cashless transactions. This would increase transparency of payments and support individuals to pay the right tax.

These two examples show why governments are so concerned about a large informal economy. It appears that informality has an impact on the efficiency of any economic policies that aim at, for example, improving economic performance or raising tax revenue, and therefore an improved understanding is needed of its extent, determinants and its role in society.

Nevertheless, the debate on informality is not limited to the question of the right policies to deal with it. Policy debates on the informal economy are usually broader and are linked to perspectives or theoretical frameworks which have been developed to explain the informal economy and to answer questions such as: what determines the size of informality?

One of the earliest approaches to explaining informality in developing countries is the dual view. According to this view, the informal economy consists of small and marginal enterprises operating outside formal economic arrangements. The economic goal of these informal enterprise is to ensure survival since they will eventually disappear as the

economy grows (Hart, 1973; Thomas, 1992). However, the dualist's characterizations and predictions of the informal economy have come under criticism. This is due to the recognition that, as the contemporary examples above also suggests, the informal economy remains a persistent and growing phenomenon worldwide which is intrinsically linked to the formal economy.

A second view on informality is the structuralist perspective, which tries to explain the rising informality in many economies by looking at how informal micro firms aid larger capitalist companies to cut input and labour costs, and so increase the competitiveness of the latter and encourage more businesses to operate informally (Portes & Schauffler, 1993; Chen, 2012). The structuralist perspective, as we will discuss later, is more concerned with the linkage between formal and informal economies, and gives little attention to the regulatory or governance framework that may drive those economic units to operate informally.

An alternative view on informality, and perhaps still the most influential, is the neoliberal perspective. This approach emphasizes the role of institutions in the emergence and growth of the informal economy. According to this view, high taxation rates, a burdensome regulatory environment and a weak rule of law are among the main factors that explain increasing informality worldwide (De Soto, 1989; Loayza, 1996; De Soto, 2000). In relation to the increasing literature on the role of institutions in development, (Acemoglu & Robinson, 2000; Sokoloff & Engerman, 2000; Henderson et al., 2003), the role of institutions in explaining informality has also been increasingly supported by empirical evidence (Loayza, 1996; Friedman et al., 2000; Loayza et al., 2005; Dabla-Norris & Inchauste, 2007; Torgler & Schneider, 2009; Dutta et al., 2013). Even though most of these studies do not set out to evaluate the validity of the

neoliberal perspective, they provide a theoretical and empirical foundation for further investigation. A recent work by Williams (2017), however, questions the validity of the neoliberal perspective since he found that informality has little or no association with tax rates and corruption. The mixed results in the literature illustrate the ongoing debate regarding the determinants of informality. A more detailed discussion of these findings is presented in the next chapter.

As the debate continues over what causes the rise of informality, this study aims to assess the validity of the neoliberal perspective by examining the role of regulation quality, tax policies, and the rule of law in determining the size of the informal sector.

The theoretical framework that underpins this study is derived from Loayza's (1996) model, in which changes in the quality of government institutions promote an increase in the relative size of the informal economy and so generate a reduction in the rate of economic growth through the congestion of public services. From this framework (Chapter 3), several hypotheses will be examined in this study, hypothesis 1: the size of informal economic activities is greater in countries with higher tax rates and a higher regulatory burden; and hypothesis 2: the size of informal economic activities is greater in countries with a weak rule of law and, subsequently, higher levels of public sector corruption.

Unlike previous published studies, which mostly adopt a macroeconomic cross-sectional analysis, this study seeks to provide new empirical evidence using both micro and macro-level data sets. The findings indicate that tax rates and the quality of regulation play a crucial role in determining the size of the informal economy, consistent with the presented theoretical model. Moreover, the overall findings support

the hypothesis that the size of informal economic activities is greater in countries with a weaker rule of law.

The overall structure of the study takes the form of six chapters, including this introduction. Chapter 2 presents the literature review in four sections. The first section provides an overview of the development of the definitions of the informal economy, while the second section describes the main methods of estimating the size of informality. The main theoretical perspectives on informality are discussed in the third section, while the final section of Chapter 2 is devoted to the neoliberal determinants of informality, reviewing the related literature. Chapter 3 presents the theoretical foundation of the empirical analysis. Chapter 4 presents the macro level analysis of the neoliberal determinants of informality. In the first empirical investigation, macroeconomic panel data for 90 countries (developed, transition, and developing economies) is used to examine the relationships between informality and the institutional determinates including regulation quality and the rule of law. Chapter 5 presents the main empirical contribution of this study, which is based on firm-level data analysis. A sample comprising responses from 4167 firms in 43 countries (from different global regions) is used to investigate the propensity to operate informally given the quality of institutions in a country. Finally, chapter 6 summarizes the results of this work and draws conclusions.

Chapter 2 Literature review

Given the prominence of debates about the informal economy, one might expect to find a consensus about its definition, causes, or measurement that are consistently applied or considered across the whole range of the theoretical and empirical literature. The findings of this chapter indicate otherwise. The literature on the informal economy has been unable to reach any agreement on those aspects. Instead, it turns out that informality is better thought of as a heterogeneous phenomenon, comprising a mixture of economic actors who participate in the informal economy for various reasons. Hence, its definition, determinants and impact vary according to the questions as well as the context of the research.

Nonetheless, investigating informal economic activities requires a clear definition as the question of which activities are included in the definition of informality would have an impact on the interpretations of any estimates of the extent of this phenomenon. Throughout this chapter, the strategy is to present both general reviews of the state of literature on the definitions, measurements, and the theoretical approaches for informality, and conclusions contain what has been adopted and employed in this study.

This chapter first gives a brief overview of the evolution of the concept of the informal economy and presents its contemporary definitions and taxonomy. The second part of this chapter reviews the various approaches that have been used to measure the size of the informal economy. A general review of the main dominant theoretical approaches to informality is presented in the third section, while the fourth part of this chapter focuses on the neoliberal determinants of informality, including the theoretical underpinnings.

2.1 Defining the informal economy

2.1.1 The origins of the concept

There is a consensus in the literature on the fact that the informal sector as a concept was first introduced in 1971 by Keith Hart. Hart, an economic anthropologist, studied the low-income activities among unskilled workers in the slums of Ghana's capital city, Accra, who could not manage to find wage employment. In his paper presented at a 1971 conference on 'Urban unemployment in Africa', Hart argued that: "The urban poor were not 'unemployed'. They were working, although often for low and erratic returns. 'Informal' incomes, unregulated by law and invisible to bureaucracy, were a significant part of urban economies that had grown up largely without official knowledge or control" (Hart, 2010:145). A year later, the term was also used by the International Labour Office Organization Employment Mission to Kenya. The Kenya Mission finds that the traditional sector in Kenya, the "informal sector", comprised efficient and profitable enterprises as well as marginal activities (ILO, 1972; Chen, 2012). These studies used the "informal" concept to describe the economic activities that are carried out outside the formal framework of the economy. At that time, the concept of the informal economy was associated exclusively with analyses of urban labour markets and economic and social processes in less developed countries, and it was usually characterized as an excluded sector in such economies. According to Portes and Haller (2005:404): "The informal economy was taken to refer to an "urban way of doing things" characterized by (1) low entry barriers in terms of skill, capital, and organization; (2) family ownership of enterprises; (3) small scale of operation; (4) labour-intensive production with outdated technology; and (5) unregulated and competitive markets".

It should be noted, however, that the problem of increasing urban masses, supporting themselves in invisible ways, is an older one. According to Hart (2010:143) "in the eighteenth century, Scottish economists wrote about the 'urban riffraff' of Glasgow and Edinburgh. Later, the inhabitants of English city slums were called 'the dangerous classes'. London's East End in the mid-nineteenth century, as captured by Charles Dickens in Oliver Twist, is a stark example of informal economic organization which rivals in scale any of today's tropical slum areas." Also, it also worth mentioning that a similar characterization of informal activities was found in an earlier strand of the literature. These activities were described in terms of "instability", "lack of organization", and being "disorganized" (Williams & Lansky, 2013:356).

2.1.2   Contemporary Definitions

During the 1980s and 1990s the terms of the informal economy debate expanded. This was as a result of the expansion of employment in the informal economy during the periods of economic adjustment or transition that occurred in different regions with different levels of economic development. Examples of these economic developments included changes that were taking place in the developed industrialised countries, in which production was being reorganized into small-scale and more flexible economic units. Also, the economic crisis in Latin America in the 1980s and the Asian economic crisis of the 1990s underlined another feature of the informal economy, that is, employment in the informal economy is also becoming more common during periods of economic crisis, partly as an alternative to open unemployment (Chen, 2012). Thus, the departure from the notion of economic dualism and social marginality was inevitable.

The negative characterization of the informal economy has been challenged by other scholars. De Soto (1989) , for example, sees informal activities as a sign of

entrepreneurial dynamism. As he put it: "the informal economy is the people's spontaneous and creative response to the state's incapacity to satisfy the basic needs of the impoverished masses" (Ibid. 14). The informal economy is no longer viewed as an individual condition but rather a process of income-generation. Castells and Portes (1989:12) indicate that "There is strong evidence of the systematic linkage between formal and informal sectors, following the requirements of profitability". Therefore, the concept of informal economy was redefined as all income-earning activities that are "… unregulated by the institutions of society, in a legal and social environment in which similar activities are regulated" (Ibid).

Using a new institutional approach to economic development, Feige (1990) defines the informal economy when he identifies different types of "underground" economic activities. Feige's taxonomy of the underground economies distinguishes illegal, unreported, unrecorded and informal economies as the following:

1) The illegal economy consists of the production and distribution of legally prohibited goods and services.

2) The unreported economy encompasses the economic activities that circumvent or evade the institutional established fiscal rules as codified in the tax code.

3) The unrecorded economy consists of activities that circumvent reporting requirement of government statistical agencies.

4) The informal economy consists of those economic activities that circumvent the costs and fail to adhere to the government's institutional rules or are denied their protection. (Feige, 1990; Portes & Haller, 2005)

Of course, the overlap between these types of economies is substantial since activities named informal are, for many cases, unreported and unrecorded. However, criminal activities have distinct characteristics that set them apart from the others. Castells and Portes (1989) clarify this distinction in the diagram reproduced as Figure 2.1.

The main difference between formal and informal hinges upon the manner of production and exchange of the goods and services. There is no difference in terms of the character of the final product. After making a clear distinction between these three categories - formal, informal and criminal activities - one can examine their mutual relationships.

From these interrelationships illustrated in part II (Figure 2.1), we can consider the possible heterogeneity of actors and their reasons for taking part in informal activities. These activities are not exclusive to unregistered businesses as in many cases large formal firms also do business in the informal sector.

I.   Definitions:

            + = Licit

            - = Illicit

Process of Production and Distribution	Final Product	Economy Type
+	+	Formal
-	+	Informal
+ or -	-	Criminal

II.   Relationships:
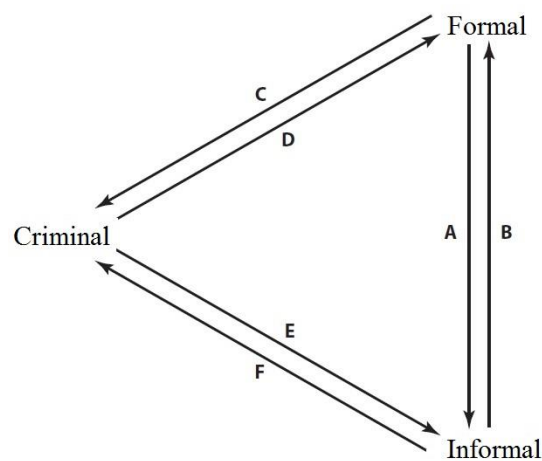
A. State interference, competition from large firms, sources of capital and technology.

B. Cheaper consumer goods and industrial inputs, flexible reserves of labour.

C. State interference and disruption, supplies of certain controlled goods.

D. Corruption, "gatekeeper's rents" for selected state officials.

E. Capital, demand for goods, new income-earning opportunities.

F. Cheaper goods, flexible reserves of labour.

Source: Castells and Portes (1989:14)

Figure 2.1 Types of economic activities and their interrelationships.

Perry et al. (2007) address this heterogeneity and come up with another taxonomy of informality. Based on analysis of data from Latin America and the Caribbean, Perry et al characterize the informal economy as heterogeneous, containing a mixture of economic actors who participate in the informal economy for a variety of reasons. Among them, they find the following:

"Labour

• Workers, particularly the old and young, who would prefer a job with standard labour protections, but are unable to get one;

• Workers who have quit formal sector jobs to start a microbusiness to be their own boss, make more money, and avoid paying social protection taxes; and women leaving formal salaried jobs for the flexibility of balancing home and income-raising responsibilities.

Microfirms

• Microentrepreneurs with no intention of or potential for growing, and hence no intention of engaging the institutions of civil society.

• Microentrepreneurs stymied in their expansion by excessively high barriers to registering with the government and thereby accessing other inputs offered by the informal sector.

Firms

• Firms and individuals avoiding taxation or other mandated regulations because everybody else does, and because enforcement is weak and uneven;

• Firms registering only part of their workers and part of their sales - or declaring only part of the salary of their workers - due to an excessive regulatory burden." (Perry et al., 2007:21-22)

The main contribution made by Perry et al. (2007) was to include the "exit" dimension to the "exclusion" definition of informality. This is explained, for example, by the voluntary informal workers who have the satisfaction of "being their own boss", and by firms choosing to stay informal as a result of their assessment of the net benefits associated with operating formally.

We conclude this survey by the most conventional definition used by the International Labour Office (ILO), in its 90th session (2002). It reflects the main types of informality discussed above and according to its main conclusions, first : The term "informal economy" is preferable to "informal sector" because the workers and enterprises in question do not fall within any one sector of economic activity, but cut across many sectors. Second, the term "informal economy" refers to all economic activities by workers and economic units that are - in law or in practice - not covered or insufficiently covered by formal arrangements (ILO, 2002).

In brief, it appeared that the definition of the informal economy is not settled in the economics literature and it has developed according to changing approaches that try to explain it. As previously mentioned, it was first identified as formal-informal dualism in the context of developing countries and characterized by low capital and small scale of operations taking place outside the formal framework of the economy. This view and its related definition were challenged by other views that redefined the informal economy as all economic activities conducted by various economic units that avoid the cost and

fail to adhere to institutional rules. Based on this more general view, the question of which activities to be included in the definition of informality would depend on the problem at hand.

Finally, it is worth noting that many terms have been used to name this phenomenon including "shadow", "black", "cash-in-hand", "underground", "second", "parallel", "household", "non-observed" and "hidden" economy or sector. Kabra (1995) indicates that some thirty terms are currently being used to describe these activities such as the survival sector, the non-structured sector, transitional activities, and subsistence economy. This multiplicity of adjectives, according to Pedersen (2003) , is due to the fact that it involves very different social and economic factors, depending on the approach to the problem used and the country concerned. Thus, the terminological confusion surrounding the informal economy activities indicates why different fields (e.g. labour economics, sociology, finance, macroeconomics, statistics or criminology) give it a different meaning. Nevertheless, this study adopts the generic term 'informal economy' or 'informality' and applies the contemporary definition of the International Labour Office mentioned above.

2.2 Methods for estimating the informal economy

In the earlier discussion, it was shown how difficult it might be to present one definition or one perspective that presents a complete picture of informality. Measuring the magnitude of informal economic activity is also a potentially challenging task given that such activities are by their nature hidden from the authorities.

Although the debate over what we mean by informality started in developing economies, the first attempts to measure informality were in advanced economies. The increasing role of government in late 1970s translated into higher levels of taxation and higher tax rates in many advanced countries. The intensity of regulation also increased. These developments generated strong motivations for individuals and firms to operate informally to avoid taxes and regulatory constraints. The growing size of informality, according to Tanzi (1999), would distort estimates of the official economy and the tax base. Thus, in many advanced countries, the informal economy had gradually become a phenomenon to worry about and gaining reliable estimates of the size of the informal economy would be useful to policymakers.

Various approaches have been used to measure the size of the informal economy. Thomas (1992); and Schneider and Buehn (2013) present an extensive description of these approaches. The existing methods, however, can be classified broadly into three types according to Perry et al. (2007) : (1) direct methods; (2) indirect methods; and (3) the model approach (Figure 2.2). This section briefly reviews these methods and reports some of the advantages and disadvantages.
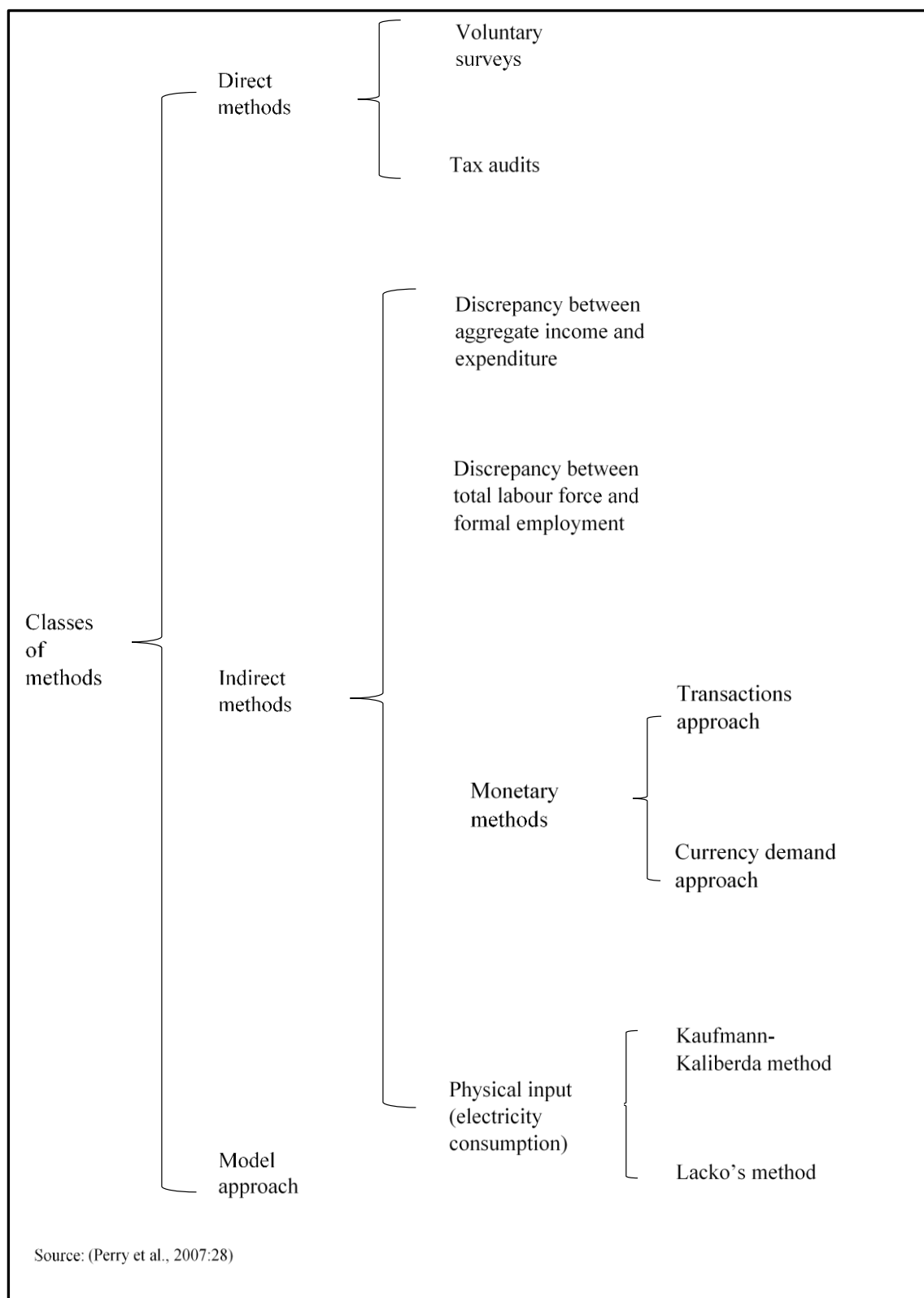
Figure 2.2 Methods for measuring the informal economy

2.2.1   Direct methods

The direct methods, also called microeconomic approaches, consist of voluntary surveys as well as tax audits. Both measures are used to evaluate the magnitude and/or characteristics of informal economy activity in a country.

2.2.1.1   Voluntary surveys

Voluntary surveys can be classified into:

a) Household surveys in which individuals are interviewed and asked about whether they participate in the informal economy over an indicated period as buyers or sellers, and the volume or the value of their exchange. It also contains information on the characteristics of the respondents such as gender, age, and employment status. There are examples of studies that use this measure for a single country as in Ahn and De Rica (1997), and Haigner et al. (2013) in the case of Spain and Germany, respectively. Another example is the survey conducted by European-Commission (2007), which was an attempt to measure the size and structure of informality in the European Union. Household surveys, according to Williams (2006), usually investigate informality only in relation to final demand (consumers spending on goods) rather than intermediate demand (business spending) which accounts for about the third of total spending. Therefore, the direct investigations should also include business surveys.

b) Firm-level surveys, which employ standard survey tools to collect data on the business environment from managers or business owners. They contain information on the characteristics of the firms and deal with a wide range of issues such as finance, competition, infrastructure, and corruption. Regarding

informality, these surveys, such as the World Business Environment Survey (WBES), explore the value of off-the-books purchases and/or sales. Another example of the firm-level survey is the Enterprise Surveys. Both surveys are initiated by the World Bank Group.

2.2.1.2   Tax audits

The auditing of tax returns is the second type of the direct methods. Tax audits are surveys usually carried out by tax authorities in a country, to measure the amount of undeclared taxable income. By investigating the tax returns (or non-returns) of a sample of taxpayers, this measure can be used to measure the size of informality by calculating the difference between the income declared in the tax returns and the income actually found after an audit (Thomas, 1992; Perry et al., 2007). Applications of this measure, however, have been limited to a few advanced economies. Pedersen (2003) cites some studies that reported an approximate estimation of the average size of tax evasion including a study by Simon and Witte (1982) in the USA; a study by Malmer and Persson (1994) in Sweden , and Mogensen (2003) in Denmark.

There are three major critiques of direct methods (surveys and tax auditing) in the literature. First, these surveys are generally not based on a random sample of the population and so there is a possibility of selection bias. The survey method also has the problem of non-responses and/or dishonesty in the responses, which affects the quality and the reliability of the data collected. Another shortcoming of these two direct methods is that they are costly and mostly conducted at some specific point in time. Therefore, it is difficult to create a time dimension for a time-varying estimate of informality (Pedersen, 2003; Williams, 2008; Elgin & Oztunali, 2012).

Despite these difficulties, the micro approaches have produced comprehensive and detailed information about the characteristics of informality. They have also provided some answers to questions of who is working in the informal economy, why and how they operate. In addition, they tend to give a precise idea of which businesses and income groups, in particular, avoid paying their rightful tax. This is not possible with the indirect approaches based on macroeconomic aggregates (Thomas, 1992; Pedersen, 2003).

2.2.2 Indirect methods

Due to the skepticism that many economists feel toward data collected through sample surveys, such as tax evasion or informal work, most studies have concentrated on indirect macroeconomic measures of informality. The alternative methods to measurement rely upon macroeconomic data sources and the ideas underlying them incorporate reasonable assumptions about the behaviour of those engaged in informal economic activities and the macroeconomic implications of this behaviour (Feige, 1990; Thomas, 1992).

2.2.2.1 Discrepancy between aggregate income and aggregate expenditure

The discrepancy between aggregate income and aggregate expenditure measure tries to estimate the size of the informal economy by attributing the discrepancy between aggregate income and expenditure from the National Income and Product Accounts to the informal economy. According to Feige (1990:995-996): "if individuals are less likely to misrepresent their expenditure than they are to misrepresent income, such a method would capture the net difference in misrepresentation on the two sides of the accounts." Therefore, for this technique to work, it is essential to have independent

calculations of aggregate income and expenditure. In practice, however, the application of this method has been limited to a few developed countries. Thomas (1992) provides a critical survey of a number of studies that have attempted to obtain a measure of the size of the informal economy by examining the difference between the estimates of national expenditure and national income. In his conclusion, Thomas (1992) states that in many cases the initial discrepancy does not reflect shadow market activities but is due to other factors, such as measurement problems of both sides of the national income accounts. Thus, great care should be taken to evaluate the quality of national income data and understand the nature of the discrepancy before accepting it as a measure of informality.

2.2.2.2 Discrepancy between total labour force and formal employment

The second indirect method is the discrepancy between total labour force and formal employment. From the employment perspective, the decline in labour-force participation in the formal economy can be seen as an indication of increased activity in the informal economy. This measure is based on the assumption that if labour force participation is constant, then a decreasing formal rate of participation can be interpreted as an indicator of widespread informality. However, the weakness of this measure is that discrepancies between total labour force and formal employment may have other causes. In addition, individuals can work in the informal economy and have a job in the official sector. Therefore, this measure gives weak indicators of the size and development of the informal economy (Schneider & Buehn, 2013).

2.2.2.3 Monetary methods

Currency-based methods have been widely applied for obtaining aggregate estimates of the size and development of informal economies. These measures are based on a basic idea that paying cash is the superior medium of exchange for informal economy

transactions. In the literature, there are two different techniques, which use monetary statistics to measure the size and growth of informality: the transactions approach, proposed by Feige (1979), and the currency demand approach (or Gutmann's method).

The transactions approach , as summarized by Schneider and Buehn (2013) is based on the assumption that there is a constant relation over time between the volume of transactions and official GNP which is given by Irving Fisher's quantity equation, M.V = P.T. Where M is the money stock, V is the transactions velocity of money, P is the average price of transactions and T is the total number of transactions. It is assumed that while incomes from informal activities could be hidden from the authorities, the magnitude of these activities will show up in transactions. Therefore, a comparison of transactions and income may be used to provide information about the informal economy. For this measure to work, additional assumptions have to be made about the velocity of money and about the relationships between the value of total transactions P.T and total (official + unofficial) nominal GNP. Relating total nominal GNP to total transactions, the GNP of the informal economy can be calculated by subtracting the official GNP from total nominal GNP. However, to derive figures for the informal economy, one must also assume a base year in which there is no informal economy and therefore the ratio of P.T to total nominal (official = total) GNP was "normal" and would have been constant over time if there had been no shadow economy.

The argument for the currency demand approach is similar to that in the transaction method. People use cash in order to conceal income generated in the informal economy. The cash deposit ratio is based on three main assumptions. First, there will be a base year in which the informal economy did not exist. Secondly, transactions in the informal economy are carried out exclusively using cash. Finally, the velocity of circulation of

cash is the same in both the formal and informal economy. Given these assumptions, and by estimating a currency demand function over time, an increase in the demand for currency is interpreted as an increase in the informal economy (Schneider & Buehn, 2013). However, these assumptions have been widely criticized as being unrealistic. Thomas (1999) described them as heroic assumptions, which are arbitrary and not derived from any economic theory.

2.2.2.4 Physical input (electricity consumption)

Another indirect approach commonly used is the estimation of physical inputs (electricity consumption). Kaufmann and Kaliberda (1996) were the first to use this method. They assume that the growth of total electricity consumption was the proper indicator for representing the growth in overall (official and unofficial) GDP. According to this approach, the difference between the growth rate of official (registered) GDP and the growth rate of total electricity consumption can be attributed to the growth of the informal economy. The electricity consumption approach was also developed by Lackó (2000) who assumes that a certain part of the informal economy is associated with the household consumption of electricity. This part comprises the so-called household production, do-it-yourself activities, and other non-registered production and services. Lackó further assumes that in countries where the portion of the informal economy associated with the household electricity consumption is high, the rest of the hidden economy (or the part Lackó cannot measure) will also be high (Schneider & Buehn, 2013).

However, these methods have been criticized on several grounds. First, they do not consider technological progress so that both the production and use of electricity are more efficient than in the past. Second, not all informal economy activities require a

considerable amount of electricity and other energy sources can be used. Finally, informal economy activities do not take place only in the household sector (Schneider & Buehn, 2013).

2.2.3   Model approach

All the measurement methods mentioned above consider just one indicator that is assumed to capture the effects of the informal economy. The model approach, however, assumes that the size of the informal economy is an unobserved variable or index which is influenced by numerous factors, and which can be measured via various indicators. The MIMIC (multiple indicators multiple causes) model, proposed by Frey and Weck-Hanneman (1984), comprises two parts, the measurement model and the structural equations model as shown in Figure 2.3. The measurement model links the unobserved variable, the size of the informal economy, to observed indicators, such as the growth rate of official GDP and the labour force participation rate. The structural equations model, on the other hand, links a set of observed causal (determinants) variables which are believed to be important driving forces behind informality, such as the tax burden, tax morality, the rate of unemployment, and the level of development of an economy.
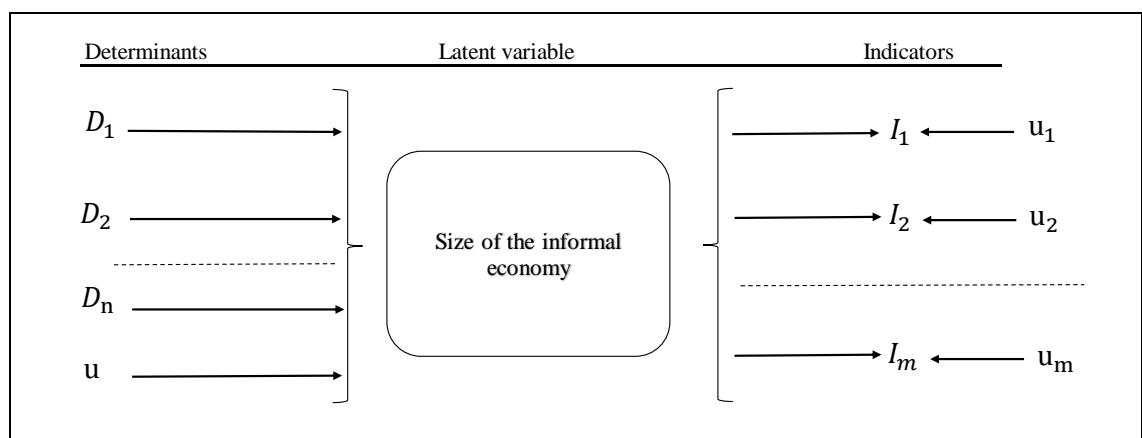
Figure 2.3 The size of the informal economy as a latent variable.

Values of the index over time are inferred from data on causal variables and indicators by estimating the statistical model and predicting the index. The fitted index of informality is then interpreted as a time series of the magnitude of the informal economy (Breusch, 2005a).

Frey and Weck-Hanneman (1984) estimate the relative size and development of the informal economy over time (1960-1978) for 17 OECD countries. Many other economists have used this approach for their statistical analyses of informality. For example, Loayza (1996) for Latin America countries, Giles (1999) for New Zealand, Dell'anno (2003) for Italy, and the study by Schneider et al. (2010), which presents estimations of the size of the informal economy for 162 countries, including developing, Eastern European, Central Asian, and high income OECD countries over 1999 to 2007.

Overall, one of the advantages of the model approach, compared with other methods, is that it can be done with macro data that are easily available to conduct such international comparative studies. Moreover, it allows one to vary the choice of causal and indicator variables according to the particular features of the economy under study, the period in question and the availability of data. However, there are several drawbacks to this approach. It has been found that results are sensitive to transformations of the data, to the units of measurement, and to the sample used. Another problem with this approach is that it lacks a solid theoretical basis for the choice of variables to include as causes or indicators (Helberger & Knepel, 1988; Breusch, 2005b; Perry et al., 2007).

In brief, the question of the size of the informal economy was first considered in the context of developed countries. In such economies, it has been of considerable policy

interest to obtain estimates of the magnitude of the informal economy. This is because the indicators most commonly used to measure the functioning of the economy, namely the behaviour of economic variables, such as the growth of GDP, and the size of the tax base, can be significantly distorted by the existence of a sizable informal economy. This recognition of the importance of such impacts of informality has led to the development of several methods to measure its size, each of which has its advantages and disadvantages.

Tax audits, for example, are used to gauge the extent to which business is evading taxes, while the discrepancy between total labour force and formal employment is used to measure informal employment. Other methods, however, such as the monetary method, uses the cash-deposit ratio that could reflect not only informal activities but also criminal and illegal transactions. In addition, the cash transactions indicators do not take into account characteristics of production and labour markets. These examples show that methods to estimate the informal economy could differ depending on the assumptions about, and the scope of, informal economic activities or participants. At best, these measures, as Thomas (1992) points out, produce a single aggregate figure and tell us nothing about the nature and dynamics of the informal economy. Their limitation, therefore, should be taken into account when considering the implications of empirical studies.

In this study, the key objective is to evaluate empirically the neoliberal explanation for the extent of informality; that is, that informality is mostly determined by the quality of formal institutions. Hence, and in order to cover a large number of countries and regions, the following estimates and proxies for the size of informal economy are used:

- Estimates of the size of informality derived from the model-based (MIMIC) approach of Schneider et al. (2010). It is the largest and most cited data set in the literature and provides estimates of the size and development of the informal economy as a percentage of official GDP for 162 countries from 1999 to 2007.

- Proxies for the extent of informality derived from the World Business Environment Survey (WBES) by the World Bank Group. It is a standard core firm-level survey in which information on hidden sales are provided by a large number of firms from different countries and regions.

2.3 Competing perspectives on the informal economy

As can be seen from the discussion above, informality is not restricted to a single definition. Instead, the defining characteristics of informal economic activities and the determinists of the size of the informal economy have been debated over the years. Some observers take the view that the informal economy is marginal and it is not linked to modern capitalist development. They also believe that informal activities will disappear when an economy achieves a sufficient level of economic development (ILO, 1972; Hart, 1973; La Porta & Shleifer, 2008). Other scholars argue that the way development is structured within capitalist production assists the emergence and perseverance of informal economic activities (Portes & Schauffler, 1993; Wilson, 1998). Others believe that informal economic activities are an economic survival option, which gradually expand in response to hostile legal systems and the limitations of the mercantilist state (De Soto, 1989; Loayza, 1996). Over the years, these debates have crystallised into three dominant views: the dual view, the structuralist view and the neoliberal view. Each is briefly discussed below.

2.3.1 The dual view

The concept of the dual economy was the starting point for the early economic modeling of the labour market in developing countries. In the dual economy there are two sectors, the industrial (modern, capitalist, urban) sector and the agricultural (traditional, subsistence, rural) sector (Thomas, 1992). During the 1950s and 1960s, it was assumed that economic development in less developed nations would, in the long run, create enough modern industrial jobs to absorb the surplus labour in traditional agricultural economies. This would then lead to a 'turning point' when incomes would begin to increase above the subsistence level and so initiate the process of development.

These assumptions were based on Lewis's (1954) theoretical model of development in a dualistic economy. The predictions of the model were supported by the successful rebuilding of some European economies and Japan after World War II. However, by the mid-1960s there was no sign of the 'turning point' of Lewis's model in many developing economies. Instead, it was gradually being recognized that accelerated growth policies were not solving the problems of unemployment and poverty in those countries (Moser, 1978; Chen, 2012).

The findings reported by Hart (1973) and ILO (1972) support the argument that economic development in less developed countries has not provided adequate employment opportunities for all. In fact, in these countries, increasing unemployment rates and the lack of government and institutional support push people to work in the informal economy.

According to the dual perspective, informal enterprises were described by common characteristics such as little capital, low efficiency and technology, and low profits. These enterprises, in general, consist of small marginal activities - different from and not related to the formal sector - which provide income and a safety net for the poor (ILO, 1972; Hart, 1973; Henken, 2005).

The dualist view says that there are two main factors that contribute to informal workers being excluded from modern economic opportunities. First, the rate of population growth is higher than the rate of modern industrial employment. Second, there is a mismatch between people's skills and the structure of these modern economic opportunities. Singer (1970) argues that this tendency arises because of the nature of technological progress. According to him, the technological advances in health and

disease control have led to a significant growth in the population, whereas the extensive use of capital-intensive technology has contributed to the limited creation of jobs (Chen, 2012:5).

The Dualist school, therefore, sees the transition from the informal, preindustrial economy to the formal, industrial economy as the key outcome of economic development. This is can be achieved by imposing policies that encourage the creation of formal and large scale businesses, letting the informal small ones die as the economy grows (La Porta & Shleifer, 2008).

From the discussion above, it is clear that the dual perspective sees informality as a problem related to economic development and unemployment. Indeed, there is a large literature which focuses on these two factors as the main determinants of the size of the informal economy. We briefly present a review of some of the studies that have tried to evaluate the impact of these factors on informality.

Informality and economic development: informality is thought to pervasive in less developed countries. This is, according to the dual view, due to the fact that official economy in those economics has failed to absorb the growing surplus labour in the traditional informal activities. Of course, the phenomenon of informality is not limited to less developed countries only, but it is evident that informality is strongly negatively associated with income per capita, as we discuss below.

Friedman et al. (2000) report a significant negative association between GDP per capita and the size of the informality. These findings are obtained from a cross-country analysis of 69 countries (developed and developing economies). Similar conclusions were reported by Loayza and Rigolini (2006) who look at the trends of employment in

the informal sector in the context of an error-correction framework for a sample of 47 countries. They find that informality is larger in economies with lower GDP per capita and less efficient governance. Furthermore, La Porta and Shleifer (2008) also find evidence from World Bank firm-level surveys which support the dualist hypothesis that informality is large but it decreases sharply in relative terms when the economy develops.

Other empirical evidence, however, has questioned the dualist predictions. Not only does the informal economy show no signs of disappearing, but its size has been stable or it has become larger during periods of economic crisis (Wilson, 1998). For example, Portes and Benton (1984) examine industrial development and labour absorption in Latin American countries from 1950 to 1980. They concluded that informal employment increased to about half the urban labour force during the time of the industrialization process. Such evidence suggest that industrialization in developing countries is a distinctive process, significantly different from that experienced in developed economies and subsequently enshrined in dualist explanation.

Informality and unemployment: high rate of unemployment is also an important factor in explaining informality according to the dualist view. Early literature on informality, particularly in developing countries, sees the participants of informal activities as surplus of labour, who mainly survive at low subsistence levels (ILO, 1972). For example, Swaminathan (1991) indicates that the primary motive for starting an investigation of the informal economy in less developed countries was related to the problems of mass poverty and unemployment. This 'survival' criterion is used as an indicator of divergence between developed and developing countries. While studies in the former show that the informal economy offers potentials for growth, research in the

latter provides evidence that survival is the main feature of informal economy activities (Gërxhani, 2004).

Theoretically, it is ambiguous whether an increase in unemployment should be expected to increase or decrease the size of the informal economy. Frey and Weck-Hanneman (1984) argue that while the demand for informal work increases with unemployment, it is also possible that the supply of such work opportunities falls with rising unemployment. The rate of unemployment is one (of many) indicators for the state of the economy, and when it rises, employers reduce the supply of all jobs, formal and informal (Frey & Weck-Hanneman, 1984:38).

Although the relationship between unemployment and the informal economy is considered to be ambiguous, there is some empirical evidence to support the view that the two may be linked in the sense that some of the unemployed are in fact busy working informally. For example, Tanzi (1999) shows that for OECD economies there is an association between panel data estimates of the extent of informality and unemployment rates. He concludes: "over the years, the unemployment rates have been increasingly broadly in line with the reported increases in the estimates of the underground economy" (p. 343). In addition, Bajada (2005); Bajada and Schneider (2009), examined the relationship between changes in the unemployment rate and informality in some OECD countries. They find support for the hypothesis that the informal economy provides financial support for unemployed.

For many developing countries, however, the statistical relationship between informality and unemployment is problematic. In general, it has been noticed that many developing countries have relatively large informal sectors and relatively low rates of

unemployment. This seemingly paradoxical negative correlation needs an explanation. While it seems plausible that the informal economy is large in such economies, the notion that there are lower unemployment rates in many less developed countries seems less plausible. Hussmanns (2001:5) argues that this is not a consequence of any manipulation of statistics. It is rather due to the fact that the unemployment rate measures only one aspect of the unemployment problem. There are less obvious situations, such as partial lack of work, low employment income, or low productivity, which are not accounted for in unemployment statistics at all.

Certainly, investigating how unemployment rates can explain the variation in informality is a challenging task given the quality of data for these complex multi-determined phenomena. Nevertheless, it is plausible to argue that in countries that lack unemployment insurance or other public relief schemes, few workers can afford to be unemployed. As a result, informality will increase with higher levels of unemployment.

2.3.2   Structuralist perspective

The structuralist view considers the economy to be fragmented with interconnected, and in many cases integrated, sectors rather than being divided into two distinct (formal and informal) sectors. This view was labelled "Structuralist" by Portes and Schauffler (1993) because their main focus was on the analysis of the structural relationships between formal and informal sectors as facets of the same economic system. This analysis begins by observing the complex consequences of excess labour supply created by rural-urban migration. Instead of looking at informality as marginal or residual activities, the Structuralist perspective sees the activities of both informal enterprises and informal wage workers as closely interlinked with activities in the informal

economy. According to this view, informality is the manifestation of subordinated economic units (micro firms) and workers that assist to cut input and labour costs and, thus increase the competitiveness of large capitalist companies. Structuralist theorists, therefore, view the continued and increasing presence of the informal sector as due to current global economic restructuring. They point out that the informal economy is growing in developed capitalist economies, following a logic of keeping wages low and ensuring a flexible labour force that can be employed in booms and dismissed in recessions (Swaminathan, 1991; Portes & Schauffler, 1993; Wilson, 1998).

Portes and Schauffler cite some empirical evidence to support this view. In Guatemala, for example, they reported how several well-known US clothing companies provide local entrepreneurs (contractors) with quantities of pre-cut cloths, design patterns, and sometimes loans for the purchase of sewing machines. These informal contractors employ Indian village women at a rate below the minimum wage and without social security protection (Portes & Schauffler, 1993). More recently, In the BBC's Panorama, "Undercover: The Refugees Who Make Our Clothes", shown on 24 October 2016, reporter Darragh Macintyre discovers how tens of thousands of Syrian refugees and their children are working illegally and in harsh conditions in the Turkish garment industry, in the supply chains of some of the best-known brands in the UK.

In summary, these examples illustrate that the nature of capitalist development (rather than a lack of growth) is what gives rise to and persistence to informal production relationships. They also show, contrary to the dualist view, that informal economic activities are not necessarily traditional or marginal, but can be closely interconnected with the modern capitalist economy (Portes & Schauffler, 1993; Chen et al., 2004). However, the structuralist view presents an inadequate explanation of informality as it

failed to address the importance of the regulatory, policy, and governance environment in which the informal economic activities increase in size, and in many cases they are found to be linked to the official economy.

2.3.3   Neoliberal perspective (Legalist school)

Based on a neoliberal ideology, this perspective is advocated by De Soto (1989; 2000), who argues that the informal economy consists of small scaled businesses and individuals who choose to operate informally to avoid the costs of formal registration. De Soto sees informal firms as economic forces that have entrepreneurial energy but are held back by government regulations and weak systems of formal property rights. Reducing entry regulation and improving property rights would unleash this energy, and this, in turn, leads to enhance growth and development. The importance of the work of De Soto and other legalists, as we shall discuss below, is that it has caused a shift of the focus of the debate about informality towards the role of institutions, power and politics in determining informality and development.

De Soto's first book, titled The Other Path: The Invisible Revolution in The Third World (1989), is a result of different research projects conducted by *The Instituto de Libertady Democracia* (ILD) of which De Soto is president. ILD's research-generated information which fed directly into De Soto's premise that "this 'other' economy, which is not 'underground' but in fact operates quite openly, actually constitutes the heart of Peru's real economic life". De Soto and the ILD gathered information and statistics on different economic aspects including housing, transportation, and trade. They also tried to measure revenue generated by the informal economy in Peru. The data showed that

the widespread informal economic activities in Peru reflected an important aspect of the people's battle for economic rights (Marquez, 1990).

The information on informality in Peru was obtained by using an observational approach in which various experiments were conducted to calculate the access costs of the formal economy. For example, De Soto and the ILD's research team set up a small business (clothing factory) in the suburbs of Lima and examined the process of registration. They reported: "During the months the experiment lasted, government officials asked for bribes ten times... Licenses and other requirements cost 195 dollars, and the loss in utilities caused by the ten-month waiting period was estimated at 1,037 dollars. The total cost of legal registration was equivalent to 32 times the minimum monthly salary" (Loayza, 1996:132). In comparison, Chickering and Salahdine (1991) report that the process of registration small factory takes only about four hours in Florida and New York .

De Soto's main conclusions in his first book are as follows:

- The legal environment in a country seems to be the best explanation for the existence of an informal economy.

- Businesses and individuals usually evaluate the relative costs and benefits of entering existing legal systems before making the choice between working formally or informally.

- The differences in the level of economic developments between nations around the world can be explained by the quality of the legal systems.

In this view, the answer to the problem of informality would thus be to reduce state regulatory barriers that prevent flexibility and force up labour costs and to remove the

welfare constraints which consider as a disincentive for seeking formal jobs. These policies would help popular entrepreneurship, and ultimately the economy to flourish (Williams & Lansky, 2013)

However, the policy solution advocated by De Soto's perspective faced two main criticisms. Firstly, it has been argued that removing all state regulation, at one extreme, would lead to the elimination not of the informal economy, but of the capitalist market. This is because the rational basis for long-term capitalist investment and planning are largely dependent on state agencies that must oversee transactions and guarantee the observation of contracts. The regulated economy is, therefore, the proper realm of modern capitalism. The second criticism focuses on the existence of some counter-examples to De Soto's view that the origins of informality lie in the extensive regulation of the economy. Many economies in northern Europe, for example, are highly regulated but they do not have large informal sectors (Portes & Schauffler, 1993).

De Soto's second book, The Mystery of Capital (2000), makes the more realistic demand that the legal system should be sufficient to promote economic development. Regulation should make the costs of formality less than the cost of informality. In this book, he focuses on the importance of the institution of formal property rights and the rule of law in development and the question of how these institutions can explain the persistence of informality. He argues that the system of formal property rights, particularly for land and housing, is weak in developing countries. This prevents informal workers in these countries from obtaining a legal title to property and, consequently, from using these assets as collateral to obtain formal loans for investment in businesses.

There are some researchers who applied De Soto's methodology to different economies. Tokman (1992), for example, assesses the cost of the registration procedure in a group of Latin American countries. He finds that the high access cost to the formal economy is the main reason why small firms become informal. However, the strong emphasis on the role of institutions was supported by the work of Loayza (1996). Loayza presents theoretical and empirical analyses that support the legalist view. Using data from Latin American economies, he finds that the size of the informal economy depends negatively on the quality of institutions measured by the quality of bureaucracy, corruption and rule of law. Loayza's results also indicate that the size of informality depends positively on proxies for the tax burden and restrictions on the labour market.

In brief, the development of the informal economy is commonly analysed through three competing perspectives. The dualist view emphasizes that informal economic activities are marginal and take place largely outside the formal relations of production. For the structuralist school, formal and informal modes of production not only co-exist but are intimately connected and interdependent. The neoliberal view, on the other hand, focuses on explaining the behaviour of micro-entrepreneurs who seek to avoid the costs associated with formalising their businesses.

From our the discussion of these perspectives, it appears that although the neoliberal perspective acknowledges the dualist's description that informality serves well for the survival purposes, it argues that informality is the main reason for poor countries remaining poor. According to De Soto (2000), this is because a large proportion of resources held by informal economic units cannot be used productively due to missing information and a lack of formal property systems, which results in an inability of capital accumulation in the developing economies.

It also seems that, unlike the dual perspective, the neoliberal and structural approaches are relatively close in their characterization of the informal economy since they both focus on the dynamic interrelationship that exists between informal workers on the one hand and the state/capital relationship on the other. Yet, the neoliberal perspective goes beyond merely providing descriptions of the informal economy. By analysing micro-level mechanisms, under which informal economic activities evolve, the neoliberal perspective has shifted the attention towards the importance of institutions for reducing informality and for resolving the problems of marginalisation and poverty.

Based on above, the neoliberal institutional argument seems to be more compelling and it has received more attention in recent literature on informality. The growing dominance of the neoliberal explanation is related to an increasing interest in the role of institutions in development. Many studies emphasize how the quality of institutions can explain better economic growth and enhancements in the quality of life (Acemoglu & Robinson, 2000; Sokoloff & Engerman, 2000; Henderson et al., 2003). As the research on the institutional determinates of development has gained prominence, the impact of institutional factors on informality has also been increasingly supported by empirical evidence (Loayza, 1996; Friedman et al., 2000; Loayza et al., 2005; Torgler & Schneider, 2009; Dutta et al., 2013).

However, as we shall discuss later, most previous published studies are limited to using aggregate data to make cross-country comparisons. This study, however, seeks to contribute to existing research by conducting both micro and macro level empirical investigations to evaluate the importance of the neoliberal determinants of informality, namely regulation quality, tax policies, and the rule of law. These determinants are reviewed in the following section.

2.4 Neoliberal determinants of the size of the informal economy

The previous section has presented three different explanations for the informal economy and concluded that the neoliberal perspective provides a wider scope than the dual and structural views by emphasising the role of institutions in determining the extent of informality.

The most broad and frequently cited definition of institutions is North's (1991), who described it as "the humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)" (p.97). Sindzingre (2006:65) further explains: "formal constraints are 'created', written, and intentional, whereas informal constraints evolve over time and are unwritten. The role of institutions is to reduce uncertainty, introduce regularity, and stability by establishing a stable (but not necessarily efficient) structure to human interaction".

It is clear from above that the work of De Soto has been central in exploring the impact of formal institutions on informality. Therefore, and in order to assess the validity of the neoliberal perspective, this study will be focusing on the formal constraints. Specifically, it investigates whether business regulation, corruption and the rule of law can explain the evolution and persistence of informality. Before proceeding, we should consider the role of these factors in the existing literature where we can review the empirical evidence that support the inclusion of these factors in the analysis.

2.4.1 Quality of institutions - regulations and tax burdens

As noted earlier, for the neoliberal perspective, excessive regulations not only raise barriers to working formally but also raise costs to operating formally. Although the regulations are designed to achieve specific objectives (e.g. provide job security, minimum wage, increase public revenue, health and safety etc.), they can also unintentionally increase the cost and barriers to investing in the informal economy (Andrews et al., 2011).

There is a large literature detailing how regulation can drive firms into the informal economy and how they can avoid some or all of these regulations. For example, a cross-country study of 85 nations by Djankov et al. (2002) presents data on the regulation of entry of start-up firms. The data cover the number of procedures, official time, and the official cost of starting up new businesses formally. The study indicates that the regulation of entry varies enormously across countries. In the Dominican Republic, for example, firms had to complete 21 procedures over 80 business days with fees of 463% of GDP per capita, whereas establishing a new firm in Canada required only two procedures over two days with fees of 1.4% of GDP per capita. Djankov et al. (2002) then examine the association between these regulatory cost variables and other social and economic outcomes including, among others, economic development, corruption, and informality. They conclude that countries with higher regulation entry-cost have larger informal economies, lower quality of public or private goods, and lower GDP per capita.

Auriol and Warlters (2005) argue that informality is larger in less developed countries than in rich countries because of the higher fixed costs of entry into the formal economy in developing countries. In their investigation of why the direct tax base is so low in

developing countries, they found that restricting official market entry is a deliberate policy of raising tax revenue by allowing only a relatively small number of larger companies to enter the underlying markets. Hence, a few large taxpayers account for a large proportion of total tax collection and contribute to raising overall tax revenues in developing countries. Using macroeconomic cross-country data, their empirical evidence indicates that a 1% increase of entry sunk cost increases the informal sector by 14%. This large impact of market entry fees on the emergence of the informal economy can be explained, according to Auriol and Warlters (2005), by the feedback effects between the cost of entering the formal market and the growth of the informal economy: when higher entry fees leads to an increase in the size of the informal economy, the government would consider raising taxes and entry fees to compensate for the narrowness of the tax base. But this, in turn, will also lead to further increase of informal economic activities. Loayza et al. (2005) study the impact of regulation on growth and the informal economy in a sample of 75 countries (industrial and developing economies). They employ aggregate indicators in cross-country regressions and find that a heavier regulatory burden decreases growth and increases informality, particularly in countries with poor quality of governance.

Similar results are found by Dabla-Norris and Inchauste (2007), who use firm-level data on transition economies to examine the role of informality as a channel through which regulatory constraint affects firm growth. They conclude that firms increase the size of their informal activities with a higher tax and regulatory burden, but reduce it with better enforcement quality.

Ulyssea (2010) examines the effect of the regulation of entry on the size of the informal economy using Brazilian data. The results indicate that high entry costs are associated with higher informality measured by informal employment.

Together, these findings support the neoliberal argument that the magnitude of entry costs into the formal economy is a crucial determinant of the size of the informal economy.

The neoliberal view also assumes that the increase in the tax burden is one of the main causes of the increase in the size of the informal economy. However, Friedman et al. (2000), using macroeconomic indicators of 69 countries (developed, transition and developing) find that higher marginal tax rates do not appear to be associated with a larger informal economy. Informality in this study was measured as a percentage of GDP. In their sample, however, it appears that higher tax rates are associated with more tax revenue, a stronger legal environment, and less unofficial activity.

Similarly, a recent article by Williams (2017) has critically evaluated the neoliberal tax rate hypothesis as well as the neoliberal corruption hypothesis in relation to 36 developing and transition economies. A different definition for informal economy was used in this study: the level of employment in the informal economy. By using Spearman's rank correlation in a bivariate analysis, Williams (2017) evaluates the association between five different tax rate indicators and the level of informal employment, and finds no evidence to support the hypothesis that the share of the workforce in the informal economy falls as tax rates rise.

The explanation in the literature, as in Friedman et al. (2000:481), is that "a great deal depends on how the tax system is administrated". It is important, therefore, that one

should consider the interaction of tax rates with the regulatory environment. The impact of regulation and tax rates is likely to be affected by the institutional context in which they are imposed (Loayza et al., 2005). Indeed, quality of institutions regarding corruption and rule of law is, potentially, the strongest determinant of informality which should not be overlooked. The following section examines the empirical evidence available in the literature to support this hypothesis.

2.4.2 Quality of institutions - Corruption and the rule of law

It has been argued that workers and businesses make a rational economic decision to voluntarily exit the formal economy due to three main factors: high tax rates, a burdensome regulatory environment and a corrupt public sector (Williams, 2017). The first two factors were discussed in the previous section and it was concluded that the implementation of tax policies and other business regulations depend upon the quality of government institutions. This section, therefore, reviews the literature on the relationship between informality and specific proxies for the quality of government institutions: public sector corruption and the rule of law.

The literature on the informal economy and corruption in developing countries finds that a high level of corruption is a significant influence on the growth of the informal economy in a country. Substantial corruption among law enforcement authorities, financial agencies, bureaucrats, politicians, and other regulators essentially means more bribery and greater rent seeking in the formal sector. Thus, the cost of creating new businesses and staying in business in the formal sector may become prohibitively costly. Consequently, informal businesses may provide viable alternatives (Saha, 2001; Dutta et al., 2013).

The relationship between informality and corruption has gained growing attention in the literature since the 1990s, when studying corruption and its implication for markets and for the public sector was attracting a lot of attention around the world. (Tanzi, 1994); Tanzi (1998), for example, who defined corruption as "the abuse of public power for private benefit", concludes that acts of corruption by public officials play a role in encouraging or sustaining informal economic activities and facilitating tax evasion. This view based on a theoretical presumption that economic agents are usually not willing to accept extortionate demands from corrupt officials. Rose-Ackermann (1997:21) argues, "Going underground is a substitute for bribery, although sometimes firms bribe officials in order to avoid the official states"[2]. In addition, Choi and Thum (2005) develop a theoretical framework in which they show that the entrepreneurs' option to escape to the informal economy limits the corrupt official's ability to introduce distortions to the economy for private gains. They conclude that in the presence of corruption, informal activities act as a complement to the official economy and therefore any efforts to eradicate the informal economy without tackling the fundamental problem of corruption would be counterproductive.

The rise of informality due to corruption is to some extent related to the debate about the effect of corruption on the official economy and its growth. For some writers, corruption can have a positive impact on growth; it 'greases the wheels of an economy,' in that it helps to circumvent regulatory and administrative restrictions (Lui, 1985; Egger & Winner, 2005; Saha & Ali, 2017). Most researchers, however, take the position that widespread corruption lowers investment, thereby lowering economic growth in the formal economy. Mauro (1995) finds a significant negative association between

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[2] This quotation appears in Schneider and Enste (2000:91)

corruption and investment as well as economic growth in a cross-section study of 67 countries. Johnson et al. (1999) also examine the relationship between corruption and GDP growth and the informal economy (measured by electricity consumption) for a sample of 49 countries from different world regions. They find a significant negative impact of corruption on growth, as well as a strong support for the proposition that countries with more corruption tend to have a larger informal economy.

The impact of institutional quality on the size of the informal economy has been examined by a few papers. Torgler and Schneider (2009), for example, argue that in economies where corruption is systemic and accountability and transparency is not the norm it cannot be expected that the commitment of paying taxes is an accepted social norm. The lack of rule of law may undermine the willingness of economic agents to be active in the formal economy. This is because individuals will feel cheated if they believe that corruption is widespread, their tax burden is not spent well, and that they are not protected by the rules of law. Such tendencies might have a strong impact on the size of the shadow economy.

There are a few other studies, which empirically investigate the relationship between informality and corruption either in a single country or for a sample of countries, including Loayza (1996); Friedman et al. (2000); Johnson et al. (2000); Dutta et al. (2013). Most of the studies use macro data, such as the amount of cash in circulation, electricity consumption, or employments statistics as measures of informality, with the exception of Johnson et al. (2000), who analyse firm-level data and use the level of underreported sales (as a percent of total sales) as a proxy for informality.

Friedman et al. (2000), investigate the determinants of informal activity in 69 countries and they conclude that: "In summary, the relationship between share of the unofficial economy and rule of law (including corruption) is strong and consistent across eight measures provided by six distinct organizations. The results from all eight of the indices suggest that countries with more corruption have a higher share of the unofficial economy" (p. 180).

Similar results are reported by Johnson et al. (2000) who use firm-level data for only five post-communist transition countries to investigate the reasons why firms hide their activities. They concluded that informality is larger in countries where entrepreneurs are more likely to pay bribes and where entrepreneurs have less faith in the legal system (p. 514).

Dutta et al. (2013) analyze the corruption-informality linkage in India. Their findings indicate that a higher level of corruption is associated with larger informality (measured by the level of employment in the informal sector). They also show that this association becomes weaker as state-level productivity rises.

Likewise, Williams (2017) found that the share of the workforce whose main job is in the informal economy is higher in economies with higher public sector corruption levels. These findings emerge when the study measures corruption using Transparency International's Corruption Perceptions Index for 36 developing and transition economies. However, no significant correlation is identified between corruption and informal employment when using firm-survey data on making informal payments to public officials.

Overall, these empirical results provide statistical evidence that support the neoliberal explanation. It appears that most of these studies use macroeconomic indicators in cross sectional analysis and show statistical correlation between informality and the quality of institutions measured by factors such as the rule of law and regulation quality. These findings provide a motivation for conducting more comprehensive analysis of the reasons why firms choose to operate in the informal economy. Nevertheless, and before turning to our main empirical investigation, a simple theoretical model is presented below to summarize the above discussion and to provide a foundation for our suggested testable hypotheses.

In this section, it has been argued that informality is a product of, among other factors, high taxes, public sector corruption and poor quality institutions in general. As we have shown, several cross-country studies have investigated the relationship between informality and each of those factors and they provide empirical evidence that support the neoliberal argument. In the following chapter, we present a simple theoretical framework to underpin the empirical analysis and explain why economic agents choose to operate in the informal economy.

Chapter 3 Theoretical underpinning

Previous research suggests an association between informality and a number of indicators that represent the quality of institutions and regulations. Here we present further theoretical discussion to model entrepreneurs' choice to operate informally given the formal regulatory environment and quality of institutions. In this study we follow Loayza (1996) as this helps to organize some of the information on the neoliberal determinants of informality and to generate empirically testable hypotheses.

Loayza (1996) follows De Soto's analytical framework on the informal economy. Accordingly, informality thrives when higher taxes and complicated regulations are imposed by states that lack the ability to enforce compliance. In his paper, Loayza studies the determinants of the informal economy and its relationship to output growth in an endogenous growth model in which the production function depends fundamentally on tax-financed public services. One of the main conclusions of Loayza's model is that changes in the quality of institutions encourage an increase in the relative size of the informal economy, which will cause a decline in the rate of economic growth through the congestion of public services.

Following Loayza (1996), we begin by outlining the main assumptions as follows:

i. The economy is populated by agents endowed with a starting level of capital (physical and human capital).

ii. Agents operate a production function that exhibits constant returns to capital to produce a single good.

iii. Raw labour is not an input of production.

iv. The capital rate of return depends on the available amount of public services relative to aggregate production. This assumption is based on the work of Barro and Sala-I-Martin (1992) who argue that an individual's decision to expand his own capital and hence output congests the facilities available for other producers.

The simple function of production is then given by:

$$Y_i = A \left(\frac{G}{Y} \right)^\alpha k_i , \quad 0 < \alpha < 1 \qquad (2.1)$$

Where Y_i is the production output by agent i, and k_i is the capital owned by agent i, A is an exogenous productivity parameter, G is the flow of public services, Y is total production in the economy, and α is the elasticity of output with respect to $\frac{G}{Y}$, which measures the productivity of public services relative to private services.

There are two sectors in which economic units choose operate at any point in time: the formal and informal sector. Formal agents pay income tax and/or corporation tax, which are used for financing public goods and enforcement systems. It is possible though that tax returns can be wasted or misused depending on the quality of institutions and governance. Informal agents, on the other hand, pay penalties, which are not used to finance public goods. Also, they have access only to a fraction of available public services.

Therefore, according to the sector agent i belongs to, his net-of-tax/penalty income is given by:

$$y_i^F = (1 - \tau) A \left(\frac{G}{Y} \right)^\alpha k_i , \qquad 0 < \tau < 1$$

$$(2.2)$$

$$y_i^I = (1 - \pi) A \left(\frac{\delta G}{Y} \right)^\alpha k_i , \qquad 0 < \pi < 1$$

Where τ is the tax rate, π is the effective penalty rate, δ is the fraction of public services available to informal units, and the superscripts F and I denote, respectively, formal and informal status.

The effective penalty rate, π, is assumed to depend on both the quality of rule of law and the level of public dissatisfaction with the informal sector. This dissatisfaction, according to Loayza (1996), is due to the fact that an increase in the relative size of the informal economy is most likely associated with a decrease in everyone's productivity. The strength of the legal structure and the enforcement system determines the ability to detect and punish informal activities and therefore it affects the effective penalty rate.

The penalty rate is given by:

$$\pi = \pi (\lambda, I), \quad 0 < \lambda \leq 1 \qquad (2.3)$$

$$\frac{\partial \pi}{\partial \lambda} > 0, \quad \frac{\partial \pi}{\partial I} > 0$$

In (2.3), λ is the strength of the enforcement system, I is the relative size of the informal economy which measures public dissatisfaction with the effects of informality on capital's rate of return. By assuming that the effective penalty rate partially depends on the size of the informal sector, Loayza suggests a simple way to endogenize public policy in the face of informality.

A simple functional form of equation (2.3) (after presenting positive interaction between the parameters λ and I) is given by:

$$\pi = \lambda I \qquad (2.4)$$

The relative size of the informal economy in equilibrium can be determined by restricting ourselves to the study of an interior solution. Given that economic agents can move freely between the two sectors, in equilibrium the formal and informal rates of return must be equalized at all times. From the two equations in (2.2) we obtain:

$$(1 - \pi)\delta^{\alpha} = (1 - \tau) \qquad (2.5)$$

When $\pi = \lambda I$, from equation (2.4), we have

$$(1 - \lambda I)\delta^{\alpha} = (1 - \tau)$$

$$\delta^{\alpha} - \delta^{\alpha}\lambda I + \tau - 1 = 0$$

$$\delta^{\alpha} + \tau - 1 = \delta^{\alpha}\lambda I$$

Therefore[3]

$$I = \frac{\delta^{\alpha} + \tau - 1}{\delta^{\alpha}\lambda} \qquad (2.6)$$

The expected signs of the parameters will be obtained by taking the partial derivative of I with respect to each parameter as follows:

$$\frac{\partial I}{\partial \lambda} = \frac{-(\delta^{\alpha} + \tau - 1)}{\delta^{\alpha}\lambda^{2}}$$

$$\frac{\partial I}{\partial \tau} = \frac{1}{\delta^{\alpha}\lambda}$$

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[3] From equation (2.6), an interior solution for I requires the following parameter restrictions:

$$\delta^{\alpha} + \tau - 1 > 0 \quad (\Rightarrow I > 0)$$

$$(1 - \lambda)\delta^{\alpha} + \tau - 1 < 0 \quad (\Rightarrow I < 1)$$

$$\frac{\partial I}{\partial \delta} = \frac{\alpha \, \delta^{\alpha-1} \, \lambda \, (1 - \tau)}{(\delta^{\alpha} \, \lambda)^2}$$

$$\frac{\partial I}{\partial \alpha} = \frac{- (\tau - 1) \, \ln \delta}{\delta^{\alpha} \, \lambda}$$

recall that : $0 < \tau < 1$ *from equation* (2.2),

$$\Rightarrow \; I = \; I \, (\underset{\lambda}{^{-}}, \, \underset{\tau}{^{+}} , \, \underset{\delta}{^{+}} , \, \underset{\alpha}{^{-}}) \quad (2.7)$$

The results from (2.6) and (2.7) show that: (a) the informal economy decreases when enforcement strength rises. Of course, higher level of the quality of government institutions enables strengthening enforcement efficiently. (b) If the tax rate increases and, therefore, motivation to avoid taxes rises, the size of informal economy increases. (c) If a smaller share of public services is available to informal units, the size of informal economy drops. (d) When the productivity of public services is relatively higher, the extent of informality is expected to be lower. This is because informal producers consume public services but they do not contribute to financing them; therefore, a smaller informal economy is expected to be associated with a more productive public services sector.

Building on the above, there are two main testable hypotheses for the determinants of informality:

Hypothesis 1: the size of informal economic activities is greater in countries with higher tax rates and higher regulatory burden.

Hypothesis 2: the size of informal economic activities is greater in countries with a weak rule of law and, subsequently, higher levels of public sector corruption.

Based on the above theoretical analysis, and with the aim of providing new empirical evidence, this study empirically evaluates the neoliberal hypotheses using two types of analysis and data sets. First, we examine the determinants of the size of informality using panel data analysis for macroeconomic variables. The second empirical investigation uses firm-level data in an ordered probit model.

Chapter 4 Macro level analysis

The availability of macroeconomic indicators or proxies for informality and institutional quality can be useful for conducting our first empirical investigation to find out whether institutional factors such as regulation and the rule of law have a significant influence on the size of the informal economy. This chapter describes the data, the empirical approaches, and the specification of the estimated equations.

4.1 Data and summary statistics

4.1.1 Data and sample size

Data for the size of the informal economy is from Schneider et al. (2010), where informality is measured as a percentage of the official GDP. The main reason for choosing this data is that, unlike other measures of informality, the estimations provided by Schneider et al., as we discussed in section 2.2, are based on a unified methodology (Multiple Indicators Multiple Causes, MIMIC[4]) that provides estimates for the extent and development of informality during the period from 1999 to 2007, and for 162 countries across different regions. This helps in increasing the number of observations used in the panel data analysis. The other macroeconomic proxies for the size of informality such as electricity consumption and informal employment, however, usually lack a consistent measurement over a range of time points or across a large number of countries. Thus, they are more commonly used in studies that rely on cross-county regression analysis (Johnson et al., 1999; Ulyssea, 2010; Williams, 2017).

Data on the quality of business regulation is taken from Economic Freedom of the World (EFW) Index from the Fraser Institute. The business regulation index aggregates

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[4] For a detailed explanation of the MIMIC approach, see section 2.2.3.

sub-components that measure regulatory aspects such as the bureaucracy cost, licensing restrictions and the cost of tax compliance. This index is designed to identify the extent to which regulations and bureaucratic procedures restrain entry and reduce competition. The business regulation index is placed on a scale from 0 to 10, where higher values correspond to good quality of business regulatory environment.

Two proxies are used for the quality of institutions regarding the rule of law in a country. First, aggregate data from the Corruption Perception Index (CPI) by Transparency International provides perceptions of business people and country experts of the level of corruption in the public sector. Note that on the original scale, the index has a range from 0 (highest corruption) to 10 (no corruption). For "increasing corruption" interpretation, the index was rescaled (taking values from 0 to 10) so that higher values represent greater corruption. An alternative proxy for the rule of law is the composite indicator of legal structure and security of property rights (Economic Freedom of the World, EFW Index) from the Fraser Institute. This Index indicates how well the protective function of government is performed by aggregating seven components: (1) judicial independence, (2) impartial courts, (3) protection of property rights, (4) military interference in rule of law and the political process, (5) integrity of the legal system, (6) legal enforcement of contracts, and (7) the regulatory restrictions on the sale of real property. The legal structure index ranges from 0 to 10, where higher values indicating a better rule of law.

Another commonly used measure of corruption is the index from the International Country Risk Guide (ICRG). This measure captures forms of political corruption that can cause risks to foreign investment, due to demands for special payments and bribes connected with import and export licences and exchange controls. The ICRG measure

tends to be less preferred by researchers to the CPI index, which measures corruption in the public sector. However, for robustness analysis, the corruption ICRG index is also used. This index is compiled by Political Risk Services and its original scale varies from 0 (no corruption) to 6 (highest corruption). For "increasing corruption" interpretation, the corruption ICRG index is also recoded so that its scale ranging from 0 (lower levels of corruption), to 6 (higher level of corruption).

Information about other possible economic determinants of informality is also included in the analysis. Data for unemployment rate, industry as value added (% of GDP), and GDP per capita (constant 2005 US$) are taken from the World Bank. The reasoning behind their inclusion is discussed in section 2.3.

Due to the availability of information about informality and institutional indicators, the period of study is nine years i.e. from 1999 to 2007, and the data obtained are reported annually. The choice of countries selected is largely dictated by the availability of data for all variables used in this part of the study. Appendix A lists the 90 countries from various global regions which are included in the empirical analysis. However, in some models the number of countries is reduced to 80 due to data availability of the variables.

4.1.2 Descriptive statistics

Table 4.1 reports the summary statistics of all the variables used in the analysis. The dataset is a balanced panel data set with 90 countries over 9 years from 1999 to 2007. The simple pair-wise correlations between the variables are reported in Table 4.2.

Based on the previous discussion of the literature (sections 2.3 and 2.4), the expected sign of the relationship between informality and each of the suggested determinants is reported in Table 4.1, which corresponds to correlation coefficients in the first column

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of Table 4.2. The relationship between the institutional factors and informality can be further examined by using simple cross-country correlation analysis.

Table 4.1 Basic summary statistics – macro level data

Variable	overall	Mean	Std. Dev.	Min	Max	Observations		Expected sign
Informal economy (%GDP)	overall	33.31	12.21	8.40	67.70	N =	801	
	between		12.25	8.63	66.07	n =	90	
	within		1.24	24.56	37.30	T =	8.9	
Corruption CPI	overall	6.05	1.80	0.60	9.00	N =	685	+
	between		1.72	0.74	8.37	n =	90	
	within		0.32	4.95	7.31	T bar = 7.61		
Legal structure	overall	5.36	1.59	1.40	9.30	N =	677	-
	between		1.49	2.46	8.83	n =	90	
	within		0.52	2.68	6.99	T bar = 7.52		
Business regulation	overall	5.27	1.02	1.80	8.30	N =	599	-
	between		0.81	3.40	7.31	n =	90	
	within		0.60	3.67	7.37	T bar = 6.65		
Unemployment	overall	9.46	6.56	0.70	38.70	N =	810	+/-
	between		6.36	1.29	34.34	n =	90	
	within		1.70	0.24	17.74	T =	9	
Industry	overall	31.46	10.01	8.54	72.72	N =	762	-
	between		9.65	14.26	66.01	n =	87	
	within		2.61	21.14	47.08	T bar = 8.75		
Log GDP per capita	overall	7.89	1.42	5.31	10.72	N =	801	-
	between		1.42	5.36	10.66	n =	90	
	within		0.11	7.50	8.33	T =	8.9	
Corruption ICRG	Overall	3.43	0.99	0.00	5.5	N =	765	
	between		0.84	0.55	4.83	n =	85	+
	within		0.53	1.32	5.04	T =	9	

Table 4.2 Correlation matrix – macro level data

	Informal economy	Corruption CPI	Legal structure	Business regulation	Unemployment	Industry	Log GDP per capita	Corruption ICRG
Informal economy	1.00							
Corruption CPI	0.56*	1.00						
Legal structure	-0.59*	-0.83*	1.00					
Business regulation	-0.39*	-0.67*	0.70*	1.00				
Unemployment	-0.06	-0.04	0.01	-0.06	1.00			
Industry	-0.16*	0.07	0.04	-0.15*	0.12*	1.00		
Log GDP per capita	-0.55*	-0.78*	0.68*	0.49*	0.06	0.27*	1.00	
Corruption ICRG	0.38*	0.75*	-0.57*	-0.53*	0.00	0.15*	-0.51*	1.00

Notes: The correlation coefficient is the Pearson r. The pairwise correlations are calculated using the statistical software STATA 14.
* Correlation coefficients significant at the 5% level.

Figures 4.1 and 4.2 show scatter plots that represent the relationship between the rule of law indices (corruption and legal structure) and the size of the informal economy using average data for the 90 countries during the period 1999-2007.
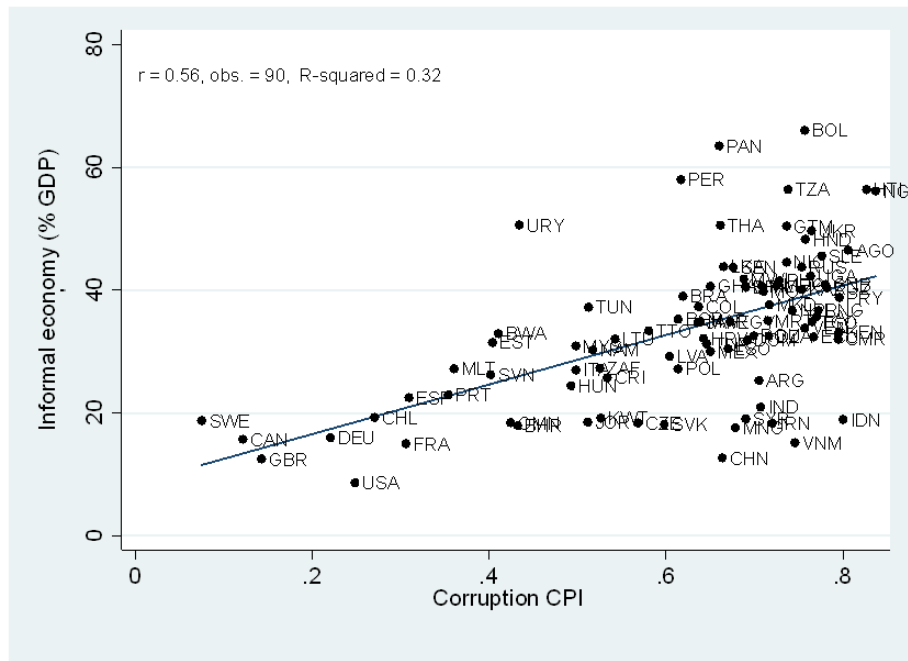
Figure 4.1 The informal economy and corruption (CPI index)

Figure 3.1 suggests that economies with higher levels of public sector corruption tend to be more informal. The CPI index of corruption shows a significant associations between cross-national variations in the size of informality and levels of public sector corruption

(r = 0.56). Observations reflecting large informality and higher levels of corruption belong mostly to developing countries, while developed economies tend to occupy the other end of the distribution.

Similarly, Figure 4.2 shows a strong statistically significant association between cross-county variation in the size of informality and the rule of law.
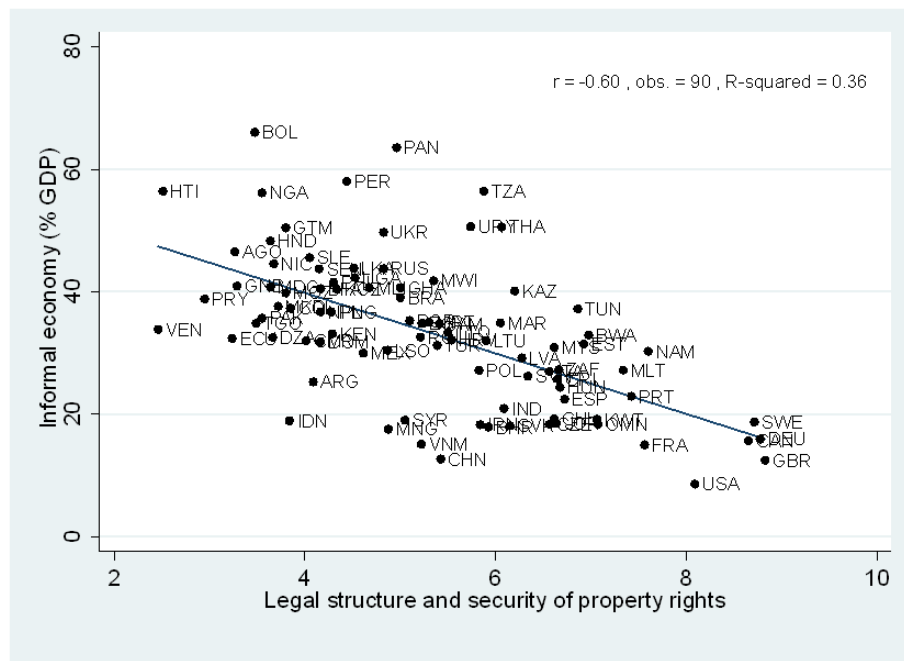
Figure 4.2 The informal economy and legal structure and security of property rights

Consistent with past research, the graph shows that countries with a strong rule of law, proxied by a legal system that protects property rights, an independent judiciary and an impartial court system, tend to have a smaller informal sector.

The relationship between informality and regulation is also examined. Figure 4.3 shows that there is a relatively significant association between the size of the informal economy and the quality of business regulation. It illustrates, as expected, that countries with a better regulatory environment have a smaller informal economy.
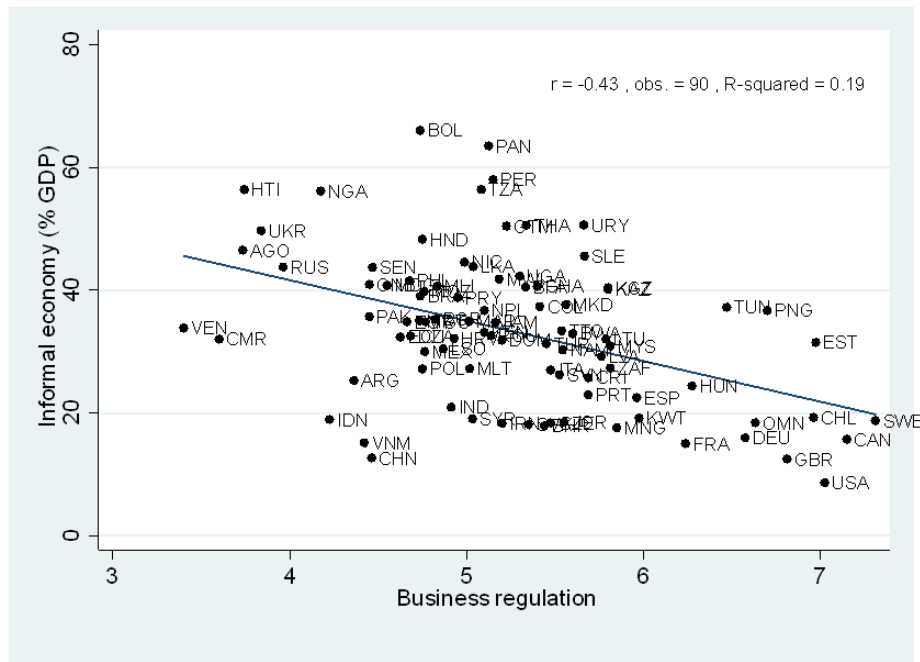
Figure 4.3 The informal economy and business regulation (EFW index)

In summary, the figures show a relationship between all institutional quality measures and informality. These findings are in line with those of previous studies mentioned in the literature review (section 2.4), and they provide further motivation for conducting a more in depth empirical investigation.

Figures 4.4 and 4.5 compare how the informal economy has evolved over time in countries that have the largest and smallest informal sectors. Over the period 1999-2007, the informal economy had a declining trend in Bolivia and Peru. However, its size in those countries still accounts for more than 50 percent of the GDP. In comparison, informality in advanced economies such as the UK and the United States, which have smaller informal sectors (8-13 percent of the GDP), had a stabilised trend over the same period of time. This indicates that there is a kind of divergence between the various regions in terms of the economic and institutional factors that cause an increase or a decrease in the size of the informal economy. In some developing countries, the

economic growth and the regulatory reforms can occur at an accelerating pace within a short time span; hence the estimated size of the informal economic activities, influenced by such development, will be more variable in the developing regions.
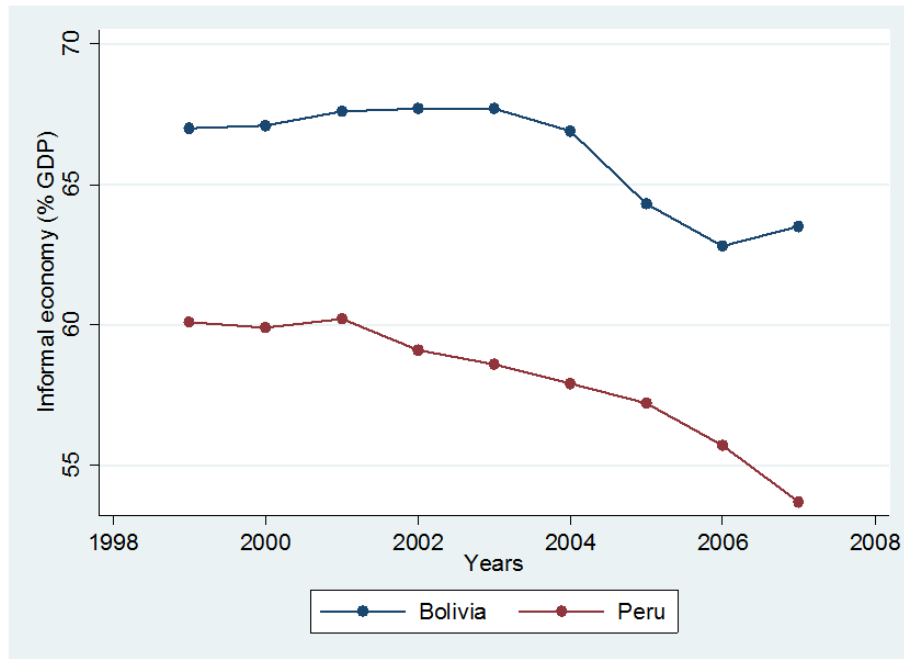
Figure 4.4 The informal economy in the Bolivia and Peru
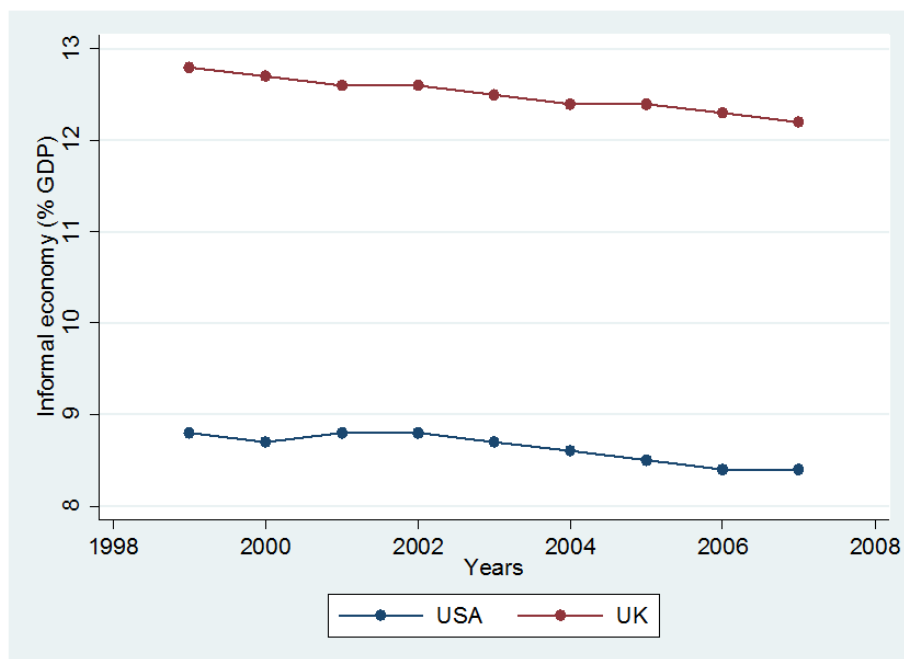
Figure 4.5 The informal economy in the US and UK

Finally, bivariate Granger (1969) causality tests are employed to formally examine the presence of short-run causality between our variables of interest and the size of the informal economy. Table 4.3 shows that causality runs from GDP per capita and the share of industry in GDP to the informal economy and not the other way around. However, the results for the corruption ICRG index, legal structure, and business regulation indices indicate the possibility that these determinants are affected by the size of the informal economy. This simultaneity between the quality of institutions and informality is addressed in more details in the following section.

Table 4.3 Granger causality tests - panel data

Null Hypothesis:	F-Statistic	Prob.
Log GDP per capita does not Granger-cause informal economy	10.523	0.001
Informal economy does not Granger-cause log GDP per capita	0.026	0.872
Industry share does not Granger-cause informal economy	7.098	0.008
Informal economy does not Granger-cause industry share	1.400	0.237
Corruption ICRG does not Granger-cause informal economy	5.197	0.023
Informal economy does not Granger-cause corruption ICRG	12.760	0.000
Business regulation does not Granger-cause informal economy	2.096	0.148
Informal economy does not Granger-cause business regulation	7.960	0.005
Corruption CPI does not Granger-cause informal economy	0.380	0.538
Informal economy does not Granger-cause corruption CPI	1.944	0.164
Legal structure does not Granger-cause informal economy	0.307	0.580
Informal economy does not Granger-cause legal structure	10.450	0.001
Unemployment does not Granger-cause informal economy	2.688	0.102
Informal economy does not Granger-cause unemployment	0.014	0.907

Notes: Granger causality tests (panel) are from the statistical software EViews10.
Lag order: 1.

4.2 Empirical model and methodology

The theoretical model discussed in Chapter 3 suggests that institutional quality factors such as business regulation and the rule of law determine the size of informality. As we shall discuss later, the implications of this model are better captured in investigation using a richer data than is available for this macro analysis. However, we do have macroeconomic proxies for institutional quality, such as corruption and regulation indices, and these appear to be related to informality, as seen above.

The aim in this part of the study is to estimate the following model in a panel data setting:

$$IE_{i,t} = \beta_0 + \beta_1 \, QRUG_{i,t} + \beta_2 \, QLAW_{i,t} + \sum_{k=3}^{n} \beta_k \, X_{k_{i,t}} + \alpha_i + \varepsilon_{i,t} \qquad (4.1)$$

Where for country i in year t, IE is the informal economy size as % of GDP, $QRUG$ is the quality of regulation, which is measured by the business regulation index (EFW index), $QLAW$ is the quality of rule of law which is measured by two alternative proxies (corruption CPI index and legal structure index), and $X_{k_{i,t}}$ are the other determinants of informality which include unemployment rate, the share of industry in GDP and GDP per capita. These variables are widely used in the literature (Friedman et al., 2000; Bajada, 2005; Loayza & Rigolini, 2006; Bajada & Schneider, 2009). Moreover, α_i in (4.1) represents unobservable country-specific effects (or country heterogeneity), and $\varepsilon_{i,t}$ is the error term (idiosyncratic errors which change across t as well as across i).

The main advantage of panel data is the large number of data points (several time periods of data for each individual country), which increases the degrees of freedom and so improves the precision of the estimation.

In this study, we assume that countries are heterogeneous. They differ in terms of their political systems, social and cultural norms, and religious affiliations. Panel data models have the advantage of being able to take into account these individual characteristics (or unobserved effects) of each country which are captured by α_i in our model.

A fixed effects approach, FE hereafter, treats α_i as a group-specific constant term in the regression model, which does not vary over time ($\alpha_i = \alpha$), and it is permitted to be correlated with the explanatory variables. Whereas a random-effects model, RE hereafter, treats unobserved effects α_i as a random variable and assumes that the unobserved individual characteristics need to be uncorrelated with the included variables (Wooldridge, 2002; Cameron & Trivedi, 2005; Greene, 2012). In this study, country-specific fixed effects (e.g., political, social and cultural factors) are more likely to be correlated to the explanatory variables. Hence, it seems that FE approach is more applicable to our model and data set as it can mitigate the potential omitted variable bias.

In this study we report the result of FE and RE estimations using the statistical software STATA 14. A brief description of how these two approaches deal with unobserved effects is presented below (Cameron & Trivedi, 2005):

Let y_{it} be a scalar dependent variable, X is a K × 1 vector of independent variables, α_i are the individual effects and ε is the error term.

$$y_{it} = \alpha_i + \mathbf{x}'_{it}\,\beta + \varepsilon_{it}, \qquad (4.2)$$

The within estimator or fixed effects estimator exploits the special features of panel data as it measures the association between individual-specific deviations of the dependent

variable from its time-averaged value. This is done using the variation in the data over time. By taking the average over time we obtain:

$$\overline{y}_i = \alpha_i + \overline{\mathbf{x}}' \beta + \overline{\varepsilon}_i, \qquad (4.3)$$

As mentioned earlier, in fixed effects model $\alpha_i = \alpha$. Subtracting (4.3) from (4.2) yields the within model

$$y_{it} - \overline{y}_i = (\mathbf{x} - \overline{\mathbf{x}})\beta + (\varepsilon_{it} - \overline{\varepsilon}_i), \quad i = 1, \dots, N, \quad t = 1, \dots, T, \qquad (4.4)$$

as the α_i terms cancel. The within estimator is the OLS estimator in (4.4). The advantage of this estimator is that it yields consistent estimates of β in the fixed effects model, whereas the pooled OLS and between estimators do not.

The random effects estimator also exploits the special features of panel data. Starting from the same individual-specific effects model (4.2), the random effects model can be rewritten as

$$y_{it} = \mu + \mathbf{x}'_{it}\beta + \alpha_i + \varepsilon_{it}, \quad i = 1, \dots, N, \quad t = 1, \dots, T, \qquad (4.5)$$

The individual-specific effects α_i are assumed to be realizations of iid random variables with distribution $[0, \sigma_\alpha^2]$ and the error $\varepsilon_{i,t}$ is iid $[0, \sigma_\varepsilon^2]$. The random scalar intercept μ is added so that the random effects can be normalized to have zero mean. There are many consistent estimators of the random effects model, but the feasible GLS estimator will be more efficient (Cameron & Trivedi, 2005).

Overall, and from a practical perspective, the fixed effects model is costly in terms of degrees of freedom lost. However, it has a significant advantage over the random effects model as there is little justification for the assumption in the latter of zero correlation between the individual country characteristics and the regressors, which is the case in

this study as discussed above (Greene, 2012). Nevertheless, both approaches will be considered and a discussion of their results will be shown in the following chapter.

The issue of potential endogeneity is also addressed in the empirical analysis. In our panel data model in (4.1) we hypothesize that the size of the informal economy is likely to be determined by institutional factors such as corruption or legal structure quality. However, as we have shown from the results of Granger causality tests, we cannot exclude the possibility that these determinants are, in turn, affected by the size of informality. This simultaneity between the quality of institutions and informality was also addressed by Friedman et al. (2000). For example, poor governance and more corruption increase the diversion of resources into the informal economy, but this diversion causes a reduction in government revenue and undermines institutions such as control of corruption and the rule of law.

Dealing with this possible simultaneity between the regressors and the dependent variable requires a set of valid instruments that are exogenous but correlated with the included variables. Finding such instruments is difficult in our case due to panel data availability. There are some cross-sectional studies in which instrumental variables are employed to account for the endogeneity of corruption or the quality of institutions in general. Those instrumental variables include ethnolinguistic fractionalization, legal origins, religious affiliations, and geographical location (La Porta et al., 1999; Friedman et al., 2000). However, and given the panel data nature of our data, we cannot include these instruments as they have no time variation that could predict a time-varying variable. Consequently, in order to mitigate this potential endogeneity we apply the generalized method of moments (GMM) approach as an alternative. With the dependent

variable (informal size) being lagged one year, our model is also estimated by the Arellano-Bond and the Arellano-Bover/Blundell-Bond Estimators.

Arellano-Bond (Arellano & Bond, 1991) and Arellano-Bover/Blundell-Bond (Arellano & Bover, 1995; Blundell & Bond, 1998) dynamic panel estimators are general estimators designed for panel analysis in situations when:

- T is small and N is large, meaning few time periods and many individual units.
- The left-hand-side variable is dynamic, depending on its own past realizations.
- Some regressors may be endogenous (Roodman, 2009).

Arellano-Bond estimation begins by transforming all regressors, usually by differencing, and uses generalized method of moments (GMM), called "difference-GMM". The Arellano-Bover/Blundell-Bond estimator augments Arellano-Bond by making an additional assumption that first differences of instrumental variables are uncorrelated with the fixed effects. This allows the introduction of more instruments and can dramatically improve efficiency. It builds a system of two equations-the original equation and the transformed one-and is known as "system-GMM".

Baltagi (2013) illustrates the basic idea of these estimators as follows:

Suppose that we have a simple autoregressive model with no regressors:

$$y_{it} = \delta y_{i,t-1} + u_{it} \quad (i = 1, \dots, T), \qquad (4.6)$$

Where $u_{it} = \mu_i + v_{it}$ with $\mu_i \sim IID\ (0,\ \sigma_\mu^2)$ and $v_{it} \sim IID\ (0,\ \sigma_v^2)$.

To get a consistent estimate of δ as $N \to \infty\ with\ T\ fixed$, we first-difference (3.5) to remove the individual effects,

$$y_{it} - y_{i,t-1} = \delta \left(y_{i,t-1} - y_{i,t-2} \right) + \left(v_{it} - v_{i,t-1} \right) \qquad (4.7)$$

Note that $v_{it} - v_{i,t-1}$ is MA (1) with unit root. For $t = 3$, the first period that we observe this relationship, we have:

$$y_{i3} - y_{i,2} = \delta \left(y_{i,2} - y_{i,1} \right) + \left(v_{i3} - v_{i,2} \right)$$

Here, y_{it} is a valid instrument, since it is highly correlated with $y_{i,2} - y_{i,1}$ and not correlated with $v_{i3} - v_{i,2}$, as long as the v_{it} are not serially correlated.

However, for t =4, the second period that we observe (4.7):

$$y_{i4} - y_{i,3} = \delta \left(y_{i,3} - y_{i,2} \right) + \left(v_{i4} - v_{i,3} \right).$$

Here, y_{i2} as well as y_{i1} are valid instruments for $y_{i3} - y_{i,2}$, since both y_{i2} and y_{i1} are not correlated with $v_{i4} - v_{i,3}$. One can continue in this fashion, adding an extra valid instrument with each forward period, so that for period T, the set of valid instruments becomes $(y_{i1}, y_{i2}, \ldots \ldots \ldots, y_{i,T-2})$.

The Arellano-Bond estimator sets up a generalized method of moments (GMM) problem in which the model is specified as a system of equations, one per time period, where the instruments applicable to each equation differ (as we addressed above, in later time periods, additional lagged values of the instruments are available). This estimator forms moment conditions using lagged-levels of the dependent variable and the predetermined variables with first-differences of the disturbances.

Arellano and Bover (1995) and Blundell and Bond (1998) found that if the autoregressive process is too persistent, then the lagged-levels are weak instruments. They proposed using additional moment conditions in which lagged differences of the dependent variable are orthogonal to levels of the disturbances. To get these additional

moment conditions, they assumed that panel-level effect is unrelated to the first observable first-difference of the dependent variable. The results of these two estimators are discussed in the next chapter.

4.3   Results and discussion

The empirical model proposed in (4.1) suggests that the size of the informal economy is determined in part by institutional factors such as the quality of the rule of law and the quality of business regulation. This chapter first presents the results of estimating this model using panel data analysis for 90 countries. It then goes on to provide a brief discussion of the main findings.

4.3.1   Estimation results

Tables 4.4 and 4.5 present all the results of our estimations, using corruption CPI index and legal structure index as alternative proxies for the rule of law. The first four columns of the tables report the results of fixed effects (FE) and random effects (RE) estimations, for the baseline specification in columns (1) and (2) and for all determinants of informality in columns (2) and (4). In columns (5) and (6) we report the results of GMM estimations to provide further robustness checks for the results. To obtain heteroskedasticity-robust standard errors in these estimations, the option "vce (cluster country)" was used in the regression code.

We begin by considering the choice between FE and RE regressions. Although we assume that the FE is appropriate because of its ability to mitigate potential omitted variable bias, the models are subject to the specification test proposed by Hausman (1978). This test is used to test for orthogonality of the unobserved effects and the explanatory variables. It is based on the idea that under the assumption of no

correlation, both FE and RE are consistent but FE is inefficient, whereas with the opposite assumption, FE is consistent but RE is not (Greene, 2012). Although the results of the Hausman test in columns (1) and (3) indicate that the FE models are more appropriate, there is no major difference in the results that may affect the consistency of the results described below.

Table 4.4 The informal economy and the quality of institutions-panel data estimations (1)

	(1)	(2)	(3)	(4)	(5)	(6)
	FE	RE	FE	RE	GMM	GMM
	OLS	GLS	OLS	GLS	Arellano–Bond	Arellano–Bover/ Blundell–Bond
Business regulation	-0.730***	-0.733***	-0.348***	-0.367***	-0.0165	-0.101***
	[.1111]	[.1113]	[.0878]	[.0874]	[.0252]	[.0177]
Corruption CPI	0.558*	0.745**	0.206	0.217	0.0067	0.0797
	[0.333]	[0.317]	[0.224]	[0.220]	[.5559]	[.5352]
Unemployment			0.0391	0.0602	0.00237	0.100***
			[.0421]	[.0392]	[.0118]	[.015]
Industry			-0.00208	-0.00776	0.00959**	-0.00867
			[.0292]	[.0286]	[.0049]	[.0066]
Log GDP per capita			-7.911***	-7.152***	-4.292***	-0.174***
			[.9424]	[.7555]	[.4313]	[.067]
Lagged dependent variable (informal economy % GDP)					0.809*** [.0288]	0.957*** [.0071]
Constant	33.20***	32.25***	96.88***	89.90***	40.76***	2.744***
	[2.077]	[2.361]	[7.646]	[6.649]	[4.389]	[.7328]
Observations	562	562	526	526	434	526
Countries	90	90	86	86	80	86
R-squared	0.293	0.303	0.301	0.302		
F statistic	23.05		36.96			
Chi2 statistic		50.99		208.8		
AR (1) test (p value)					0.070	0.011
AR (2) test (p value)					0.098	0.048
Instruments #					34	41
Sargan test of over-identification (p value)					0.105	0.242
Hausman test – chi2 (p value)	22.23 (0.000)		25.94 (0.000)			

Dependent variable: informal economy (% GDP).
Robust standard errors in brackets.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%

Table 4.5 The informal economy and the quality of institutions-panel data estimations (2)

	(1)	(2)	(3)	(4)	(5)	(6)
	FE	RE	FE	RE	GMM	GMM
	OLS	GLS	OLS	GLS	Arellano–Bond	Arellano–Bover/ Blundell–Bond
Business regulation	-0.462***	-0.449***	-0.298***	-0.308***	-0.023	-0.0851***
	[.1341]	[.1336]	[.1036]	[.1026]	[.0331]	[.028]
Legal structure	-0.632***	-0.698***	-0.160	-0.176*	-0.017	-0.012
	[.1519]	[.1513]	[.1002]	[.1]	[.0259]	[.0348]
Unemployment			0.033	0.052	0.002	0.102***
			[.0397]	[.037]	[.0109]	[.0141]
Industry			-0.001	-0.005	-0.0203**	-0.0264***
			[.0254]	[.0246]	[.0094]	[.0071]
Log GDP per capita			-7.911***	-7.201***	-3.982***	-0.024
			[.9188]	[.7433]	[.5122]	[.0452]
Lagged dependent variable (informal economy % GDP)					0.761*** [.0923]	0.965*** [.0207]
Constant	38.83***	39.10***	98.88***	92.26***	39.09***	1.397***
	[.6079]	[1.582]	[7.631]	[6.72]	[5.217]	[.4065]
Observations	590	590	550	550	464	550
Countries	90	90	86	86	83	86
R-squared	0.322	0.326	0.298	0.299		
F statistic	47.30		37.02			
Chi2 statistic		107.70		211.60		
AR (1) test (p value)					0.026	0.004
AR (2) test (p value)					0.086	0.049
Instruments #					34	41
Sargan test of over-identification (p value)					0.066	0.366
Hausman test: chi2 (p value)	32.48 (0.000)		28.95 (0.000)			

Dependent variable: informal economy (% GDP).
Robust standard errors in brackets.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%

The results in Tables 4.4 and 4.5 show that the quality of business regulation matters; it is highly statistically significant and has an expected negative relationship in all estimations. This means that the level of informality decreases with better quality regulation as measured by the business regulation index (the extent to which regulations and bureaucratic procedures restrain entry and reduce competition). In both tables, the first two columns (the baseline specifications) show that a one percentage point rise in the quality of business regulation reduces the size of informal economy by 0.45 to 0.73 percentage points. In contrast, although the estimated impact of business regulation in models (3), (4), and (6) is significant and consistent in direction with the baseline regressions, the coefficient estimates become smaller in magnitude.

Table 4.4 shows that a higher level of corruption leads to a higher level of informality. Yet, when other determinants of the size of the informal economy (unemployment, industry, log GDP per capita) are included, corruption becomes insignificant. Table 4.5 shows that an increase in the quality of the legal structure (alternative proxy of the quality of the rule of law) leads to a reduction in the size of the informal economy. However, when other determinants are included in the regressions, the coefficient estimates becomes less precise.

Regarding the other determinants of informality, the signs of unemployment, industry and per capita GDP are consistent with a priori expectations and match those observed in earlier studies (Friedman et al., 2000; Bajada, 2005; La Porta & Shleifer, 2008; Bajada & Schneider, 2009). A rise in the unemployment rate is associated with more informality, while an increase in the level of industrial development and per capita income is associated with a lower level of informality. However, only per capita GDP appears to be consistently significant (in almost all regressions).

For robustness analysis, columns (5) and (6) show the results of GMM estimations. The results of over-identification specification test (Sargan statistic) indicate that the validity of the instruments set used in Arellano–Bover/ Blundell–Bond approach (in column 6, p = 0.24; 0.36) is higher than in those in Arellano–Bond approach (in column 5, p = 0.10; 0.06). This suggests that the former is more consistent as the null hypothesis that the population moment conditions are correct is highly not rejected. The results of Arellano–Bover/ Blundell–Bond approach confirms the results of FE and RE regarding the importance of role of business regulation, although its coefficient estimates are smaller in magnitude. The results of the dynamic GMM estimation strongly support the assumption that existing informal activities attract more participants in the future. Columns (5) and (6) in Tables 4.4-4.6 show that the lagged dependent variable (the size of the informal economy) has a significant positive effect on the current level of informality.

For further robustness check, all models are re-estimated with alternative measure of corruption, that is, the corruption ICRG index. The results reported in Table 4.6 confirm the role of business regulation in explaining informality. The estimates for business regulation are similar in direction, statistical significance, and in magnitude to those obtained from our core analysis presented in tables 4.4 and 4.5.

In addition, Appendix H reports the estimation results of separate panel data models for the industrial and developing economies in the sample. The results are consistent with those for the whole sample. They also show that the macro level data do not reveal any major variations in the importance and the magnitude of the effects of the determinants of the informal economy between the developing and developed economies.

Overall, the panel data estimates confirm the hypothesis that the size of informal economic activities is greater in countries with a higher regulatory burden. The findings are also consistent with previous cross-sectional analyses regarding the direction of the association between rule of law variables and informality. A summary and further discussion of the main results is presented below.

Table 4.6 The informal economy and the quality of institutions-panel data estimations (3)

	(1)	(2)	(3)	(4)	(5)	(6)
	FE	RE	FE	RE	GMM	GMM
	OLS	GLS	OLS	GLS	Arellano–Bond	Arellano–Bover/ Blundell–Bond
Business regulation	-0.789***	-0.804***	-0.374***	-0.389***	-0.0453	-0.0708***
	[.1031]	[.1025]	[.0912]	[.0901]	[.0277]	[.0159]
Corruption ICRG	0.549***	0.522***	0.133	0.153	0.0218	0.132*
	[.1144]	[.1152]	[.1041]	[.0994]	[.0215]	[.0714]
Unemployment			0.0402	0.0576	0.0111	0.105***
			[.0405]	[.0384]	[.0125]	[.0149]
Industry			0.00391	0.000519	-0.00453	-0.0183
			[.0277]	[.0269]	[.0051]	[.0204]
Log GDP per capita			-7.881***	-7.304***	-4.276***	-0.0931*
			[.9433]	[.7806]	[.4426]	[.0502]
Lagged dependent variable (informal economy % GDP)					0.761***	0.965***
					[.0923]	[.0207]
Constant	38.95***	38.98***	98.65***	93.36***	42.99***	1.983
	[.7332]	[1.759]	[7.63]	[6.918]	[4.533]	[1.728]
Observations	574	574	534	534	453	534
Countries	85	85	81	81	78	81
R-squared	0.0181	0.025	0.299	0.299		
F statistic	34.77		33.95			
Chi2 statistic		70.26		189.8		
AR (1) test (p value)					0.045	0.004
AR (2) test (p value)					0.104	0.038
Instruments #					34	41
Sargan test of over-identification (p value)					0.049	0.276
Hausman test-chi squared (p value)	24.5 (0.00)		18.51 (0.00)			

Dependent variable: informal economy (% GDP).
Robust standard errors in brackets.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%

4.3.2 Summary and discussion

The aim of this empirical investigation was to evaluate the relationship between the informal economy and the quality of institutions using panel data analysis for 90 countries over the period 1999-2007.

It is clear from the results that there is a significant association between informality and the efficiency of regulation of entry. The results validate the neoliberal hypothesis that the size of the informal economy is expected to be lower in countries with better business regulation. According to our measure of regulation, this means countries will have, among other things, lower bureaucracy costs and little licensing restrictions. These results are in agreement with those obtained by Djankov et al. (2002); Auriol and Warlters (2005); Loayza et al. (2005); Dabla-Norris and Inchauste (2007), who also use macroeconomic data but in a cross-sectional analysis.

The results from our macro level analysis have also shown that the association between informality and the rule of law is in the direction suggested by neoliberal theory and is consistent with those of Friedman et al. (2000); Torgler and Schneider (2009); Dutta et al. (2013). Informality is higher in countries that have higher levels of public sector corruption and a lower quality of legal structure/protection of property rights. However, this relationship is not robust to the inclusion of all determinants and specifications. This may be related to the limitations of our data as we discuss below.

This study, like any other empirical inquiry of informality based on aggregates or averages, faces the daunting challenge of data availability and reliability.

Due to the limited availability of data, the panel data analysis was restricted to a relatively short time span of 9 years. Consequently, and over such a short time horizon,

informality and institutional quality proxies often do not vary much. This is in turn limits the reliability of panel data estimations that relay on having data with enough variability over time, as we discuss in section 3.2.

Furthermore, it should be noted that the macroeconomic approach to investigate informality has limited scope. It can often only show statistical correlation rather than causal relation. It cannot provide answers to questions like: why do firms choose to operate in the informal economy? What other factors may cause an increase in informal activities? Nevertheless, the results from the panel data analysis highlight the association between informality and quality of institutions and confirm previous findings.

Given the limitation of macroeconomic data, the main empirical contribution of this study is based on firm-level data from which we can construct a number of proxies for the extent of informality and the magnitude of the main institutional factors that might drive the growth of the informal economy. The following chapters present a micro level analysis of the determinants of informality in selected countries and regions.

Chapter 5 Micro level analysis

The first section of this chapter starts by describing the basic features of the survey data set, and then presents some descriptive statistics that highlight the main constraints and questions in the survey. Together with simple graphics analysis, they form the basis of our quantitative analysis of data presented. The empirical method used in our investigation is presented in the second section of this chapter.

5.1 Data and summary statistics

5.1.1 Data and sample size

The data used in this part of the study is from the World Business Environment Survey (WBES), conducted by the World Bank. The survey employed a standard core questionnaire (see Appendix I), sent to more than 10,000 firms in 80 developing and developed countries, between the end of 1998 and the middle of 2000. The main objective of the survey was to look at the impact of the investment climate on enterprise performance. It provides comparisons of the severity of constraints affecting businesses depending on their characteristics, such as size, age or ownership.

Response rates were high, except to questions on corruption and hidden sales. Therefore, in this study the sample consists of the responses of 4167 firms in 43 countries. The intention of the survey was generally to assess firms' view of the quality of public goods, business regulation, the level rule of law, financial obstacles, and tax rates and system. It also reports on firm size and other characteristics. The rich details of the WBES dataset permits an investigation of how entrepreneurs view the quality of formal institutions speaking from direct experience of the business environment they

operate in. Despite the fact that these firms are thought to be formal, they were asked to rate the extent of informality according to their perception and knowledge.

For constructing the dependent variable and testing the above hypotheses, the survey has information about the size of the informal economy. This information can be determined from answers to the following question (Q.36, Appendix J): "Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity reports for tax purposes"?

Firms are understandably reluctant to reveal the level of their reporting to government. Therefore, the question was framed in terms of payments made by 'firms in your area of activity.' However, Johnson et al. (2000) argue that "managers presumably most often respond based on their own experiences, and with caution we believe the responses can be interpreted as indicating the firms' own payments" (Johnson et al., 2000:504)

The answers are categorized and ordered as follows: 1 if all sales reported to tax authorities (100 percent), 2 if 90-99 percent, 3 if 80-89 percent, 4 if 70-79 percent, 5 if 60-69 percent, 6 if 50-59 percent, 7 if less than 50 percent.

Businesses are considered to be more informal when the percentage of sales reported to the tax authorities is lower. Thus, this variable can be used as a proxy for the size of the informal economy, (the dependent variable), after combining the larger categories, as follows:

Value	Percentage of sales not reported to tax authorities (proxy for informality)
1	0 %
2	1-10%
3	11-20%
4	21-30%
5	> 30%

Larger categories in the original data set were combined in order to have sufficient number of observations. Appendix D shows the number and the percentage of observations for each category.

The survey also contained questions on firm's perception of the regulatory and financing constraints faced by firms, the legal environment in which they operate, the efficiency of government, the nature and extent of corruption, and the quality of public services. It provides information about how problematic is these factors, in general, for the operation of businesses in given countries. The ratings for these general constraints can range from 1 to 4, with 1 indicating no obstacle and 4 reflecting a very serious obstacle (See Appendix J. Q.38). Based on our theoretical discussion, these factors are important in explaining a firm's tendency to engage in informal economic activities avoiding such hurdles and formal constraints.

Furthermore, the survey reports responses to more detailed questions about disaggregated elements of some general constraints. For example, with regard to tax and regulation indicators, the survey (Appendix J Q.7) asked firms to rate on a four-point scale how problematic are the following different regulatory areas for the operation and growth of their businesses: high taxes, tax administration, business regulation, and labour regulation. The ratings range from 1 (no obstacle) to 4 (major obstacle).

In addition to the question on corruption among other major obstacles, respondents were asked additional questions about bribery as the most observable form of corruption (Q.13 and Q.19 in Appendix J). The survey asks managers how common is it "in their line of business to have to pay some irregular 'additional payment' to get things done". The answers for this question were quantified from 1 (never) to 6 (always). It also explores the severity of corruption by asking about the amount of additional payment. The question is "on average, what percent of revenues do firms like yours typically pay per annum in unofficial payments to public officials?: 0 percent (1), less than 1 percent (2), 1-1.99 percent (3), 2-9.99 percent (4), 10-12 percent (5), 13-25 percent (6), over 25 percent (7).

To capture a firm's perception of the legal and contractual environment, the enterprise managers were asked to what degree they agree with the statement: "I am confident that the legal system will uphold my contract and property rights in business disputes". The answers were rate from 1 (fully agree) to 6 (fully disagree). They were also asked whether they believe that their country's court system is fair and impartial. This variable is rated from 1 (always) to 6 (never).

Regarding the quality and of public services, the data provides firms' perspective on the how efficient the government is in delivering public services. Dabla-Norris et al. (2008) include this variable as an indicator of the advantages of operating formally. It is rated on a six-point scale that ranges from 1 if the government is very efficient to 6 if it is thought to be very inefficient.

The survey had responses from firms of different sizes. Dummy variables for firm size can be used to control for differences in firms' propensity to be informal. Firm size is

defined in terms of the number of full-time employees (small = fewer than 50 employees, medium = 51-500 employees, and large = > 500 employees). Dummy variables were constructed for the large and small categories.

The WBES's survey aimed to provide a basis for making regional comparisons by including firms from six regions: 1-East Asia, 2-Eastern Europe and Central Asia; 3-Latin America and the Caribbean; 4-Middle East and Africa, 5-OECD Western Europe and North America, and 6-South Asia. Response rates were the lowest in the Middle East and Africa region for our variables of interest. Hence, the sample was limited to firms from the other five regions.

Appendix B lists the number of firms included in the analysis by country. The sample includes 4167 firms from 43 countries. These are the firms that give a response to the question about the estimated size of informal activities (the dependent variable), questions about regulation and corruption as general obstacles, and the question about the size of firm. Nonetheless, some of the firms have missing information for other explanatory variables. As a result, the exact number of observations may vary according to model specifications due to the missing values on some of these variables.

It is worth mentioning that the size of our sample of the firms in certain countries or regions was determined by the availability of data only. As can be seen from Table 5.1, the firms included are mainly from developing and transition countries (84 percent of the total number of firms). Advanced economies constitute about 16 percent of the sample analysed in this study with 685 firms. The number of observations varies between the five regions. Eastern Europe and Central Asia and Latin America have the larger proportion of observations with 39 percent and 33 percent respectively. The

number of firms that gave answers to our main question of interest is very low in East Asian and South Asian countries. Therefore, regressions for the regional analysis and comparison will be limited to three regions: Eastern Europe and Central Asia, Latin America and the Caribbean, and OECD countries.

Table 5.1 Firms by region

Region	Number of firms	Percent	Cumulative Percent
East Asia	273	6.55	6.55
Eastern Europe and Central Asia	1629	39.09	45.64
Latin America and the Caribbean	1370	32.88	78.52
(OECD) Western Europe and North America	685	16.44	94.96
South Asia	210	5.04	100
Total	4167	100	

5.1.2 Descriptive statistics

Table 5.2 presents sample statistics for all the variables used in the analysis. Looking at firm characteristics, we observe that 38 percent of the firms are small (less than 50 employees), while large firms accounted for 18 percent of the sample. The overall average of the hidden output is around 10 – 20 percent. With regard to the general constraints firms face, on average and for the overall world sample, firms report that tax regulation poses a moderate to major obstacle, while corruption, legal and financing obstacles pose a minor to moderate obstacle.

The summary statistics in Table 5.2 also show that high taxes were identified as a moderate to major constraint according to the overall sample means. Regarding corruption, the global average for the frequency of paying additional payment (bribe to public officials) was "sometimes" to "seldom", while the average percentage of revenues paid in those unofficial payments is about 2 percent. The efficiency of government in delivering services, on average, was rated to be "mostly inefficient".

Table 5.2 Basic summary statistics – micro level data

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Percentage of sales not reported to tax authorities	4167	2.59	1.64	1	5
Firm size - small	4167	0.35	0.48	0	1
Firm size - medium	4167	0.45	0.50	0	1
Firm size - large	4167	0.20	0.40	0	1
Tax and regulation - general constraint	4167	3.02	0.99	1	4
Corruption - general constraint	4167	2.40	1.17	1	4
Financing - general constraint	4167	2.79	1.14	1	4
Infrastructure - general constraint	4151	2.14	1.04	1	4
Confidence in courts enforceability	4167	3.90	1.16	1	6
Efficiency of government in delivering services	4167	3.90	1.16	1	6
High taxes	4115	3.33	0.96	1	4
Business licensing	4046	2.17	1.10	1	4
Pay additional payment (bribery)	3867	4.37	1.59	1	6
Bribes (as % of revenues)	2805	2.27	1.45	1	7

However, these worldwide average figures mask fundamental differences across regions, and particularly between developed and developing countries. Therefore, it is worthwhile to explore the distribution of each variable for the developing economies (DCs), the industrialized (OECD) countries, East Europe and central Asia (EECA), and the Latin America and Caribbean (LAC) regions. Relevant comparative graphs are used to illustrate those differences.

Figure 5.1 shows the firms' perception of the extent of informality. On average, and as expected, the figures for the advanced economies shows that more than three-quarter of firms estimated informality to be less than 10 percent, and only 14 percent of the firms believed that informality is more than 20 percent. By contrast, less than 40 percent of respondents in developing countries estimated the size of informal economy to be 0

percent, while for the other 60 percent of firms half (30 percent) believed the size of informality to be more than 30 percent. Among the developing regions, however, there is no major difference in the estimated size of hidden sales. By looking at the higher categories of informality, we can see that in Latin America and Caribbean about 40% of firms evaluated hidden output to be more than 21 percent, followed by 35 percent in Eastern Europe.
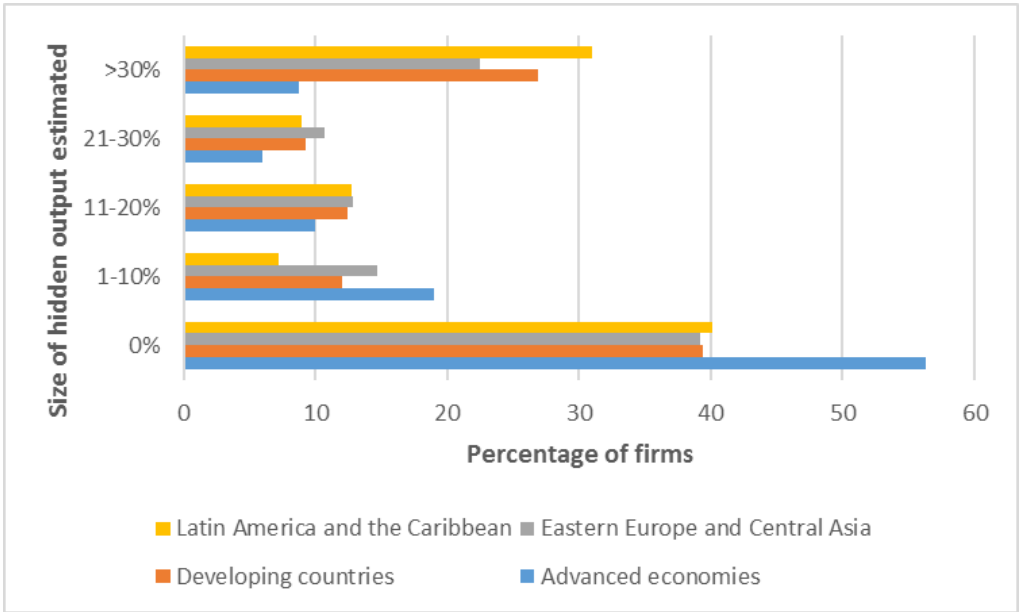
Figure 5.1 The informal economy (hidden output) by region

Figure 5.2 presents the distribution of the various potential business environment conditions which are thought to be associated with firms' decisions to hide their output. It illustrates a regional comparison of the rating of leading constraints on business operation.
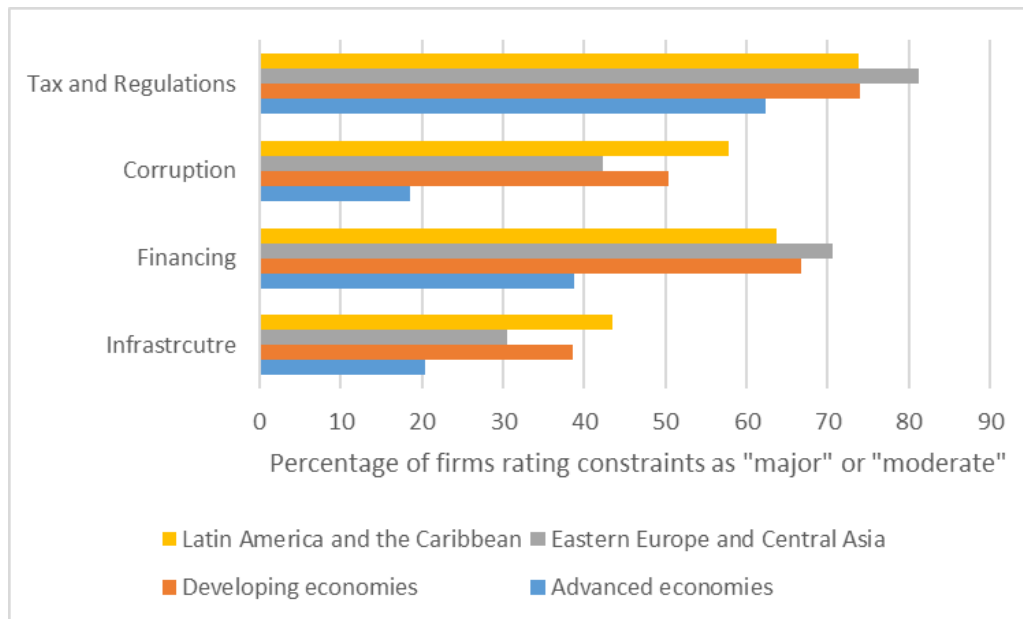
Figure 5.2 General constraints on firms by region

We can see that tax and regulation is the most important constraint in both developed and developing countries. About 62 percent of firms in advanced countries and 75 percent of those in developing countries evaluated this area as a moderate or major constraint. For the other obstacles, however, relatively small percentages of firms in advanced countries regarded them as real obstacles. In developing countries, financing was identified as major or moderate obstacle by 67 percent of the firms. Corruption also was a serious constraint for more than half of the firms in these countries. Generally, and as expected, in developing economies tax and regulation, financing, and corruption are notably the leading constraints.

Before we proceed to the analysis of the link between theses institutional constraints and informality, it is worthwhile to look at firms' responses to the other detailed questions, specifically, the ones that are related to tax and regulations as well as corruption. First, as Figure 5.3 shows, tax and regulatory constraints were rated individually in separate questions. Among these constraints, "high taxes" leads in every

region. While more than 70 percent of businesses reported it as serious constraint in the developed world, more than 80 percent did so in developing countries. Tax administration is also viewed to be problematic across regions, supporting the fact that taxes are generally a significant cost of doing business.
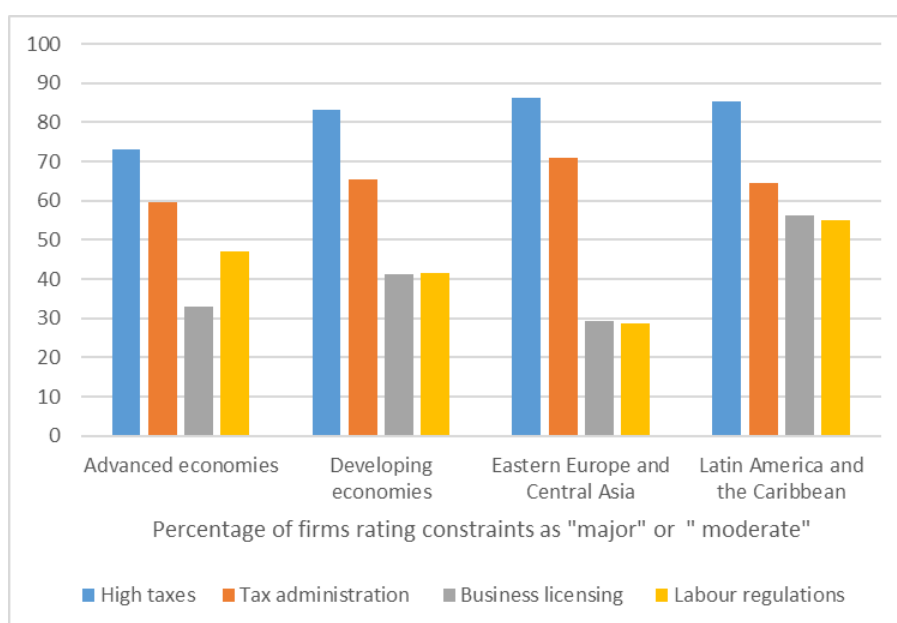
Figure 5.3 Tax and regulations constraints- more detailed questions

Business licensing and labour regulations were rated major or moderate constraints by more than 50 percent of firms in Latin American countries and by about 30 percent of firms in Eastern European economies.

Among the general constraints, corruption was identified as a major or moderate business constraint by more than half of firms in developing countries (Figure 5.2). The same pattern is found in the reported answers to questions relating to bribery, which was considered an important aspect of corruption. As shown in Figure 5.4 bribery is perceived to be more widespread in most developing countries than in advanced economies.
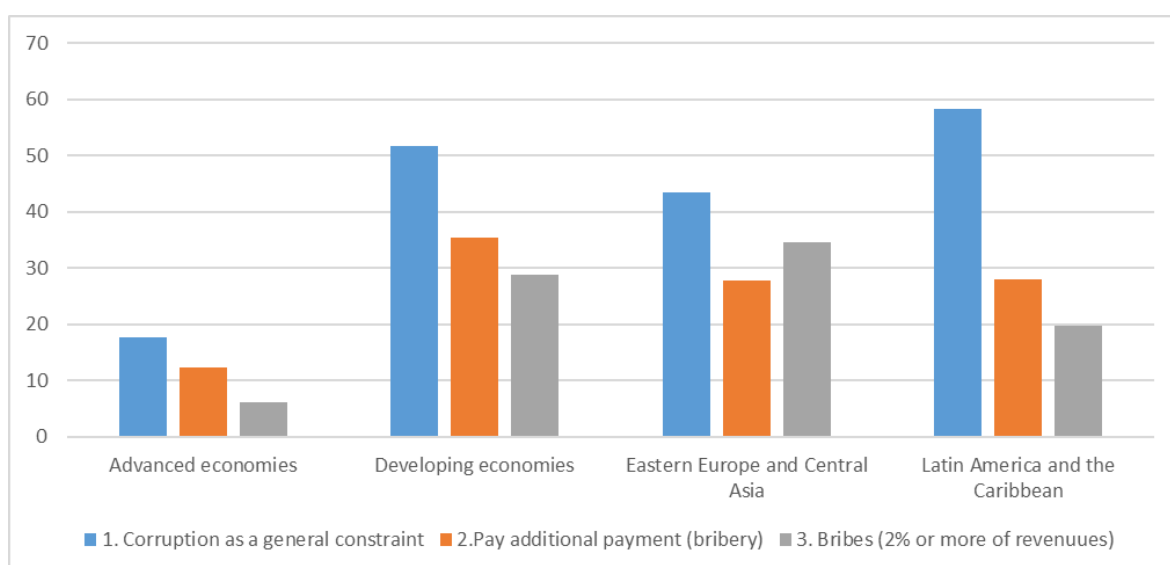
Figure 5.4 Corruption constraints

There are also some differences among the two regions of the developing world. In Latin America, more than half of firms reported that such "additional payments" were at least frequently required compared with 43 percent firms in Eastern Europe regions, who said that this was the case in terms of the frequency of paying bribes. Looking at the cost of bribes (measured by the total percentage of revenues paid to public officials), it is clear that payments were highest in Eastern Europe where more than 35 percent of firms reported as paying 2 percent or more of revenues in bribes. See Figure 5.4.

In general, firm's perception of the legal environment also varies across regions. Figure 5.5 illustrates the percentage of firms who said that they disagreed with the statement: "I am confident that the legal system will uphold my contract and property rights in business disputes." On average, the confidence in the legal system is lower in developing countries than in developed countries, and it confidence is at its lowest in Eastern European countries.
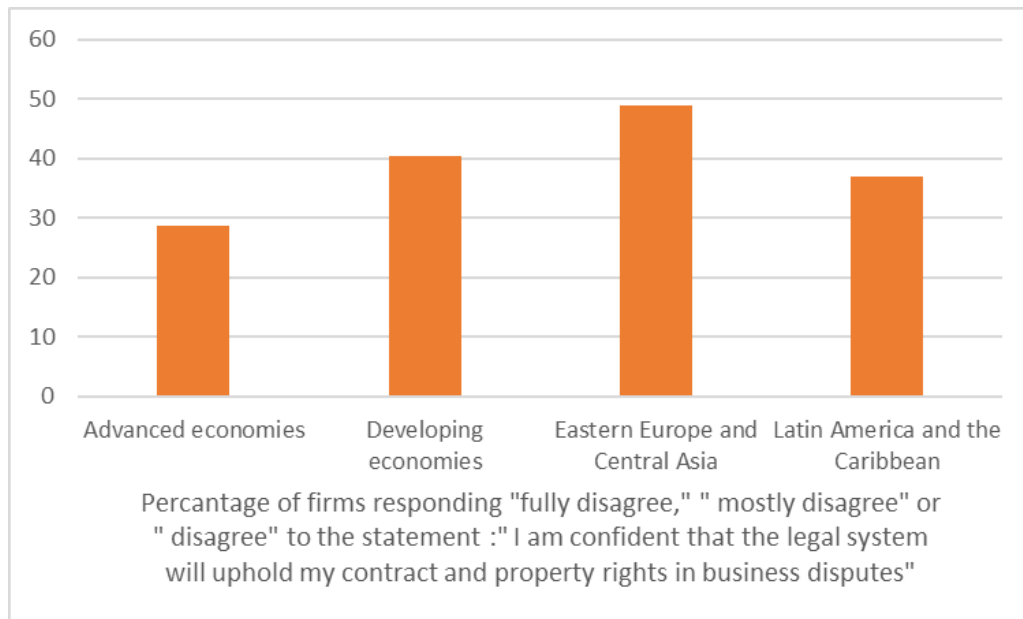
Figure 5.5 Confidence in courts enforceability by region

Overall, these results show that it is important to take regional differences into consideration when investigating informality. The results also indicate the consistency of the responses provided by participants, particularly in relation to answers for the general and more specific questions about tax regulation and corruption, which are the main variables of interest in this empirical investigation.

Finally, this section concludes by presenting the correlation matrix as well as the level of informality by firm size and the general constraints firms face. As Table 5.3 shows, it is clearly the case that a large proportion of small and medium-sized businesses reported higher estimations of informality, whereas two-thirds of large firms estimated informality to be less than 10 percent. Moreover, on average, firms that have higher levels of hidden sales tend to rate all the general constraints identified above as moderate or major obstacles. The simple pair-wise correlations between the extent of informality and firms constraints is reported in Table 5.4.

Table 5.3 Informality, firms' size, and general constraints

| | Percentage of hidden sales (%) | | | | | |
	0%	1-10%	11-20%	21-30%	>30%	Total
Size of the firm						
Small (5-50 employees)	32	14	14	11	29	100
Medium (51-500 employ)	44	13	12	9	23	100
Large (>500)	55	12	10	5	18	100
Tax and regulation - general constraint						
No obstacle	62	9	9	4	17	100
Minor obstacle	44	16	13	8	20	100
Moderate obstacle	40	16	13	8	23	100
Major obstacle	38	11	12	11	29	100
Corruption- general constraint						
No obstacle	56	12	10	6	17	100
Minor obstacle	39	18	14	9	20	100
Moderate obstacle	36	13	13	11	27	100
Major obstacle	34	10	12	10	34	100
Financing- general constraint						
No obstacle	58	12	7	6	17	100
Minor obstacle	43	16	13	8	20	100
Moderate obstacle	39	13	12	10	25	100
Major obstacle	35	12	14	9	29	100
Infrastructure- general constraint						
No obstacle	45	13	11	8	22	100
Minor obstacle	44	13	12	9	23	100
Moderate obstacle	40	13	12	10	25	100
Major obstacle	35	13	13	9	29	100
Confidence in courts enforceability						
Fully agree	55	8	10	6	20	100
Agree in most time	47	15	12	8	18	100
Tend to agree	42	14	12	8	24	100
Tend to disagree	38	12	13	11	27	100
Disagree in most case	36	14	11	10	29	100
Fully disagree	35	14	14	10	27	100
Number of firms						4167

Source: author estimates based on WBES Survey

Table 5.4 Correlation matrix – micro level data

	Percentage of sales not reported to tax authorities	Firm size - small	Firm size - large	Tax and regulation – general constraint	Corruption-general constraint	Financing-general constraint	Infrastructure-general constraint	High taxes	Business licensing	Pay additional payment (bribery)	Bribes (as % of revenues)	Confidence in courts enforceability	Efficiency of government in delivering services
Percentage of sales not reported to tax authorities	1.000												
Firm size - small	0.1421*	1.000											
Firm size - large	-0.1242*	-0.3679*	1.000										
Tax and regulation – general constraint	0.1377*	0.025	-0.1081*	1.000									
Corruption-general constraint	0.2001*	0.008	-0.014	0.2921*	1.000								
Financing-general constraint	0.1693*	0.0721*	-0.1090*	0.3324*	0.2699*	1.000							
Infrastructure- general constraint	0.0716*	-0.022	0.0326*	0.012	0.1685*	0.0967*	1.000						
High taxes	0.0895*	0.022	-0.0902*	0.5050*	0.2269*	0.2285*	0.0422*	1.000					
Business licensing	0.0774*	-0.005	0.0510*	0.1869*	0.2145*	0.1556*	0.0903*	0.2145*	1.000				
Pay additional payment (bribery)	-0.2854*	-0.0789*	0.0747*	-0.1613*	-0.3648*	-0.1824*	-0.1580*	-0.1603*	-0.1416*	1.000			
Bribes (as % of revenues)	0.3005*	0.1296*	-0.1568*	0.2089*	0.3324*	0.2460*	0.1208*	0.2004*	0.0991*	-0.5547*	1.000		
Confidence in courts enforceability	0.1073*	0.0513*	-0.0720*	0.2360*	0.1948*	0.1541*	0.0414*	0.1977*	0.1276*	-0.1777*	0.2423*	1.000	
Efficiency of government in delivering services	0.0940*	0.028	-0.0346*	0.2763*	0.2056*	0.1460*	0.0615*	0.2557*	0.1560*	-0.1493*	0.1889*	0.3249*	1.000

Notes: The correlation coefficient is the Pearson r. The pairwise correlations are calculated using the statistical software STATA 14. * Correlation coefficients significant at the 5% level.

5.2 Empirical model and methodology

As mentioned above, the key aim of this study is to empirically assess the validity of the neoliberal explanation of informality. That is, examine the extent to which institutional quality determines the size of informality. The theoretical model in Section 2.4.3, concludes that relative size of informality, y, (hidden sales by firm *i)* is a function of a vector of institutional determinants, x, as follows:

$$y_i = f(\text{x}) = f(\overset{-}{\lambda}, \overset{+}{\tau}, \overset{+}{\delta}, \overset{-}{\alpha})$$

Where λ is enforcement strength and efficiency of the legal system, measured with variables related to corruption as well as to the legal system and court enforceability. Tax rates, τ, relates to the tax and regulation variables. The productivity or the quality of public services provided by government, α, is also represented by efficiency of government variable in the data.

In this analysis, the size of the informal economy takes on these values:

$$Informality = \begin{cases} 1 & if & \text{Percent of hidden sales } = 0 \\ 2 & if & 0 < \text{Percent of hidden sales} \leq 10 \\ 3 & if & 10 < \text{Percent of hidden sales} \leq 20 \\ 4 & if & 20 < \text{Percent of hidden sales} \leq 30 \\ 5 & if & 30 < \text{Percent of hidden sales} \end{cases}$$

Since the dependent variable is ordinal in nature, we use the ordered probit model with marginal effects to examine the effect of key constraints on informality levels. The probit model is commonly used to investigate the determinants of informality when there is firm-level data from surveys. For example, Johnson et al. (2000) investigate the reasons why firms hide their activities in five post-communist transition economies using probit regression in which the dependent variable is one if the firm says that some sales are hidden. Dabla-Norris et al. (2008) use the ordered probit model to study the

link between the share of hidden sales and factors such as firm size, the quality of the legal system and financial market development in a sample of 41 countries, mainly developing and transition economies.

The latent regression of the ordered probit model can be specified as follows (Wooldridge, 2002; Cameron & Trivedi, 2005; Greene, 2012) :

Let y be an ordered response taking on the values $(0, 1, 2, \ldots, j)$ for some known integer j. The ordered probit model for y (conditional on some predictors, x) can be derived from a latent variable model. Assume that a latent variable y^* is a linear combination of some predictors, x, plus a disturbance term ε, which is assumed to be normally distributed across observations.

The structural model is

$$y^* = x'\beta + \varepsilon \ ,$$

Where β is $K \times 1$ and x does not contain a constant. The latent variable y^* is unobserved. What we do observe is y, which takes on values 0 through J according to the following scheme:

$$y = 0 \quad \text{if} \quad y^* \leq 0$$
$$= 1 \quad \text{if} \quad 0 < y^* \leq \mu_1$$
$$= 2 \quad \text{if} \quad \mu_1 < y^* \leq \mu_2$$
$$\vdots$$
$$= j \quad \text{if} \quad \mu_{J-1} < y^* \ ,$$

Where $\mu_1 < \mu_2 < \ldots < \mu_J$ are unknown cut off points (or threshold parameters) to be estimated with β. In this model, we are concerned with how changes in the explanatory variables x translate into the probability of each ordinal outcome. Thus,

given the assumption that ε is normally distributed across observations, we simply compute each response probability by deriving the conditional distribution of y given x as follows:

$$Prob(y = 0 \mid x) = P(y^* \leq 0 \mid x) = P(x'\beta + \varepsilon \leq 0 \mid x) = \Phi(-\mathbf{x'\beta})$$

$$Prob(y = 1 \mid x) = P(0 < y^* \leq \mu_1 \mid x) = \Phi(\mu_1 - \mathbf{x'\beta}) - \Phi(-\mathbf{x'\beta})$$

$$\vdots$$

$$Prob(y = j \mid x) = P(y^* > \mu_j \mid x) = 1 - \Phi(\mu_j - \mathbf{x'\beta})$$

Where Φ is the cumulative distribution function (c.d.f) of ε.

The parameters μ and β then can be estimated by maximizing the log likelihood:

For each observation i, the log-likelihood function is

$$\ell_i(\mu, \beta) = 1[y = 0] \log[\Phi(-x\beta)] + 1[y = 1] \log[\Phi(\mu_1 - x'\beta) - \Phi(-x'\beta)] + \cdots +$$
$$1[y = j]\log[1 - \Phi(\mu_j - x'\beta)]$$

In this study, the statistical software STATA 14 is used to estimate the ordered probit models.

The sign of the regression parameters, β, can be immediately interpreted as determining whether the latent variable, y^*, increases with the regressor. If β_j is positive, then an increases in x_{ij} necessarily decreases the probability of being in the lowest category ($y_i = 0$) and increases the probability of being in the highest category ($y_i = j$). For marginal effects in the probabilities:

$$\frac{\partial \, Prob(y = 0 \mid x)}{\partial x} = -\phi(x'\beta) \, \boldsymbol{\beta} \, ,$$

$$\frac{\partial \; Prob(y = 1 \mid x)}{\partial \; x} = \{ \; \phi(-x'\beta) - \; \phi(\mu_1 - x'\beta)\}\boldsymbol{\beta}$$

$$\vdots$$

$$\frac{\partial \; Prob(y = j \mid x)}{\partial \; x} = \{ \; \phi(\mu_{j-1} - x'\beta) - \; \phi(\mu_j - x'\beta)\}\boldsymbol{\beta} \; ,$$

Where ϕ denotes the derivative of Φ. The term in braces can be positive or negative.

5.3 Results and discussion

As mentioned in Chapter 2, according to the neoliberal explanation of informality the key factors that determine informality are the quality of formal institutions such as business regulations, tax rates and corruption. In this chapter we analyse the role of these factors by using a comprehensive micro-data set, which we described in the previous chapter. This chapter presents the ordered probit regressions results and their interpretation using marginal effects and predicted probabilities. The analysis starts by presenting the results for the whole sample and then presents regional results. Further, a possible perceived respondent bias is discussed is a separate section.

5.3.1 Estimates for general constraints - entire sample

Table 5.5 presents the basic specification of the ordered probit model for the whole sample. Although the main emphasis of this study is the effect of formal institutions on informality, we also examine the potential influence of other factors such as finance and infrastructure on firms' decision to operate informally. Dummy variables for small and large size firms are used to control for differences in firms' propensity to be informal (medium size is used as the reference size). We also control for unobservable country characteristics by including country fixed effects (country dummies) for all regressions.

Column 1 reports coefficient estimates of the main general constraints. The results indicate the following: first, firm size matters. Smaller firms tend to have a higher incidence of informality compared to larger ones. The "firm size large" coefficient is negative, indicating that the propensity for firms to hide sales is decreasing among large firms. Second, as expected, the main constraints, including tax and regulation, corruption, finance and courts enforceability, have a positive and significant effect on the incidence of informality. Therefore, as the severity of these constraints increases

there is a higher probability of greater informality. Infrastructure as a constraint, however, seems to be of little relevance. The efficiency of government in delivering public services is defined in a way that the higher the values the poorer the services delivered. The results indicate the expected positive relationship (significant at 10 percent) between higher informality and government inefficiency.

Table 5.5 Informality and the quality of institutions-ordered probit estimations-entire sample

	1	**2**	**3**	**4**	**5**
Firm size - small	0.248***	0.245***	0.236***	0.217***	0.184***
	[.0411]	[.0413]	[.0416]	[.0428]	[.0503]
Firm size - large	-0.292***	-0.291***	-0.303***	-0.268***	-0.263***
	[.0511]	[.0515]	[.0517]	[.0531]	[.0622]
Tax and regulation	0.113***			0.108***	0.110***
	[.0224]			[.0231]	[.0271]
Corruption	0.0716***	0.0877***	0.0897***		
	[.0185]	[.0183]	[.0184]		
Financing	0.0404**	0.0550***	0.0599***	0.0425**	0.0490**
	[.018]	[.0177]	[.0177]	[.0187]	[.0221]
Infrastructure	-0.00447	-0.00614	-0.00944	-0.0179	-0.0242
	[.0189]	[.019]	[.0191]	[.0197]	[.0232]
Confidence in courts enforceability	0.0307**	0.0330**	0.0357**	0.0204	0.0115
	[.0149]	[.0151]	[.0152]	[.0155]	[.0181]
Efficiency of government	0.0335*	0.0403**	0.0440**	0.0242	0.0356*
	[.0177]	[.0178]	[.0179]	[.0184]	[.0216]
High taxes		0.0523**			
		[.0218]			
Business licensing			0.0248		
			[.0183]		
Pay additional payment (bribery)				0.168***	
				[.0132]	
Bribes (as % of revenues)					0.132***
					[.0181]
Observations	4151	4099	4030	3851	2793
Pseudo R squared	0.0736	0.0724	0.0693	0.0832	0.086
Log likelihood	-5543.6	-5480.5	-5418.4	-5095.4	-3735.2
Country fixed effects	Yes	Yes	Yes	Yes	Yes

Dependent variable: percent of total sales kept off the books (hidden sales).
Standard errors in brackets.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%

In columns 2 and 3 of Table 5.5 we replace "tax and regulation" as a general constraint by "high tax" and "business licensing" in order to check the robustness and consistency of these constraints. As we have shown in the descriptive statistics (section 5.1.2), "high taxes" was reported as a serious constraint by about 80 percent of firms in the whole sample, compared with only 40 percent of firms who viewed "business licensing" as a moderate or major constraint. The results in column 2 and 3 are consistent with those descriptive findings. We see that tax rates have a positive and significant effect on informality, whereas the effect of the regulation of entry is insignificant.

The results of including two alternative measures of corruption are reported in columns 4 and 5. The frequency of paying additional payments to public officials (defined in the data so that higher values correspond to higher frequency) and the estimated proportions of revenues that go to unofficial payments (higher values mean greater percentages) are both highly significant and consistent with the results for corruption as general obstacle (in column 1).

In order to provide a better interpretation of the ordered probit coefficients, the marginal effect is used to determine the influences of the variance of each independent variable per unit on the dependent variable. Table 5.6 presents the results of the marginal effects with the significance level for testing the hypothesis that the change is zero.

Table 5.6 Marginal effects of general constraints – entire sample

Independent variables	Marginal effects				
	Dependent variables: percent of hidden sales				
	0%	1-10%	11-20%	21-30%	>30%
Firm size - small [a]	-0.084	-0.001	0.007	0.011	0.068
	(0.000)	(0.012)	(0.000)	(0.000)	(0.000)
Firm size - large [a]	0.099	0.002	-0.009	-0.013	-0.079
	(0.000)	(0.015)	(0.000)	(0.000)	(0.000)
Tax and regulation	-0.038	-0.001	0.003	0.005	0.031
	(0.000)	(0.017)	(0.000)	(0.000)	(0.000)
Corruption	-0.024	0.000	0.002	0.003	0.019
	(0.000)	(0.025)	(0.000)	(0.000)	(0.000)
Financing	-0.014	0.000	0.001	0.002	0.011
	(0.024)	(0.083)	(0.026)	(0.025)	(0.025)
Confidence in courts enforceability	-0.010	0.000	0.001	0.001	0.008
	(0.040)	(0.100)	(0.042)	(0.041)	(0.040)
Efficiency of government	-0.011	0.000	0.001	0.001	0.009
	(0.059)	(0.120)	(0.061)	(0.060)	(0.059)

Notes: a dy/dx is for discrete change of dummy variable from 0 to1.

p-value in parentheses

In general, the p-values are significant in most cases (except for efficiency of government) and all marginal effects have the expected signs. Nevertheless, the magnitude of the marginal changes are relatively greater in the lowest and highest bands of informality (when informality = 0%, and > 30%), than for those in the middle. Regarding firms' size, the marginal effects reveal that small firms are less likely to report lower informality as compared with large firms.

The information in Table 5.6 can be illustrated in another way. Figure 5.6 presents a useful summary of the effects of the firms' general constraints. Overall, and as

expected, as the constraints become more (less) severe the probability of lower (higher) informality is reduced (increased).
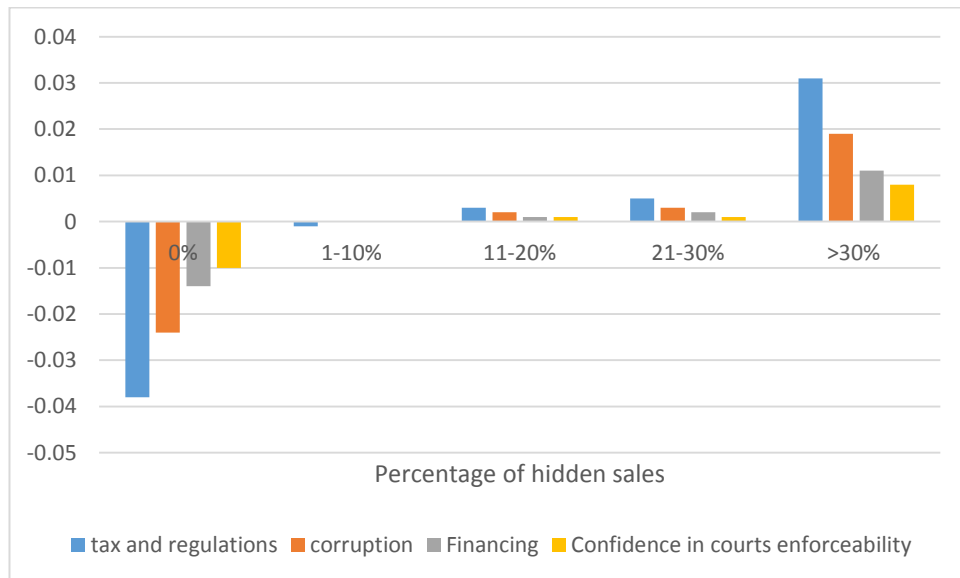
Figure 5.6 Marginal effects of general constraints - entire sample

It is clear from Figure 5.6 that the tax and regulation constraint has the strongest impact on informality. Rating tax and regulation as a serious constraint is associated with a 0.038 decrease in the probability of reporting a low level of informality and a 0.031 increase in the probability of reporting a high level of informality (>30%). Corruption and finance have a negative impact of 0.024 and 0.014, respectively on the probability of lower informality, and they have a positive impact of 0.019 and 0.011 respectively on the probability of having higher level of informality.

The in-sample predictions are computed to assess the model. Table 5.7 presents the likelihood of being in each band of hidden sales conditional on each of the constraints using the fitted values in column 1 of Table 5.5.

Table 5.7 Predicted level of informality

	Panel A[a]			
	Percentage of firms in general tax and regulation constraint category			
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle
Percent of hidden sales				
0%	0.50	0.46	0.42	0.38
1-10%	0.13	0.13	0.13	0.13
11-20%	0.11	0.12	0.12	0.13
21-30%	0.08	0.08	0.09	0.09
>30%	0.18	0.21	0.24	0.27
	Panel B			
	Percentage of firms in general corruption constraint category			
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle
Percent of hidden sales				
0%	0.45	0.43	0.40	0.38
1-10%	0.13	0.13	0.13	0.13
11-20%	0.12	0.12	0.12	0.13
21-30%	0.08	0.09	0.09	0.09
>30%	0.21	0.23	0.25	0.27
	Panel C			
	Percentage of firms in general financing constraint category			
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle
Percent of hidden sales				
0%	0.44	0.43	0.42	0.40
1-10%	0.13	0.13	0.13	0.13
11-20%	0.12	0.12	0.12	0.12
21-30%	0.08	0.09	0.09	0.09
>30%	0.22	0.23	0.24	0.25

	Panel D					
	Percentage of firms in courts enforceability category					
	Fully agree	Agree in most time	Tend to agree	Tend to disagree	Disagree in most cases	Fully disagree
Percent of hidden sales						
0%	0.50	0.46	0.42	0.38	0.35	0.31
1-10%	0.13	0.13	0.13	0.13	0.13	0.13
11-20%	0.11	0.12	0.12	0.13	0.13	0.13
21-30%	0.08	0.08	0.09	0.09	0.10	0.10
>30%	0.18	0.21	0.24	0.27	0.30	0.34

[a] Predicted informality from ordered probit results in Table 6.1, column (1)

Panel A reports the likelihood of a firm with a particular level of informality (sales off the books), given the regulation and taxes constraints it faces. It reports, for example, that a firm that views tax and regulation as a major constraint has a 0.27 probability of having over 30 percent of its sales off the books, while one that views it as a minor constraint has only 0.18 probability of having the same level of informality. Panel B shows the probability of a firm having a particular level of informality, given how it perceives corruption as a general constraint. For instance, a firm that rates corruption as a major obstacle has a 0.27 probability of being in the higher band of informality (>30 percent), whereas a firm that sees corruption as a minor constraint has a 0.21 probability of being in the same band of informality. In the same way, Panels C and D present the likelihood of a firm having a particular band of informality, given how it perceives finance and court enforceability constraints. In general, these predicted ratings from the ordered probit model, (Table 5.7), are very similar to the actual ratings in the data shown previously in Table 5.3. The findings indicate that a firm that sees court decisions as never being enforced or views corruption, finance, or regulatory constraint as a major obstacle, has a higher probability of reporting greater levels of informality (a larger share of sales hidden from tax authorities).

Overall, the results for the entire sample provide evidence which supports the neoliberal argument that public sector corruption as well as taxes and regulations are significant factors that drive firms to operate informally. Nevertheless, and before we discuss these results further, it is important to consider whether the extent of these constraints and their relation to informality varies across global regions. The descriptive statistics shown in section 5.1.2 pointed to some regional differences. The following section reports the ordered probit regressions results and the marginal effects by region.

5.3.2 Estimates for general constraints - by region

The number of observations in our sample allows us to estimate separate regressions for three regions, including the OECD countries, East Europe and central Asia, and Latin America and the Caribbean. The coefficient estimates for these regressions are reported in Table 5.8.

In general, and for all three regions, corruption has a statistically significant and positive effect on the propensity to report a higher level of informally. Further, for the OECD countries (columns 11-15), corruption is the only significant constraint that influences firms to hide their sales. The significance of the results for corruption as a general constraint is supported by two additional variables, the cost and the frequency of paying bribes. Across the three regions paying additional payments more frequently and paying a higher percentage of revenues for unofficial payments increases the probability of reporting higher level of informality.

In the developing regions, tax and regulation as a general constraint as well as high taxes are highly significant and indicate a positive association with informality, as expected. The severity of business licensing constraint, however, seems to increase the probability of having higher informality in Eastern Europe countries only. The other important regional difference is the significance of the financing constraint. In the Latin American region, the financing constraint has a statistically significant and positive effect on the probability of higher informality compared with other regions. On the other hand the coefficients on courts enforceability in this region are insignificant.

Table 5.8 Informality and the quality of institutions-ordered probit estimations-by region

	Eastern Europe & Central Asia					Latin America & the Caribbean					Advanced (OECD) countries				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Firm size - small	0.383***	0.373***	0.362***	0.336***	0.370***	0.135*	0.134*	0.117	0.11	0.154*	0.166	0.188*	0.183*	0.244**	0.151
	[.0607]	[.0609]	[.0616]	[.0636]	[.0858]	[.0794]	[.0795]	[.0797]	[.081]	[.087]	[.103]	[.104]	[.105]	[.106]	[.111]
Firm size - large	-0.474***	-0.469***	-0.484***	-0.419***	-0.410**	-0.329***	-0.327***	-0.342***	-0.298***	-0.267***	-0.168	-0.133	-0.13	-0.143	-0.223
	[.102]	[.102]	[.103]	[.106]	[.159]	[.0798]	[.0799]	[.0802]	[.0818]	[.0879]	[.129]	[.13]	[.133]	[.134]	[.138]
Tax and regulation	**0.126***			**0.151***	0.0881	**0.204***			**0.176***	**0.198***	0.012			0.0159	0.0581
	[.0371]			[.0388]	[.0569]	[.0389]			[.0394]	[.0419]	[.0531]			[.0539]	[.0548]
Corruption	**0.0857***	**0.101***	**0.0904***			**0.0592*	0.0842***	0.0988***			**0.175***	**0.184***	**0.201***		
	[.0275]	[.0272]	[.0275]			[.0327]	[.0324]	[.0322]			[.0533]	[.0532]	[.0539]		
Financing	0.0219	0.0311	0.0445	0.0421	0.016	**0.0697**	0.0919***	0.100***	0.0572*	0.0791**	0.05	0.0472	0.0616	0.0645	0.0839*
	[.0295]	[.029]	[.0287]	[.0306]	[.0437]	[.0303]	[.03]	[.03]	[.0312]	[.0335]	[.0471]	[.0464]	[.0475]	[.048]	[.0498]
Infrastructure	0.00451	0.00733	0.00931	-0.0177	-0.0526	-0.0404	-0.0456	-0.0503	-0.0393	-0.0283	0.0241	0.0193	0.00432	0.038	0.0324
	[.0286]	[.0287]	[.0291]	[.03]	[.0394]	[.0339]	[.0339]	[.0341]	[.0351]	[.0375]	[.0517]	[.0518]	[.0528]	[.0538]	[.0562]
Confidence in courts enforceability	0.0412*	0.0411*	0.0487**	0.0242	0.0196	0.00323	0.0108	0.00983	-0.000324	-0.00347	0.0247	0.0259	0.0377	-0.0019	0.0374
	[.0242]	[.0243]	[.0245]	[.0252]	[.0332]	[.0248]	[.0249]	[.025]	[.0254]	[.0273]	[.0404]	[.0407]	[.0423]	[.0421]	[.044]
Efficiency of government	0.0158	0.018	0.0266	0.00873	0.0373	0.0246	0.0432	0.044	0.0197	0.0302	0.0241	0.0176	0.029	0.0102	0.0174
	[.028]	[.028]	[.0283]	[.029]	[.0401]	[.0321]	[.0322]	[.032]	[.0329]	[.0349]	[.0465]	[.047]	[.0476]	[.0483]	[.0493]
High taxes		**0.0985***				**0.0900**						0.0173			
		[.0367]				[.04]						[.0506]			
Business licensing			0.0533*					0.0176					-0.0733		
			[.0287]					[.0321]					[.0476]		
Pay additional payment (bribery)				**0.170***					**0.176***					**0.192***	
				[.0201]					[.0223]					[.0411]	
Bribes (as % of revenues)					**0.103***					**0.140***					**0.123**
					[.0353]					[.0264]					[.0544]
Observations	1626	1613	1585	1507	796	1359	1348	1335	1302	1147	685	672	636	641	603
Prob. > Chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo Rsq	0.0587	0.0576	0.0568	0.0749	0.0529	0.0715	0.066	0.0647	0.0863	0.0926	0.0631	0.0627	0.0539	0.0697	0.0586
Log likelihood	-2276.1	-2262.2	-2224	-2073.8	-1183.5	-1763.9	-1758	-1747.1	-1666	-1443.5	-802	-791.1	-762.1	-752	-694.7
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is percentage of total sales kept off the book.

Standard errors in brackets. * Significant at 10%   ** Significant at 5%   *** Significant at 1%.

On the whole, the regional results lend support to the neoliberal view that the quality of formal institutions matters. They also support the argument that the national character and extent of the informal economy is the outcome of a mixture of economic, institutional, and social influences which combine in different ways in different regions to produce particular configurations of informal employment (Williams & Windebank, 1998).

The marginal effects of the significant variables are shown in Figures 5.7 and 5.8. The figures report the marginal changes calculated from the Eastern Europe and Latin American regressions in Column 1 and 6, respectively.

The results of the marginal effects confirm our previous findings for the whole sample. We can see that the impact of corruption, tax and regulation, and financing constraints is significant and relatively higher among the lowest and highest bands of informality.

For the Eastern Europe region (Figure 5.7), taxes and regulations, and corruption, respectively, have a 0.043 and 0.029 negative impact on the probability of reporting a lower size of informality and a 0.034 and 0.023 positive impact on the probability of reporting higher levels of informality, respectively. In other words, the propensity for firms to hide sales is increasing in countries with a more hostile regulatory and tax environment and with widespread corruption.
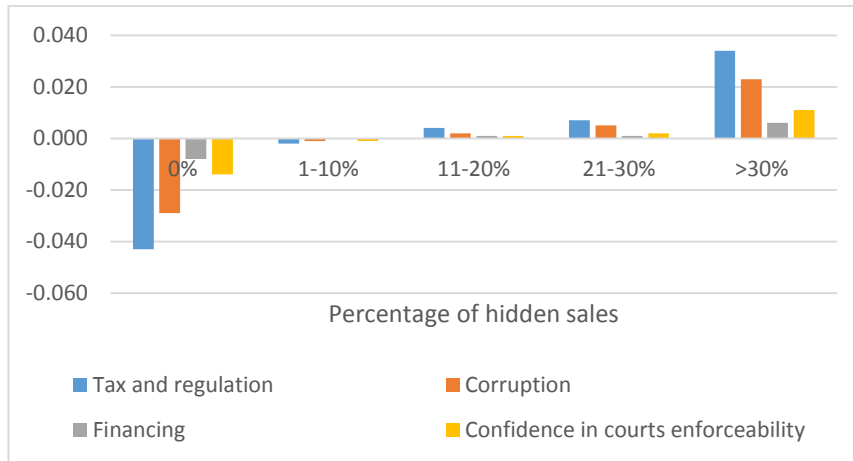
Figure 5.7 Marginal effects of general constraints-Eastern Europe and Central Asia

In the Latin American region (Figure 5.8), tax and regulation has a greater impact than finance and corruption with a positive impact of 0.063 on the probability of reporting higher levels of informality. Finance and corruption constraints have similar marginal effects in this region.
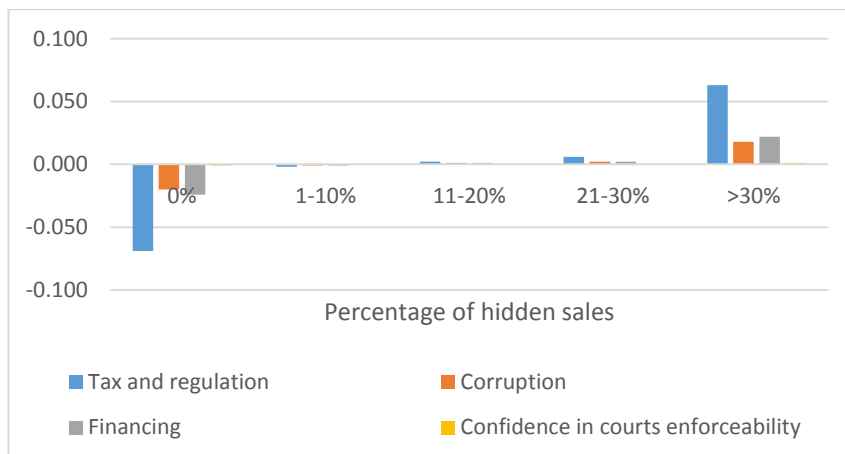
Figure 5.8 Marginal effects of general constraints-Latin America and Caribbean

In summary, the findings from the regional analysis are largely consistent with those for the whole sample. The effects of corruption constraints are statistically significant and stable over regions. This is also the case also in relation to the impact of tax and regulation constraints among developing regions. However, no significant association

was found between the efficiency of government and the estimated size of informality in the three regions.

5.3.3 Summary and discussion

In this study, it was hypothesised that the size of the informal economy is greater in countries with higher tax rates, higher regulatory costs, and higher levels of public sector corruption. These determinants were examined with data on 4167 firms from 43 countries and by using ordered probit regression. This section presents a summary of the main findings and discusses the results in relation to existing literature.

Corruption, as expected, has a highly significant effect on the extent of informality. An increase in the rating of corruption as a general constraint increases the propensity for businesses to hide sales. These results were stable across developing and developed regions of the world. The role of corruption is confirmed when we looked at two disaggregated components: the frequency of paying bribes and the share of revenues that are paid in bribes.

These results are in line with those obtained by Loayza (1996); Friedman et al. (2000); Torgler and Schneider (2009); Dutta et al. (2013), who use macroeconomic indicators for corruption and informality. The findings also match those observed by Johnson et al. (2000) who use firm-level data and a comparison of cross-country averages for five countries, Russia, Ukraine, Poland, Slovakia and Romania.

However, our findings are contrary to those of Williams (2017). While he finds a significant association between informal employment and the corruption index (by International Transparency), no significant correlation was found when using firm-survey data on informal payments to public officials (bribe). A possible explanation for

this might be the limited scope of the measure of informality which only reflects figures for informal employment. This also demonstrates, as previously discussed, the limitation of correlation analysis when using macroeconomic variables. Nonetheless, his results may also reflect the fact that adopting different definitions of informality as well as different approaches can ultimately lead to different conclusions.

Regarding high taxes and regulatory burdens, in general, the results for the whole sample as well as for the two developing regions, show that an increase in the severity of tax and regulation as a general constraint increases the chance of reporting a higher level of informality. These findings match those observed by Loayza et al. (2005) and Dabla-Norris and Inchauste (2007), in which a broad view towards regulation was considered.

In addition, and to gain a better understanding of what this general constraint is capturing, we evaluated high taxes and business licensing constraints separately. The results confirm the significance of the impact of tax rates on firms' decision to hide sales from the tax authorities. However, there was no evidence that the regulation of entry (business licensing) has an influence on firms' decisions to operate informally.

Interestingly, these results differ from findings presented in previous studies. As we discussed in section (2.4.1), no significant correlation was found between higher tax rates and the size of the informal economy when macroeconomic indicators were used, as in Friedman et al. (2000) and Williams (2017). In contrast, Auriol and Warlters (2005) found that high costs associated with government requirements to open new a business explain the higher levels of informality in developing countries. Again, this discrepancy could be attributed to the use of different measurements and indicators of

regulation and informality. For example, it is plausible to assume that measuring the severity of taxation by tax rates is different to gauging firms' perception and attitude towards high tax rates, and hence different results can be expected.

5.4   Addressing possible perceived respondent bias

Since survey data contains an element of subjectivity or perception, it is possible that there will be spurious correlation between the dependent and independent variables: firms that are doing well may have a rosier perception of the obstacles to business whereas, firms that perform poorly may exaggerate the obstacles or be overly critical in their assessment of the efficiency of government and its services. There is also a concern that perception bias could be correlated across respondents in any given country due to nation-wide factors such as a recent exposure to government corruption scandals or macroeconomic crises (Hellman et al., 2000; Batra et al., 2003).

Country-level bias can be controlled using country fixed effects and the only issue remaining is to control for unduly pessimistic or optimistic firms relative to the country effect. In this section, an attempt is made to address such potential bias and to ensure robustness of our regression results.

Following Hellman et al. (2000), and by focusing on the perception of corruption in particular, we examine the relationship between the average respondents' answers in the survey for each country and other external objective measures of corruption. The four external measure of corruption chosen were[5]:

- Corruption Perception Index (CPI) by Transparency International. Note that on the original scale, the index has a range from 0 representing highest corruption

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[5] Here, we use data for the year 2000 in order to be compatible with the survey's time frame.

to 10 (no corruption). The index was rescaled (taking values from 0 to 10) so that higher values represent greater corruption.

- Corruption index from International Country Risk Guide (ICRG). This index also recoded so that its scale ranging from 0 (lower levels of corruption), to 6 (higher level of corruption).

- Rule of law index from World Governance Indicators (World Bank). Here, It ranges from approximately 0 (weak) to 5 (strong) rule of law.

- Legal Structure and Security of Property Rights (Economic Freedom of the World, EFW Index) from the Fraser Institute. It is placed on a scale from zero to 10, where higher values indicating a better rule of law.

The corresponding survey questions were:

- How problematic is the factor of corruption, in general, for the operation of businesses in a given country or region. The answers are rated from 1 to 4, with 1 indicating no obstacle and 4 reflecting a major obstacle.

- How common is it "in your line of business to have to pay some irregular 'additional payment' to get things done". The answers were quantified from 1 (never) to 6 (always).

Table 5.9 reports the basic correlations[6] between these different measures of corruption. The average rate of corruption as a general obstacle for each country is found to be strongly correlated with all external measures of corruption. Perceptions of corruption by firms is positively related to CPI corruption index and the ICRG with a Pearson r = 0.77 and 0.56, respectively, It also strongly corresponds to the rule of law indicators, legal structure as well as rule of law with r = -0.81 and -0.79, respectively. Corruption

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[6] The correlation coefficient is the Pearson r. The pairwise correlations are calculated using the statistical software STATA 14.

in countries with a better legal structure and rule of law was rated very low by the firms in the survey. The average of reported answers about how common is bribe-paying have also a higher correlation with both external indices.

Table 5.9 Correlation matrix of corruption indicators

	Corruption-general constraint	Pay additional payment (bribery)	Corruption CPI index	Corruption ICRG index	Rule of law	Legal structure
Corruption - general constraint	1.00					
Pay additional payment (bribery)	0.76	1.00				
Corruption CPI index	0.77	0.76	1.00			
Corruption ICRG index	0.56	0.61	0.82	1.00		
Rule of law	-0.79	-0.66	-0.92	-0.74	1.00	
Legal structure	-0.81	-0.63	-0.87	-0.66	0.93	1.00

Notes: Number of observation is 43 countries.

The diagrams in Figures 5.9 and 5.10 illustrate the relationship between the average rate of corruption as a general obstacle from the survey and some external indices together with a regression line and associated R^2.
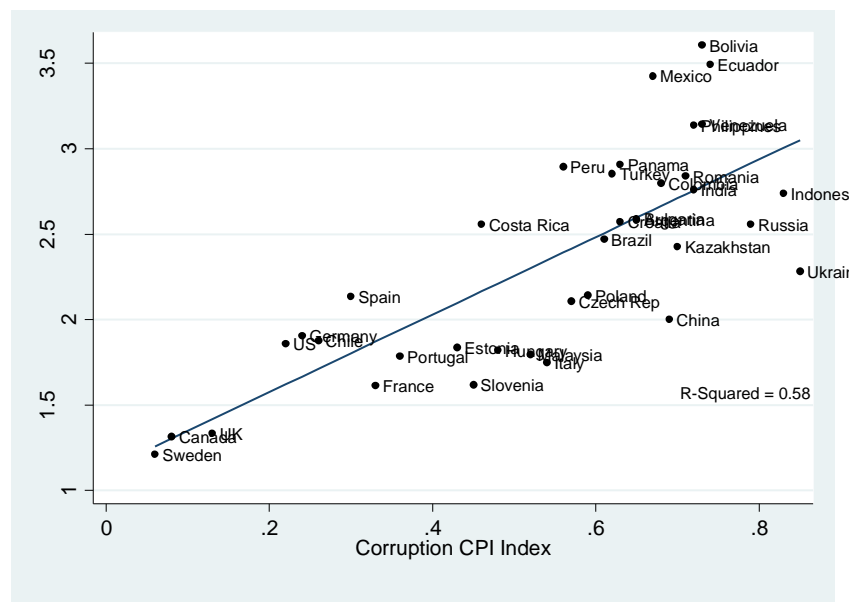
Figure 5.9 Corruption as a general constraint and CPI Index of corruption

Figure 5.10 Corruption as a general constraint and legal structure index

Although this is not a precise statistical test, the results of the correlation analysis clearly indicate that firms' views about corruption are consistent with, and to some extent correspond to, the external measures of perceptions of business people and country experts of the level of corruption in the public sector and the state of the rule of law. Given the limitations of the methodology, we can conclude with caution that the correlation analysis above supports the assumption that the World Business Environment Survey (WBES) data do not suffer significantly from perception bias.

Chapter 6 Conclusions

This study set out to empirically assess the validity of the neoliberal perspective on what determines informality. The neoliberal perspective explains the spread and persistence of the informal economy worldwide in terms of the quality of institutions, namely business regulation and the rule of law. The theoretical framework presented in Chapter 2 predicts that informality is higher in economies with higher tax rates, a higher regulatory burden and a weaker rule of law. This study assesses the validity of these predictions by employing two types of analysis and two data sets. First, it examines the determinants of informality using panel data analysis of macro level measures of informality and institutional factors for a sample of 90 countries. The second empirical investigation uses a richer and more comprehensive firm-level data set for 43 countries in an ordered probit model. By combining the results of these two empirical approaches, this study reaches the following conclusions.

First, the overall findings support the hypothesis that tax rates and regulation quality affect the size of informal economic activities: in countries with higher tax rates and a higher regulatory burden the informal economy is larger. The results of the macro-level analysis (Chapter 4), indicate that the size of informal economy decreases with better quality regulation as measured by the business regulation index (the extent to which regulations and bureaucratic procedures restrain entry and reduce competition). As the macro-level analysis has been unable to test the impact of tax rates on informality, the results from a firm-level analysis (Chapter6) reveal that higher tax rates is a significant factor influencing firms' decision to operate informally. These findings are consistent across the entire sample and developing regions.

The second conclusion that emerges from the results is that the size of informal economic activities is greater in countries with a weaker rule of law. This conclusion is supported largely by the highly significant and consistent results from the firm-level analysis that shows that higher levels of corruption in the public sector (based on the direct experience of firms) leads firms to hide a greater percentage of their sales. The panel data analysis also confirms the importance of corruption in influencing the degree of informality (though the results are not robust to the inclusion of additional regressors). Both sets of results support the ideas of the neoliberal perspective.

Taken together, these results suggest the importance of institutional determinants of informality and provide support for Loayza's (1996) argument that the informal economy will prosper when higher tax rates and a high regulatory burden are coupled with an inefficient and corrupt system of compliance control. This explains why the informal economy is a pervasive and persistent feature of most developing countries. It also explains how these economies may become trapped in a vicious circle in which higher informality reduces tax revenues, which are usually used to fund public services and infrastructure. Consequently, the deterioration of public services and infrastructure would undermine the rule of law and encourage more informality. In the context of advanced economies, however, increasing informality is considered to distort the formal economy and reduce the tax base. But if the growth of informality is caused by higher tax rates and a high regulatory burden, then these economies may also become stuck in a vicious circle of a further increase in tax rates and regulatory requirements, which lead to further increase of informal economic activities. In general, therefore, it appears that informality in many developing and developed economies is persistent and pervasive and cannot be ignored or removed though simple policy measures. Instead, and given

the importance of institutional determinants of informality, a better strategy is for government to improve aspects of governance and enhance the quality of the regulatory framework for investment and small businesses.

Finally, although this study has shed important new light on the determinants of the size of the informal economy, further analytical work is needed if we are to develop a deeper understanding of the causes of informality and its economic and social effects. Large scale surveys of firms that cover many countries and time points appear to be the best way forward for providing an improved understanding of the issues and dimensions of the informal economy. This in turn will enhance the design of policies and programmes that effectively target the key determinants of informality.

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Appendices

Appendix A. Countries in the sample – macro level panel data analysis

Country	Code	Country	Code	Country	Code
Algeria	DZA	Madagascar	MDG	Uruguay	URY
Angola	AGO	Malawi	MWI	US	USA
Argentina	ARG	Malaysia	MYS	Venezuela, RB	VEN
Bahrain	BHR	Mali	MLI	Vietnam	VNM
Bolivia	BOL	Malta	MLT		
Botswana	BWA	Mauritania	MRT		
Brazil	BRA	Mexico	MEX		
Bulgaria	BGR	Mongolia	MNG		
Burkina Faso	BFA	Morocco	MAR		
Cameroon	CMR	Mozambique	MOZ		
Canada	CAN	Namibia	NAM		
Chile	CHL	Nepal	NPL		
China	CHN	Nicaragua	NIC		
Colombia	COL	Nigeria	NGA		
Costa Rica	CRI	Oman	OMN		
Croatia	HRV	Pakistan	PAK		
Czech Rep	CZE	Panama	PAN		
Dominican Rep.	DOM	Papua New Guinea	PNG		
Ecuador	ECU	Paraguay	PRY		
Egypt	EGY	Peru	PER		
Estonia	EST	Philippines	PHL		
France	FRA	Poland	POL		
Germany	DEU	Portugal	PRT		
Ghana	GHA	Romania	ROU		
Guatemala	GTM	Russia	RUS		
Guinea-Bissau	GNB	Senegal	SEN		
Haiti	HTI	Sierra Leone	SLE		
Honduras	HND	Slovakia	SVK		
Hungary	HUN	Slovenia	SVN		
India	IND	South Africa	ZAF		
Indonesia	IDN	Spain	ESP		
Iran	IRN	Sri Lanka	LKA		
Italy	ITA	Sweden	SWE		
Jamaica	JAM	Syria	SYR		
Jordan	JOR	Tanzania	TZA		
Kazakhstan	KAZ	Thailand	THA		
Kenya	KEN	Togo	TGO		
Kuwait	KWT	Trinidad and Tobago	TTO		
Kyrgyz Rep.	KGZ	Tunisia	TUN		
Latvia	LVA	Turkey	TUR		
Lesotho	LSO	Uganda	UGA		
Lithuania	LTU	UK	GBR		
Macedonia, FYR	MKD	Ukraine	UKR		

Total (90 countries)

Appendix B. Countries in the sample –micro level Analysis

Country	Region	Number of firms	Percent	Cumulative
Argentina	Latin America and the Caribbean	77	1.85	1.85
Bolivia	Latin America and the Caribbean	81	1.94	3.79
Brazil	Latin America and the Caribbean	164	3.94	7.73
Bulgaria	Eastern Europe and Central Asia	85	2.04	9.77
Canada	(OECD) Western Europe and North America	89	2.14	11.90
Chile	Latin America and the Caribbean	87	2.09	13.99
China	East Asia	76	1.82	15.81
Colombia	Latin America and the Caribbean	89	2.14	17.95
Costa Rica	Latin America and the Caribbean	79	1.90	19.85
Croatia	Eastern Europe and Central Asia	105	2.52	22.37
Czech Republic	Eastern Europe and Central Asia	84	2.02	24.38
Dominican Republic	Latin America and the Caribbean	89	2.14	26.52
Ecuador	Latin America and the Caribbean	75	1.80	28.32
Estonia	Eastern Europe and Central Asia	105	2.52	30.84
France	(OECD) Western Europe and North America	80	1.92	32.76
Germany	(OECD) Western Europe and North America	74	1.78	34.53
Guatemala	Latin America and the Caribbean	79	1.90	36.43
Haiti	Latin America and the Caribbean	66	1.58	38.01
Hungary	Eastern Europe and Central Asia	94	2.26	40.27
India	South Asia	134	3.22	43.48
Indonesia	East Asia	65	1.56	45.04
Italy	(OECD) Western Europe and North America	67	1.61	46.65
Kazakhstan	Eastern Europe and Central Asia	75	1.80	48.45
Malaysia	East Asia	44	1.06	49.51
Mexico	Latin America and the Caribbean	75	1.80	51.31
Pakistan	South Asia	76	1.82	53.13
Panama	Latin America and the Caribbean	75	1.80	54.93
Peru	Latin America and the Caribbean	94	2.26	57.19
Philippines	East Asia	88	2.11	59.30
Poland	Eastern Europe and Central Asia	176	4.22	63.52
Portugal	(OECD) Western Europe and North America	70	1.68	65.20
Romania	Eastern Europe and Central Asia	112	2.69	67.89
Russia	Eastern Europe and Central Asia	407	9.77	77.66
Slovenia	Eastern Europe and Central Asia	118	2.83	80.49
Spain	(OECD) Western Europe and North America	81	1.94	82.43
Sweden	(OECD) Western Europe and North America	76	1.82	84.26
Trinidad & Tobago	Latin America and the Caribbean	91	2.18	86.44
Turkey	Eastern Europe and Central Asia	116	2.78	89.22
UK	(OECD) Western Europe and North America	63	1.51	90.74
US	(OECD) Western Europe and North America	85	2.04	92.78
Ukraine	Eastern Europe and Central Asia	152	3.65	96.42
Uruguay	Latin America and the Caribbean	72	1.73	98.15
Venezuela	Latin America and the Caribbean	77	1.85	100.00
Total (43 countries)		**4,167**	**100**	

Appendix C. Firm by region

Region	Number of firms	Percent	Cumulative
East Asia	273	6.55	6.55
Eastern Europe and Central Asia	1629	39.09	45.64
Latin America and the Caribbean	1370	32.88	78.52
(OECD) Western Europe and North America	685	16.44	94.96
South Asia	210	5.04	100
Total	**4167**	**100**	

Appendix D. Percentage of sales not reported to tax authorities

A. Percentage of sales not reported to tax authorities: answers in seven categories

	Percentage of sales not reported to tax authorities	Number of firms	Percent	Cumulative
1	0%	1,756	42.14	42.14
2	1-10%	547	13.13	55.27
3	11-20%	501	12.02	67.29
4	21-30%	365	8.76	76.05
5	31-40%	208	4.99	81.04
6	41-50%	322	7.73	88.77
7	>50%	468	11.23	100
	Total	**4,167**	**100**	

B. Percentage of sales not reported to tax authorities: answers in five categories

	Percentage of sales not reported to tax authorities	Number of firms	Percent	Cumulative
1	0%	1,756	42.14	42.14
2	1-10%	547	13.13	55.27
3	11-20%	501	12.02	67.29
4	21-30%	365	8.76	76.05
5	**>30**%	998	23.95	100
	Total	**4,167**	**100**	

Appendix E. Definitions and sources of variables used in the empirical analysis

Variable	Definition	Original source
Percentage of sales not reported to tax authorities	"Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity keeps "off the books": (1) none; (2) 1–10%; (3) 11–20%; (4) 21–30%; (5) 31–40%; (6) 41–50%; (7) over 50%."	World Business Environment Survey (WBES)
Tax and regulation - general constraint	"How problematic are tax and regulatory constraints for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?"	World Business Environment Survey (WBES)
Corruption - general constraint	"How problematic is corruption for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?"	World Business Environment Survey (WBES)
Financing - general constraint	"How problematic is financing for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?"	World Business Environment Survey (WBES)
Infrastructure - general constraint	"How problematic is infrastructure for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?"	World Business Environment Survey (WBES)
Confidence in courts enforceability	"I am confident that the legal system will uphold my contract and property rights in business disputes" To what degree do you agree with this statement?: fully agree (1), agree in most cases (2), tend to agree (3), tend to disagree (4), disagree in most cases (5), fully disagree (6)."	World Business Environment Survey (WBES)
Efficiency of government in delivering services	"How would you generally rate the efficiency of central and local government in delivering services: (1) very efficient, (2) efficient, (3) mostly efficient, (4) mostly inefficient, (5) inefficient, (6) very inefficient."	World Business Environment Survey (WBES)
High taxes	"Please judge on a four-point scale how problematic are tax rates for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?"	World Business Environment Survey (WBES)

Appendix E. (continued)

Variable	Definition	Original source
Business licensing	"Please judge on a four-point scale how problematic is business licensing for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?"	World Business Environment Survey (WBES)
Pay additional payment (bribery)	"Thinking about government officials, it is common for firms in my line of business to have to pay some irregular 'additional payments' to get things done. This is true: always (1), mostly (2), frequently (3), sometimes (4), seldom (5), never (6)."	World Business Environment Survey (WBES)
Bribes (as % of revenues)	"On average, what percent of revenues do firm like yours typically pay per annum in unofficial payments to public officials?: 0% (1), less than 1% (2), 1-1.99% (3), 2-9.99 (4), 10-12 % (5), 13-25% (6), over 25% (7)."	World Business Environment Survey (WBES)
Firm size dummies	Firm size is defined based on the number of full-time employees (small = fewer than 50 employees, medium = 51-500, and large = > 500).	World Business Environment Survey (WBES)
Informal economy (as % of GDP)	Informal economy is measured as a percentage of the official GDP.	Schneider et al. (2010).
Corruption CPI	The CPI index has been rescaled so that it ranges from 0 (least corrupt) to 10 (most corrupt)	Transparency International
Corruption ICRG	The ICRG index has been rescaled so that it ranges from 0 (least corrupt) to 6 (most corrupt)	International Country Risk Guide, PRS Group
Rule of law	The index range from 0 to 5, higher values mean better rule of law in a country	World Bank Governance Indicators
Legal structure	Legal Structure and Security of Property Rights from Economic Freedom of the World. The EFW Index takes on values between 0 and 10, where higher values reflect better legal environment.	Gwartney et al. (2008)
Business regulation	Business regulation index reflects the extent to which regulations and bureaucratic procedures restrain entry and reduce competition. It ranges from 0 to 10 where higher values indicate a better regulatory framework.	Gwartney et al. (2008)
Unemployment	Unemployment, total (% of total labour force)	World Bank, World Development Indicators (WDI)
Industry	Industry as value added (% of GDP)	World Bank, World Development Indicators (WDI)
GDP per capita	GDP per capita (constant 2005 US$)	World Bank, World Development Indicators (WDI)

Appendix F. Marginal effects - East Europe and central Asia

Independent variables	Marginal effects				
	Dependent variables: percent of hidden sales				
	0%	1-10%	11-20%	21-30%	>30%
Firm size - small [a]	-0.131	-0.005	0.011	0.021	0.104
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Firm size - large [a]	0.162	0.007	-0.014	-0.026	-0.129
	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)
Tax and regulation	-0.043	-0.002	0.004	0.007	0.034
	(0.001_	(0.011)	(0.002)	(0.001)	(0.001)
Corruption	-0.029	-0.001	0.002	0.005	0.023
	(0.002)	(0.015)	(0.004)	(0.002)	(0.002)
Financing	-0.008	0.000	0.001	0.001	0.006
	(0.456)	(0.465)	(0.459)	(0.457)	(0.457)
Confidence in courts enforceability	-0.014	-0.001	0.001	0.002	0.011
	(0.088)	(0.119)	(0.094)	(0.090)	(0.088)
Efficiency of government	-0.005	0.000	0.000	0.001	0.004
	(0.573)	(0.576)	(0.574)	(0.573)	(0.572)

a dy/dx is for discrete change of dummy variable from 0 to1

Note: p-value in parentheses

Appendix G. Marginal effects -Latin America and the Caribbean

Independent variables	Marginal effects				
	Dependent variables: percent of hidden sales				
	0%	1-10%	11-20%	21-30%	>30%
Firm size - small [a]	-0.046	-0.001	0.001	0.004	0.042
	(0.087)	(0.104)	(0.154)	(0.094)	(0.087)
Firm size - large [a]	0.111	0.004	-0.003	-0.010	-0.102
	(0.000)	(0.002)	(0.024)	(0.000)	(0.000)
Tax and regulation	-0.069	-0.002	0.002	0.006	0.063
	(0.000)	(0.000)	(0.017)	(0.000)	(0.000)
Corruption	-0.020	-0.001	0.001	0.002	0.018
	(0.069)	(0.089)	(0.133)	(0.075)	(0.070)
Financing	-0.024	-0.001	0.001	0.002	0.022
	(0.021)	(0.037)	(0.083)	(0.025)	(0.021)
Confidence in courts enforceability	-0.001	0.000	0.000	0.000	0.001
	(0.897)	(0.897)	(0.897)	(0.896)	(0.897)
Efficiency of government	-0.008	0.000	0.000	0.001	0.008
	(0.443)	(0.449)	(0.461)	(0.445)	(0.443)

a dy/dx is for discrete change of dummy variable from 0 to1.

Note: p-value in parentheses

Appendix H. The informal economy and the quality of institutions - regional panel data estimations

	Developing economies				Advanced economies-(OECD) Western Europe and North America			
	FE OLS	RE GLS	FE OLS	RE GLS	FE OLS	RE GLS	FE OLS	RE GLS
Business regulation	-0.387***	-0.408***	-0.341***	-0.350***	-0.088***	-0.086***	-0.070**	-0.069**
	[.0601]	[.0613]	[.064]	[.0657]	[.0263]	[.0286]	[.03]	[.0334]
Corruption CPI	0.218*	0.236*			0.241***	0.248***		
	[.1181]	[.1204]			[.0605]	[.0657]		
Legal structure			-0.145**	-0.167**			-0.05	-0.059
			[.0733]	[.0751]			[.0428]	[.0476]
Unemployment	0.0336	0.0546**	0.0282	0.0473**	0.00808	0.00897	0.00295	0.00433
	[.0251]	[.0248]	[.0239]	[.0237]	[.0121]	[.0131]	[.0136]	[.0151]
Industry	0.00168	-0.00386	0.00194	-0.0022	-0.158***	-0.157***	-0.137***	-0.134***
	[.0182]	[.0184]	[.0164]	[.0167]	[.0188]	[.0204]	[.0212]	[.0236]
Log GDP per capita	-7.953***	-7.225***	-7.955***	-7.263***	-5.730***	-5.771***	-5.898***	-5.999***
	[.4383]	[.4147]	[.4126]	[.3917]	[.3772]	[.4089]	[.4572]	[.5056]
Constant	96.65***	90.06***	98.80***	92.48***	80.11***	80.42***	82.49***	83.42***
	[3.633]	[3.608]	[3.211]	[3.199]	[4.177]	[4.687]	[5.073]	[5.733]
Observations	461	461	485	485	65	65	65	65
Countries	77	77	77	77	9	9	9	9
R-squared	0.136	0.137	0.137	0.138	0.301	0.305	0.29	0.3
F statistic	168.5		182.7		54.68		40.63	
Chi2 statistic		795.7		858.6		236.1		169.1

Dependent variable: informal economy (% GDP).
Standard errors in brackets.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%

Appendix I. WBES core survey: "Measuring conditions for business operation and growth"

Private Enterprise Questionnaire

The purpose of this survey is to better understand constraints that hinder the development of private businesses like yours. This study is being conducted for 100* countries by the World Bank and its partners on the World Business Environment Survey team. The ultimate goal of this research is to advise governments on ways to change policies that impose a burden on private firms and to develop new projects and programs that strengthen support for enterprise growth. Your answers should reflect only your perception and experience of doing business in your country.

Please note that the information obtained here will be treated strictly anonymously and confidentially. Neither your name nor the name of your firm will be used in any document based on this survey.

General Information

1. Country: _____

		Today	Three years ago
ii.	Company size: number of full-time employees:	_____	_____
	number of part-time employees:	_____	_____

iii. Year of start-up: _____

iv.	Industry:	Manufacturing	[ ]
		If manufacturing, garment firm?	[ ]
		If manufacturing, agro-processing?	[ ]
		If manufacturing, heavy industry? *(machine tools, chemicals, autos, etc)*	[ ]
		Services	[ ]
		If services, tourism, hotel, restaurant?	[ ]
		If services, transport and storage?	[ ]

*In reality, the WBES was carried out in only 80 countries and one territory.

	If services, communications/information technology?	[ ]
	Commerce (*wholesale/retail trade*)	[ ]
	Agriculture, hunting, fishing and forestry	[ ]
	Mining and quarrying	[ ]
	Electricity, gas, and water	[ ]
	Construction	[ ]

v. Please specify your enterprise's leading products or services (*up to three*):

_____

vi. Location of management: Capital city   [ ]
                             Large city   [ ]
                             Small city or countryside   [ ]

vii. City name: _____

viii. Does any government agency or state body have a financial stake in the ownership of your firm?
Yes [ ] (*specify percent of total ownership*) _____ %   No [ ]

ix. Does any foreign company or individual have a financial stake in the ownership of your firm?
Yes [ ] (*specify percent of total ownership and nationality percent of leading foreign owner*) _____
No [ ]

x. Does your firm export?
Yes [ ] (*specify percent of total sales*) _____ %   No [ ]

xi. Sales to state sector?
Yes [ ] (*specify percent of total sales to state,*   No [ ]
         state agencies, or enterprises) _____ %

xii. What is the legal organization of this company?
Single proprietorship   [ ]
Partnership   [ ]
Cooperative   [ ]
Corporation, privately held   [ ]
Corporation listed on a stock exchange   [ ]
Other (*specify*): _____ [ ]

xiii. Which of the following best describes the overall control of your firm, where control means making major decisions concerning the enterprise's direction? (*Allow only one choice.*)

"My firm is controlled by . . ."

		Today	Three years ago
(a)	individual owner(s)	1	1
(b)	a family	2	2
(c)	a domestic company group (conglomerate)	3	3
(d)	a foreign company or group	4	4
(e)	an investment fund or mutual fund	5	5
(f)	a bank	6	6
(g)	its board of directors/supervisory board	7	7
(h)	its managers	8	8
(i)	its workers	9	9
(j)	government	10	10
(k)	other (*specify*): _____	11	11

xiv. Does your firm have holdings or operations in other countries?
Yes [   ]   No [   ]

xv. If your firm has shareholders, what percent of your firm is held by the three largest shareholders, either directly or indirectly? _____%

xvi. How was your firm established (*circle one*)?
    (a) Originally private, from time of start-up
    (b) Privatization of a state-owned firm
    (c) Private subsidiary of a formerly state-owned firm
    (d) Joint venture, domestic and foreign private owners
    (e) Other (*specify*): _____

I. QUALITY AND INTEGRITY OF PUBLIC SERVICES

1. Please rate the overall quality and efficiency of services delivered by the following public agencies or services: (If usual provider is private, N/A.)

		Very good	Good	Slightly good	Slightly bad	Bad	Very bad	
Regulatory/judicial								
(a)	Customs service/agency	1	2	3	4	5	6	N/A
(b)	The judiciary/courts	1	2	3	4	5	6	N/A
Infrastructure								
(c)	Roads department/public works	1	2	3	4	5	6	N/A
(d)	Postal service/agency	1	2	3	4	5	6	N/A
(e)	Telephone service/agency	1	2	3	4	5	6	N/A
(f)	Electric power company/agency	1	2	3	4	5	6	N/A
(g)	Water/sewerage agency	1	2	3	4	5	6	N/A

Human services

(g)	Public health care service/ hospitals	1	2	3	4	5	6	N/A
(h)	Education services/schools	1	2	3	4	5	6	N/A

Security

(i)	Police	1	2	3	4	5	6	N/A
(j)	Armed forces/military	1	2	3	4	5	6	N/A

Policy/legislation

(k)	Central government leadership (*president/PM/ cabinet*)	1	2	3	4	5	6	N/A
(l)	Regional government	1	2	3	4	5	6	N/A
(m)	The parliament	1	2	3	4	5	6	N/A
(n)	The central bank	1	2	3	4	5	6	N/A

2. Does your firm own a generator because of unreliable or fluctuating electric power supply? Yes [   ]   No [   ]

3. a. If you import, how long does it typically take from the time your goods arrive in their point of entry (e.g., port, airport) until the time you can claim them from customs? _____ days   N/A
   b. How many days does the preshipment inspection process take, from the time you submit the goods until the time they are released?
   a. for imports _____ days   b. for exports _____ days   N/A

4. Does your firm have Internet access? Yes [   ]   No [   ]

II. Rules and Regulations

5. "In general, information on the laws and regulations affecting my firm is easy to obtain." To what degree do you agree with this statement?
   (1) Fully agree
   (2) Agree in most cases
   (3) Tend to agree
   (4) Tend to disagree
   (5) Disagree in most cases
   (6) Fully disagree

6. "In general, interpretations of regulations affecting my firm are consistent and predictable." To what degree do you agree with this statement?

		Today	Three years ago
(1)	Fully agree	[ ]	[ ]
(2)	Agree in most cases	[ ]	[ ]

(3)	Tend to agree	[ ]	[ ]
(4)	Tend to disagree	[ ]	[ ]
(5)	Disagree in most cases	[ ]	[ ]
(6)	Fully disagree	[ ]	[ ]

7. Please judge on a four-point scale how problematic are these different regulatory areas for the operation and growth of your business (Please do not select more than four obstacles as "major" [4].) Please circle the most important obstacle.

		No obstacle	Minor obstacle	Moderate obstacle	Major obstacle
(a)	Business licensing	1	2	3	4
(b)	Customs/foreign trade regulations in your country	1	2	3	4
(c)	Labor regulations	1	2	3	4
(d)	Foreign currency/exchange regulations	1	2	3	4
(e)	Environmental regulations	1	2	3	4
(f)	Fire, safety regulations	1	2	3	4
(g)	Tax regulations/administration	1	2	3	4
(h)	High taxes	1	2	3	4

8. How often does the government intervene in the following types of decisions by your firm?

		Always	Usually	Frequently	Sometimes	Seldom	Never
(a)	Investment	1	2	3	4	5	6
(b)	Employment	1	2	3	4	5	6
(c)	Sales	1	2	3	4	5	6
(d)	Pricing	1	2	3	4	5	6
(e)	Mergers/acquisitions	1	2	3	4	5	6
(f)	Dividends	1	2	3	4	5	6
(g)	Wages	1	2	3	4	5	6

9. Please rate your overall perception of the relation between government and/or bureaucracy and private firms on the following scale. "All in all, for doing business I perceive the state as . . . "

	Central/national government					Local/regional government				
	Very helpful	Mildly helpful	Neutral	Mildly unhelpful	Very unhelpful	Very helpful	Mildly helpful	Neutral	Mildly unhelpful	Very unhelpful
Now	1	2	3	4	5	1	2	3	4	5
Three years ago	1	2	3	4	5	1	2	3	4	5

III. LEGAL SYSTEM

10. In resolving business disputes, do you believe your country's court system to be . . .

		Always	Usually	Frequently	Sometimes	Seldom	Never
(a)	fair and impartial	1	2	3	4	5	6
(b)	honest/uncorrupt	1	2	3	4	5	6
(c)	quick	1	2	3	4	5	6
(d)	affordable	1	2	3	4	5	6
(e)	consistent	1	2	3	4	5	6
(f)	decisions enforced	1	2	3	4	5	6

11. "I am confident that the legal system will uphold my contract and property rights in business disputes." To what degree do you agree with this statement?

		Today	Three years ago
(1)	Fully agree	[ ]	[ ]
(2)	Agree in most cases	[ ]	[ ]
(3)	Tend to agree	[ ]	[ ]
(4)	Tend to disagree	[ ]	[ ]
(5)	Disagree in most cases	[ ]	[ ]
(6)	Fully disagree	[ ]	[ ]

IV. BUREAUCRATIC RED TAPE

12. What percentage of senior management's time per year is spent in dealing with government officials about the application and interpretation of laws and regulations? _____ %

13. "Thinking about government officials, it is common for firms in my line of business to have to pay some irregular 'additional payments' to get things done." This is true . . .
    (1) always
    (2) mostly
    (3) frequently
    (4) sometimes
    (5) seldom
    (6) never (skip to question 16)

14. "Firms in my line of business usually know in advance about how much this 'additional payment' is." This is true . . .
    (1) always
    (2) mostly
    (3) frequently

        (4)   sometimes
        (5)   seldom
        (6)   never

15. "If a firm pays the required 'additional payment,' the service is usual-ly also delivered as agreed." This is true...
        (1)   always
        (2)   mostly
        (3)   frequently
        (4)   sometimes
        (5)   seldom
        (6)   never

16. "If a firm pays the required additional payment to a particular gov-ernment official, another government official will subsequently re-quire an additional payment for the same service..."
        (1)   always
        (2)   mostly
        (3)   frequently
        (4)   sometimes
        (5)   seldom
        (6)   never

17. "If a government agent acts against the rules, I can usually go to an-other official or to his superior and get the correct treatment without recourse to unofficial payments." This is true...
        (1)   always
        (2)   mostly
        (3)   frequently
        (4)   sometimes
        (5)   seldom
        (6)   never

Appendix J. (continued)

18. During the last year, please characterize the interactions you had in each of the following contexts.

	During the last year, how many times did your enterprise have contact with this agency or type of official?	In what percent of these contacts did a public official indicate or request that you should make an extra payment?	On average, how much was required as payment (in equivalent value if it took the form of gift or other favor)?
Electric power company	_____	_____ %	$_____
Telephone company	_____	_____ %	$_____
Business license authority	_____	_____ %	$_____
Tax agency/ inspectors	_____	_____ %	$_____
Government procurement agents	_____	_____ %	$_____
Customs and trade licensing officials	_____	_____ %	$_____
Judges/court officials	_____	_____ %	$_____
Politicians influencing policies affecting your firm	_____	_____ %	$_____
Other (specify):	_____	_____ %	$_____

Appendix J. (continued)

19. On average, what percent of revenues do firms like yours typically pay per annum in unofficial payments to public officials?

0%	1
Less than 1%	2
1–1.99%	3
2–9.99%	4
10–12%	5
13–25%	6
Over 25%	7
Don't know	8

20. When firms in your industry do business with the government, how much of the contract value must they offer in additional or unofficial payments to secure the contract?
    (1) 0%
    (2) Up to 5%
    (3) 6–10%
    (4) 11–15%
    (5) 16–20%
    (6) Greater than 20% (*specify* _____ %)
    DK Don't know

21. When a new law, rule, regulation, or decree is being discussed that could have a substantial impact on your business, how much influence does your firm typically have at the national level of government on the content of that law, rule, regulation, or decree?

	1 = Never influential	2 = Seldom influential	3 = Influential	4 = Frequently influential	5 = Very influential
Executive	[ ]	[ ]	[ ]	[ ]	[ ]
Legislature	[ ]	[ ]	[ ]	[ ]	[ ]
Ministry	[ ]	[ ]	[ ]	[ ]	[ ]
Regulatory agency	[ ]	[ ]	[ ]	[ ]	[ ]

V. PREDICTABILITY

22. Do you regularly have to cope with unexpected changes in economic and financial policies that materially affect your business? Changes in economic and financial policies are...
    (1) completely predictable
    (2) highly predictable
    (3) fairly predictable
    (4) fairly unpredictable
    (5) highly unpredictable
    (6) completely unpredictable

23. Do you regularly have to cope with unexpected changes in rules, laws, or regulations that materially affect your business? Changes in rules, laws, and regulations are...
    (1) completely predictable
    (2) highly predictable
    (3) fairly predictable
    (4) fairly unpredictable
    (5) highly unpredictable
    (6) completely unpredictable

24. Please evaluate the following statement: "The process of developing new rules, regulations, or policies is usually such that businesses are informed in advance of changes affecting them." This is true...
    (1) always
    (2) mostly
    (3) frequently
    (4) sometimes
    (5) seldom
    (6) never

25. "In case of important changes in laws or policies affecting my business operation, the government takes into account concerns voiced either by me or by my business association." This is true...
    (1) always
    (2) mostly
    (3) frequently
    (4) sometimes
    (5) seldom
    (6) never

26. "In the last three years, the laws, regulations and policies affecting my business have become..."
    (1) much more predictable
    (2) somewhat more predictable
    (3) unchanged
    (4) somewhat less predictable
    (5) much less predictable
    (6) don't know

VI. Financial Sector Services and Corporate Governance

27. "I have full confidence in the ability of my country's financial system to provide financing to private firms like mine." To what degree do you agree with this statement?

		Today	Three years ago
(1)	Fully agree	[ ]	[ ]
(2)	Agree in most cases	[ ]	[ ]
(3)	Tend to agree	[ ]	[ ]
(4)	Tend to disagree	[ ]	[ ]
(5)	Disagree in most cases	[ ]	[ ]
(6)	Fully disagree	[ ]	[ ]

28. Please identify the share (percentage) of your firm's fixed investment over the last year coming from each of the following sources:

Internal funds/retained earnings	_____ %
Equity, sale of stock	_____ %
Local commercial banks	_____ %
Investment funds/special development finance	_____ %
Other state sources	_____ %
Foreign banks	_____ %
Family/friends	_____ %
Money lenders, traditional or informal sources	_____ %
Supplier credit	_____ %
Leasing arrangement	_____ %
Other (specify): _____	_____ %
	100%

29. How long does it take to transfer money to a supplier through the financial system?

(a)	Domestic supplier	_____ days (now)
		_____ days (three years ago)
(b)	Foreign supplier	_____ days (now)
		_____ days (three years ago)

30. Please judge on a four-point scale how problematic are these different financing issues for the operation and growth of your business. (Please do not select more than four as "major obstacles" [4].) Please circle the most important.

		No obstacle	Minor obstacle	Moderate obstacle	Major obstacle
(a)	Collateral requirements of banks/ financial institutions	1	2	3	4
(b)	Bank paperwork/bureaucracy	1	2	3	4

(c)	High interest rates	1	2	3	4
(d)	Need special connections with banks/financial institutions	1	2	3	4
(e)	Banks lack money to lend	1	2	3	4
(f)	Lack access to long-term loans	1	2	3	4
(g)	Corruption of bank officials	1	2	3	4
(h)	Lack access to foreign banks	1	2	3	4
(i)	Lack access to nonbank equity/ investors/partners	1	2	3	4
(j)	Lack access to specialized export finance	1	2	3	4
(k)	Lack access to lease finance for equipment	1	2	3	4
(l)	Inadequate credit/financial information on customers	1	2	3	4

31. Does your firm use international accounting standards (IAS)?
Yes [ ]   No [ ]

32. Does your firm provide its shareholders with annual financial statements that have been reviewed by an external auditor?
Yes [ ]   No [ ]

VII. COMPETITION

33. Regarding your firm's major product line, how many competitors do you face in your markets?
(a) none   (b) three or fewer   (c) many (*more than three*)

34. Which of the following would you define as your leading competitor?

(a)	Domestic small and medium-size enterprises	1
(b)	Domestic large private enterprises	2
(c)	Foreign firm producing in domestic market (not imports)	3
(d)	State-owned enterprises	4
(e)	Micro-enterprises/informal sector	5
(f)	Legal imports	6
(g)	Smuggled goods	7
(h)	My firm has no competitors	8
(i)	Other (*specify*): _____	9

35. Please judge on a four-point scale how problematic for your firm are the following practices of your competitors.

		No obstacle	Minor obstacle	Moderate obstacle	Major obstacle
(a)	They avoid sales tax, VAT, or other taxes.	1	2	3	4
(b)	They do not pay duties or observe trade regulations.	1	2	3	4
(c)	Foreign producers sell below international prices.	1	2	3	4
(d)	Domestic producers unfairly sell below my prices	1	2	3	4
(e)	They avoid labor taxes/regulations (e.g., social security).	1	2	3	4
(f)	They violate my copyrights, patents, or trademarks.	1	2	3	4
(g)	They receive subsidies (including the toleration of tax arrears) from national/local government.	1	2	3	4
(h)	They have favored access to credit, infrastructure services, or customers.	1	2	3	4

36 Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical firm in your area of activity reports for tax purposes?

(a)	All (100%)	1
(b)	90–99%	2
(c)	80–89%	3
(d)	70–79%	4
(e)	60–69%	5
(f)	50–59%	6
(g)	Less than 50% (*specify* _____%)	7

VIII. SUMMARY QUESTIONS

37. How would you generally rate the efficiency of government in delivering services?

		Today	Three years ago
(1)	Very efficient	[ ]	[ ]
(2)	Efficient	[ ]	[ ]
(3)	Mostly efficient	[ ]	[ ]
(4)	Mostly inefficient	[ ]	[ ]
(5)	Inefficient	[ ]	[ ]
(6)	Very inefficient	[ ]	[ ]

38. Please judge on a four-point scale how problematic are the following factors for the operation and growth of your business. (Please do not select more than three obstacles as "major" [4].) Please circle the most important obstacle:

		No obstacle	Minor obstacle	Moderate obstacle	Major obstacle
(a)	Financing	1	2	3	4
(b)	Infrastructure (e.g., telephone, electricity, water, roads, land)	1	2	3	4
(c)	Taxes and regulations	1	2	3	4
(d)	Policy instability/uncertainty	1	2	3	4
(e)	Inflation	1	2	3	4
(f)	Exchange rate	1	2	3	4
(g)	Functioning of the judiciary	1	2	3	4
(h)	Corruption	1	2	3	4
(i)	Street crime/theft/disorder	1	2	3	4
(j)	Organized crime/mafia	1	2	3	4
(k)	Anticompetitive practices by government or private enterprises	1	2	3	4
(l)	Other (specify):_____	1	2	3	4

IX. ECONOMIC PERFORMANCE

39. Please estimate the growth of your company's sales, investment, exports, employment, and debt over the past year.

	Sales ($ value)	Investment ($ value)	Exports ($ value)	Full-time employment (# workers)	Debt ($ value)
Increase	____%	____%	____%	____%	____%
No change	0	0	0	0	0
Decline	____%	____%	____%	____%	____%

40. Please predict the growth of your company's sales, investment, and employment over the next year.

	Sales ($ value)	Investment ($ value)	Exports ($ value)	Full-time employment (# workers)	Debt ($ value)
Increase	____%	____%	____%	____%	____%
No change	0	0	0	0	0
Decline	____%	____%	____%	____%	____%

41. For background purposes only (to compare your firm to others in our sample), please estimate
    (a) the value of your firm's total sales in the last one year:
        $_____
    (b) the value of your firm's fixed assets (land, building, equipment):
        $_____
    (c) the value of your firm's debts:
        $_____

Thank you very much for having taken the time to complete this questionnaire. The information on your perceptions is a very important input for the evaluation of conditions in the business environment and private sector relations with government, as well as for the formulation of policy advice.

We would appreciate any thoughts you might like to add on the business environment, on the relationship between the private sector and government, or comments on the questionnaire in general.

THE SURVEY ENDS HERE.
THANK YOU FOR YOUR COOPERATION.