Chapter 2: Theoretical background

2.1. Introduction

This chapter explores the theoretical literature on the informal economy by examining the key theories that underpin it. It begins by introducing and defining the concept of the informal economy and then analyses the main causes and effects of economic informality from a theoretical perspective. One of the central focuses is on the theory of the public sector and taxation, as these are significant drivers of informality. According to Schneider et al. (2010), the growth of the informal economy[14] can lead to a reduction in state revenues, which in turn diminishes the quality and quantity of publicly provided goods and services. This reduction often results in higher tax rates for firms and individuals in the formal sector. The combination of increased tax rates and deteriorating public goods and services—such as infrastructure and administration—creates even stronger incentives for individuals and economic agents to engage in informal economic activities.

The chapter also examines other key factors contributing to economic informality, such as the rule of law, government effectiveness, regulations or bureaucracies related to the ease of doing business, the dominance of the agriculture sector, the size of government, and electric consumption. These factors will be incorporated into the model and explained in detail.

Additionally, the chapter provides an in-depth discussion of the primary methods used to measure the informal economy, including econometric models and methodologies. It outlines the advantages and disadvantages of each approach, offering a rationale for the choice of the MIMIC model as the preferred method for measuring the informal economy, as opposed to other available models.

The informal economy tends to be larger in developing and transition economies, though it also exists in more advanced economies (Schneider, 2007; Schneider & Buehn, 2012; Hassan & Schneider, 2016a). However, its consequences vary across different countries in terms of intensity. The adverse effects of a growing informal sector are numerous and complex, making it crucial to identify and mitigate these effects (Schneider & Enste, 2000; Schneider, 2014). Despite its negative impacts, in some cases, the informal economy can serve as a survival

[14] Throughout this research only the term Informal Economy will be used, as opposed to existing literature which refers to the informal economy with other terminologies discussed in section 2.2 of this chapter.

mechanism for many people globally, especially when it operates at manageable levels (Finnegan & Singh, 2004; Chen, 2004, 2007, 2012).

When the informal economy was first acknowledged in the early 1970s, many argued that it was a marginal and peripheral phenomenon, disconnected from the official economy of modern capitalist systems (Becker, 2004). However, over time, there has been increasing global interest in the informal economy due to its growing significance, as a substantial share of the global workforce now participates in informal economic activities (Chen, 2012).

While informal economic activities are prevalent worldwide, most societies attempt to control them through various measures such as punishment, prosecution, fostering economic growth, or providing education. It is understood that there is an inverse relationship between economic growth and the size of the informal economy (Schneider et al., 2010). As the economy grows and job opportunities increase, individuals are more likely to seek employment in the formal sector rather than the informal one. Nevertheless, the informal economy can no longer be viewed as a temporary phenomenon. It has become more entrenched, particularly in countries where income and assets are distributed inequitably. In such cases, even with economic growth, if improvements in employment levels and income distribution do not occur, the informal economy remains a significant part of the overall economic activities (Becker, 2004).

Accurate data about the size and scope of the informal economy, the individuals involved, and the frequency of such activities is essential for making informed and effective policy decisions on resource allocation. Unfortunately, obtaining reliable information on informal economic activities—particularly in the goods and labour markets—is difficult because those engaged in these activities often prefer to remain anonymous (Dell'Anno & Schneider, 2003).

In developing and transition economies, both the poor and the middle class often rely on the informal economy to meet their financial and economic needs (Chen, 2012). While informal economic activities offer alternative forms of employment and production for many, they also impose significant costs on the economy. These costs include tax evasion, informal employment, disregard for the rule of law, and unfair competition, which create substantial challenges for governments (Losby et al., 2002; Chen, 2012; Williams & Martinez, 2014). The nature and characteristics of the informal economy have been the subject of considerable debate in both policy and academic circles, as discussed in more detail in the

literature review chapter. The informal economy remains a complex and multifaceted concept with no single, universally accepted definition, and a variety of terms have been used to describe it.

2.2. Defining the informal economy

Defining the informal economy has been a challenge for many scholars, as the definition chosen influences how it is measured. Additionally, various terminologies are used by different authors to describe what is commonly referred to as the informal economy. Terms such as shadow economy, black economy, underground economy, non-observed economy, bazaar economy, grey economy, unobserved economy, and hidden economy are frequently encountered in the literature. In this study, the term "*informal economy*" will be used in accordance with the definition provided by Fiege (1990, p.10), which emphasises the impact of state burdens, such as taxation, social security contributions, regulation, the rule of law, and administrative bureaucracies, on individuals' decisions to engage in activities that do not comply with these burdens (Schneider, 2007).

Hart (2008a) defines the informal economy as a set of economic activities that occur outside the framework of bureaucratic public and private sector establishments. Ihrig & Ihrig, and Moe (2004) define it as a sector that produces legal goods but does not comply with government regulations. Another common definition describes it as all unregistered economic activities that contribute to the officially calculated or observed GDP (Fiege, 1989; Frey & Pommerehne, 1984; Schneider, 2007). Smith (1994, p.18) characterises it as "*market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP.*" Fleming et al. (2000, p. 389) offer a broader definition, describing it as "*those economic activities and the income derived from them that circumvent or otherwise avoid government regulation, taxation, or observation."*

Pedersen (2003, p.13-19) offers a narrower definition, stating that the informal economy includes "*all market-based legal production of goods and services that are deliberately concealed from public authorities for the following reasons: to avoid payment of income, value-added or other taxes, and thus engage in tax evasion; to avoid payment of social security contributions, leading to informal employment; to avoid meeting certain legal labour market standards, such as minimum wages, maximum working hours, safety standards, etc.; and to avoid complying with certain administrative procedures, such as completing statistical*

questionnaires or other forms." Similarly, Feige (1990, p.10) defines the informal economy as those economic activities that circumvent the costs and are excluded from the benefits and rights included in laws and administrative rules covering property relationships, labour contracts, financial credit, and social security systems.

A study by Lippert and Walker (1997, p.5) refers to the informal economy as the underground economy, describing it as a "*reasonable consensus definition of the overall underground economy*". They outline a taxonomy of types of underground economic activities, which can involve both illegal and legal activities from a monetary and non-monetary transactions perspective. Illegal activities range from trading stolen goods and drug dealing to prostitution, smuggling, and the production and trafficking of drugs (Lippert & Walker, 1997; Mirus & Smith, 1997). Legal but informal activities, according to Mirus & Smith (1997), can be categorised into tax evasion and tax avoidance. Tax evasion refers to unreported income from various sources. In contrast, tax avoidance can include employee discounts and fringe benefits from a monetary perspective and activities like DIY or neighbour-help from a non-monetary perspective.

	Monetary Transactions		**Non-Monetary Transactions**	
Illegal Activities	Trade in stolen goods, drugs; manufacture of drugs; prostitution, gambling, fraud		Barter, drugs, stolen goods, etc.	Produce or grow drugs for own use. Theft for own use.
	Tax Evasion	**Tax Avoidance**	**Tax Evasion**	**Tax Avoidance**
Legal Activities	Unreported income from self-employ-ment, wages, salaries, and assets	Employee discounts, fringe benefits (cars, subsidized food, etc.)	Barter of legal services and goods.	Do-it-yourself work

Table 2.2. 1 - A Taxonomy of Types of Underground Economic Activities, Source: Lippert and Walker (1997, p. 5)

In the majority of studies, authors exclude illegal underground economic activities that align with serious crimes, such as burglary, robbery, drug dealing, and so on. They also exclude the informal household economy, which includes household services, production, and do-it-yourself services (Schneider, 2007, 2014). In most works, the term "informal economy" is preferred over "informal sector" because the workers and enterprises involved do not belong to a single sector of economic activity but span multiple sectors (de Soto, 1989; Rauch, 1991). This study will, therefore, focus on the narrower definition provided by Pedersen (2003, p.13-19) and will incorporate the new institutional economics classification of the informal economy as described in Fiege (1990).

2.3. Theory of the informal economy

Estimates of the size of the informal economy vary depending on the definition of its concept and the characteristics of different countries worldwide. As a result, there is an expanding body of literature analysing the theories and debates surrounding the informal economy. According to Gibson and Kelley (1994), the fundamental principles of the informal sector are that it arises from the capital-limited nature of the economy. They argue that if capital were not in short supply, all economic activity would be formal.

How the Informal Economy arises

There are different schools of thought regarding the informal economy, including the dualists, the structuralists, the legalists, and the voluntarists (Chen, 2012). Each school of thought offers a distinct theory on how the informal economy arises. Dualists argue that informal agents are excluded from new economic opportunities due to imbalances between population growth rates and modern industrial employment, as well as a mismatch between people's skills and the structure of modern economic opportunities. Structuralists, on the other hand, suggest that the nature of capitalism and the drive for capitalist growth can encourage and drive informality. Chen (2012) explains this perspective in terms of formal firms striving to increase profitability by reducing labour costs and increasing competitiveness while reacting to the power of organised labour, state regulation (especially taxes and social legislation), global competition, and the process of industrialisation (including off-shore industries, subcontracting chains, and flexible specialisation).

From the legalists' perspective, a hostile legal system compels people to become self-employed and operate informally under their extra-legal norms. Voluntarists,

similarly, argue that informal agents choose to operate informally because they perceive the costs associated with formality to be higher than those associated with informality.

The relationship between formal and informal economy

These four leading schools of thought on the theory of the informal sector offer different perspectives regarding the relationship between formal and informal economies. The dualists, for example, defend the view that informal agents and their activities have few linkages with the formal economy. Instead, they argue that the informal economy operates as a distinct and separate sector, with informal workers, who are mostly self-employed, forming the disadvantaged part of a dualistic or segmented labour market. The dualists tend to pay relatively little attention to the relationships between the informal sector and government regulations or tax burdens. However, they recommend that governments create more jobs, offer credit and business development services to informal agents, and provide essential infrastructure and social services to their families (Chen, 2012; la Porta & Schleifer, 2014).

In contrast, the structuralists view the informal and formal economies as intrinsically linked. They see both informal firms and informal workers as subordinated to the interests of capitalist development, contributing cheap goods and services. The structuralists argue that governments should address the unequal relationship between "big business" and subordinated producers and workers by regulating both commercial and employment relationships. The legalists, meanwhile, focus on informal firms and the formal regulatory environment, often neglecting informal wage workers and the formal economy itself. They acknowledge that formal firms often collaborate with the government to set bureaucratic regulations, which make it harder for new entrants, sometimes creating barriers to entry and driving informality (De Soto, 1989; Chen, 2012). The legalists argue that governments should simplify bureaucratic procedures to encourage informal enterprises to register and extend legal property rights to the assets held by informal operators, thereby unlocking their productive potential and transforming their assets into real capital.

The voluntarists, on the other hand, pay less attention to the economic linkages between informal agents and formal firms. They typically subscribe to the view that informal agents create unfair competition for formal agents by avoiding formal regulations, taxes, and other production costs. The voluntarists argue that

informal agents should be brought into the formal regulatory environment to increase tax rates and reduce unfair competition for formal businesses (Chen, 2012).

Factors driving informality

There are various theories regarding what constitutes and drives informality. Maloney (2004) argues that the informal economy is made up of informal entrepreneurs who either choose to work informally or are forced to do so. Other economists suggest that informal employment tends to increase during economic crises or downturns, with necessity and survival being the primary causes of informality (Chen, 2004, 2007, 2012; Finnegan & Singh, 2004; Schneider, 2002, 2007; Cling et al., 2010). In contrast, some studies argue that informal employment and informality are characteristics of modern economic growth and the global economy, with informal wage workers hired by formal firms growing in numbers worldwide (Finnegan & Singh, 2004; Cling et al., 2010). Increasingly, it is acknowledged that different factors drive different segments of the informal economy. As a result, many scholars use the MIMIC model to measure the informal economy (Schneider, 2002, 2007, 2014).

Several developments have been made in models that aim to capture the components and driving factors of informality. Perry (2007) proposed a holistic model of the composition and causes of informality. For the composition of informality, Perry identified three types of economic agents: workers, micro-firms, and firms. For the causes of informality, the authors specified two forms: Exit (voluntary informality) and Exclusion (involuntary informality). Kanbur (2009) proposed a conceptual framework distinguishing four types of economic responses to regulation, highlighting the importance of regulation, bureaucratic rules, and norms, as well as taxation, in determining the size of informality in developing countries, where informality is substantial (Chen, 2012). The ILO and WIEGO have also developed and tested a multi-segmented model of informal employment, defined in terms of employment statuses. This model broadens the concept and definition of the informal sector to incorporate previously excluded forms of informal employment. It includes all forms of work-related informality as seen in industrialised, transition, and developing economies, particularly the employment arrangements of the working poor (Chen, 2012).

Understanding the informal economy and its primary drivers is crucial for combating, controlling, and potentially formalising it. The impact of the informal

economy on the formal or overall economy has been shown to be significant. Loayza (1996) finds that the size of the informal economy is positively correlated with tax burdens, labour market restrictions, and inefficient government institutions. This conclusion is based on data from Latin American countries and has been tested by several scholars, including Loayza (1996) and Friedman et al. (2000). Friedman et al. (2000) argue that the costs of bureaucracy and corruption, rather than official taxes, are key factors contributing to the informal sector. They suggest that informal sector producers avoid much of this tax burden but, in doing so, must operate with less assistance from public services, such as protection of property rights, police, courts, and essential utilities like roads, water, and sewage disposal.

Azuma and Grossman (2002) investigate the drivers of informality, suggesting that heavy taxation, bribes, and bureaucratic regulations are major causes. Using two models of the state (one in which the state acts as a proprietary instrument for the ruling elite and another where the state is benevolent and seeks to maximise the net incomes of all producers), they demonstrate that a large informal sector exists because productive endowments often contain unobservable components. The state cannot adjust the amount it extracts from formal sector producers according to each producer's endowment (Azuma & Grossman, 2002).

Some view the informal economy as exploitative, organised, and low-paid, with fraudulent activity being a key feature, as seen in Williams (2005). However, others suggest that some workers and producers choose informality rather than being forced into it (Williams & Renooy, 2008). For instance, Williams & Renooy (2008) show that around 60% of undeclared work in EU countries (EU27) was done voluntarily, while only 18% was due to exclusion from the formal economy. Therefore, the emerging view is that the informal economy consists of diverse, heterogeneous markets, with different groups of individuals and firms engaged in various informal activities for different reasons and at varying income levels (Andrews et al., 2011). From a policy perspective, it is essential to understand the precise nature of informality, as policies targeting its different types may need to vary considerably.

Main agents involved in the informal economy

The informal economy is primarily understood to consist of three types of actors or agents engaged in informal economic activities, and these actors are the main drivers of the informal economy as a whole (Andrews et al., 2011). First, there are the informal workers employed by both formal and informal firms. This group includes jobs where labour regulations are not applied, enforced, or complied with or jobs that are not declared to tax authorities by the firms or producers. It typically involves illegal immigrant workers (more common in developed countries), workers who would prefer to work in the formal sector but cannot find such employment (a situation more typical in developing countries), and those who are satisfied with informal employment (again, more common in developing countries).

Secondly, there are the informal self-employed individuals, which include own-account workers (i.e. self-employed people without employees) who operate entirely informally. This category also includes self-employed workers who derive part of their income from undeclared (cash-in-hand) work to avoid taxation, such as VAT and income tax. This group mainly consists of unlicensed street traders, individuals balancing home and income-raising responsibilities, self-employed tradespeople, and household service workers performing cash-in-hand work for friends, family, and acquaintances (Andrews et al., 2011).

The third and final group of actors driving the informal economy consists of firms or producers and informal production. This form of informality includes both formal and informal firms (with employees) conducting all or part of their business "off-the-books"; for instance, by avoiding VAT payments, under-reporting revenues, and employing informal workers. This group typically comprises firms that regularly engage in informal activities as a strategy or means of "getting by," as well as entrepreneurial start-ups that use informality as a low-cost method for testing a business venture or establishing the firm (Andrews et al., 2011).

From a behavioural perspective, participation in the formal economy by different actors (outlined above) can be viewed as a decision driven by a cost-benefit analysis. A variety of factors may influence the decisions of these actors, including individual and firm characteristics, market structure, social norms, institutional and policy settings, and how these factors interact in different circumstances (Andrews et al., 2011).

Impact of the informal economy

The volume of informal activities and the size of the informal sector can generate externalities that affect actors both within the informal economy and in the formal economy. According to Enste (2010), a large informal sector can create a situation where a given level of public services requires higher taxes on the income and profits of formal firms and workers, making the informal sector more attractive in comparison. This means that the government has to rely more on formal firms and workers, imposing higher taxes on them. Additionally, high levels of informality can reduce trust in government institutions and services and lead to social norms that accept free-riding on public services and tax evasion, which can further increase informality and externalities (Andrews et al., 2011; Enste, 2010). These mechanisms can result in countries becoming trapped in self-sustaining equilibria of either low or high levels of informal employment (Bovi & Dell'Anno, 2010).

For countries in between these extremes, measures that reduce the extent of informality can have a multiplier effect, leading to improved finances and lower corruption, which, in turn, can further reduce informality (Andrews et al., 2011). Thus, the informal sector can have an impact on economic growth and productivity. Some studies that estimate the impact of informality on economic growth show a negative cross-country correlation between the level of GDP per capita and indicators of informality (Loayza, 1996). However, this relationship may not be causal, as the level of economic development affects the quality of institutions, which in turn determines the extent of informality (Andrews et al., 2011).

From the perspective of social benefits and costs, as well as public sector theory, every market participant in the informal economy benefits directly and personally in some way: (i) individuals receive higher net salaries and can buy private goods and services at lower prices; (ii) firms can produce more competitively without the costly and time-consuming interactions with government officials; and (iii) corrupt officials and politicians receive additional private income (bribes) in exchange for accommodating those participating in the informal economy (Olters, 2003). On the other hand, the corresponding costs are largely public in nature and include reduced fiscal revenues, which lead to lower expenditures on public goods like hospitals, schools, universities, roads and the continuous provision of essential services like electricity and water (Olters, 2003).

Overall, households, firms, and the government recognise that everyone would benefit from a more formalised economic environment where fiscal evasion is minimal and the quality of public goods is satisfactory. However, due to the conflict between private benefits and public costs, economic agents in the informal economy are not likely to voluntarily formalise their activities (Olters, 2003). The potential reduction in private benefits from informal activities might outweigh the uncertain expectation of improvements in public goods provision. As a result, economies with substantial informal sectors tend to become stuck in a 'vicious cycle' (Alesina, 1999), where the large degree of informality complicates the government's ability to collect revenues efficiently. Lower tax revenues translate into lower expenditures on public goods and services, affecting their quality and constraining private-sector investments. This, in turn, perpetuates a cycle of low taxpayer discipline and low tax morale, keeping the economy in a fiscal trap.

Several studies (de Soto, 1989; Neck et al., 1989; Asea, 1996; Loayza, 1997; Alesina, 1999; Abed & Gupta, 2002; Schneider & Enste, 2000; Olters, 2003) represent this situation in a dual equilibrium model, where an economy without credible, coordinated, and efficient actions by all market participants cannot automatically find a path toward an outcome with high-quality public goods and services and high tax morale. Even in competitive market economies, the government remains the only actor capable of initiating and coordinating the necessary measures. The dual equilibrium interpretation suggests that, with the wrong government policies, the economy could converge into equilibrium with a large informal sector, weak tax administration, low tax revenues, and poor public services, which would strengthen the economic incentives to continue operating informally (Tanzi & Tsibouris, 2000; Olters, 2003).

Neck et al. (1989) and Schneider & Enste (2000) argue that the existing incentive structure in economies with large informal sectors resembles the prisoner's dilemma discussed in game theory. This prevents economic actors from making sudden changes in their conduct due to a simple political-economic argument: as individual participants in the informal economy—whether as workers, consumers, voters, or taxpayers—benefit from the status quo, so too do firms that profit from lower labour costs, reduced regulations, and lower tax obligations. Consequently, elected politicians have no incentive to propose reforms that would reduce their voters' economic advantages. This is tied to the leading causes of the

informal economy discussed earlier, which are not only economic, legal, and administrative but also social and political.

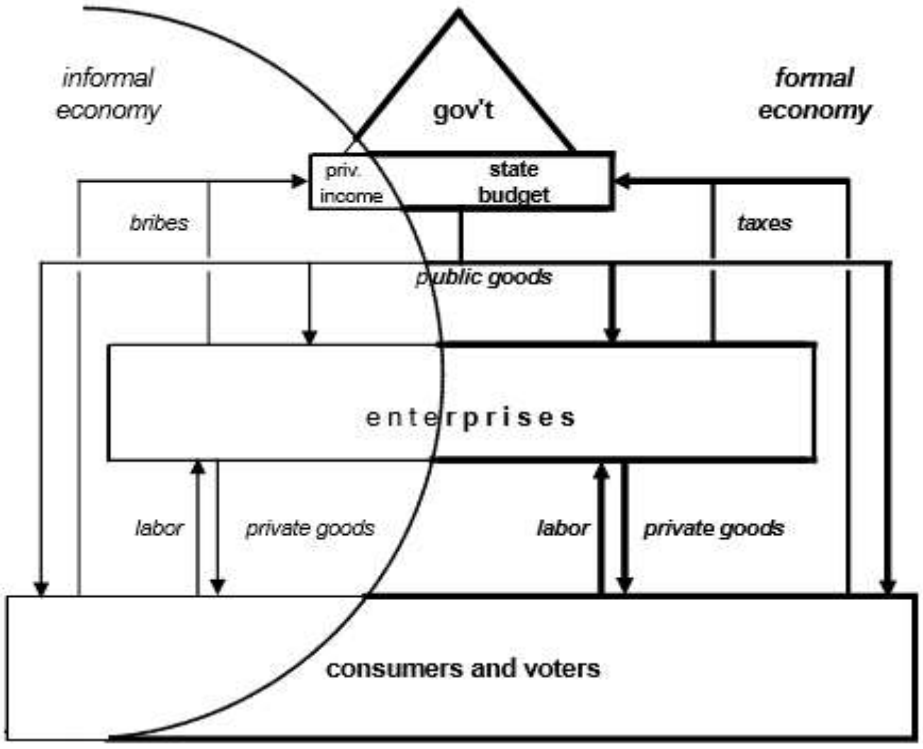

Figure 2.3. 1 - The stylised Dual Economy adopted from Olters (2003)

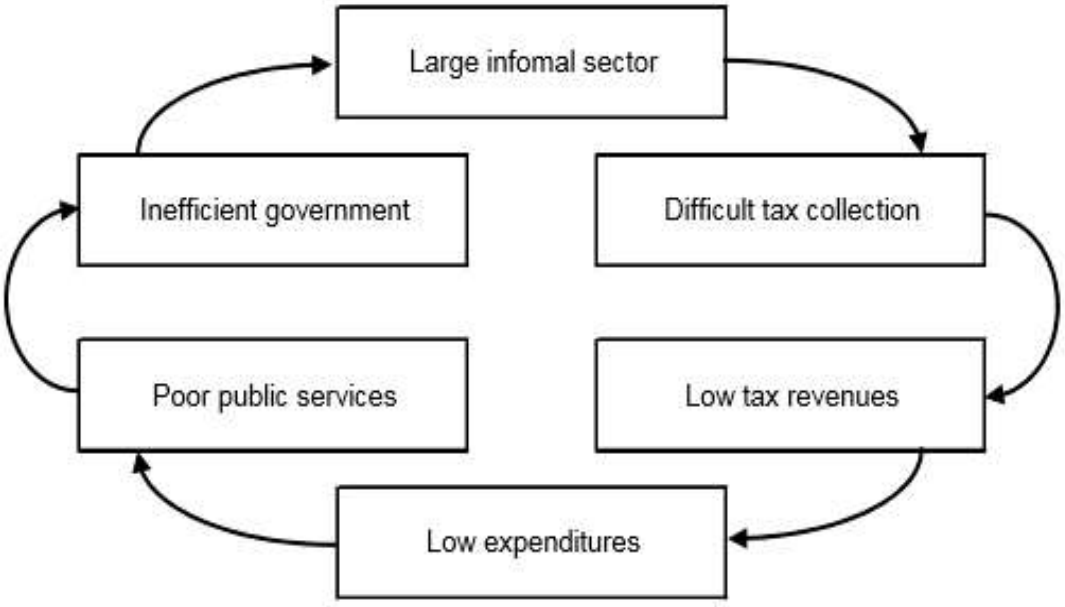

Figure 2.3. 2 - Vicious Cycle, adopted from Alesina (1999) and Olters (2003)

There is a general consensus that the informal economy constitutes a significant part of the overall economy. However, its influence on the broader economy of a country can be both positive and negative. The informal economy has various advantages and disadvantages from three distinct perspectives: economic, social, and political. These perspectives are adopted from Harding & Jenkins (1989), Frey (1989), la Portes et al. (1989), and Gerxhani (2004b). According to Harding & Jenkins (1989), informal sector activities and firms can contribute to growth if they are supported and encouraged. This sector can exert downward pressure on wages in the formal labour market and provide lower prices for goods and services. On the other hand, la Portes et al. (1989) argue that, despite these various advantages, the informal sector is not expected to contribute to sustainable development or growth. This is because the informal sector can cause distortions in key economic indicators, such as unemployment rates, inflation rates, and growth rates. The appendix provides a comprehensive list of the informal economy's advantages and disadvantages in table format.

2.4. Causes of the Informal Economy

According to Schneider and Enste (2000), Schneider (2014), and Sarac and Basar (2014), several factors contribute to the informal economy's existence in many countries around the world. The first set of causes includes general economic factors such as the unjust distribution of income, high inflation, high unemployment levels, the taxation system, and the presence of intense regulation and administrative bureaucracies. The following sections will explore these leading causes of the informal economy in more detail.

Fiscal Policies

Fiscal policies are significant causes of the informal economy in a country. High tax rates, deficiencies in auditing, and insufficient accounting services are just some of the main factors that contribute to the growth of the informal economy (Azuma and Grossman, 2002; Loayza, 1996). In addition, complicated regulations, unclear laws, frequent changes in laws, and a deteriorating unitary structure are considered legal causes of informality.

Schneider (2014) and Sarac & Basar (2014) also highlight administrative, social, and political causes of informality. Administrative causes include the organisation of tax authorities, technical structures, and auditing mechanisms. Social causes encompass factors like tax ethics and morale, taxpayer psychology, and historical influences, which can lead informal agents to engage in informal

economic activities. Political causes, such as elections, government reforms, and corruption, are also important triggers of informality.

Thomas (1992), Schneider (1994, 1997, 2003, 2005), Pozo (1996), Johnson et al. (1998), Giles (1997, 1999), Giles et al. (2002), and Del'Anno (2003) suggest that the leading causes and indicators of the informal economy include both actual and perceived burdens of direct and indirect taxation. A rising tax burden creates a strong incentive to work informally. Furthermore, increasing regulatory burdens also encourage entry into the informal economy (Friedman et al., 2000). Another factor is "tax morality," which refers to citizens' attitudes towards the state. A decline in tax morality is thought to lead to an increase in the size of the informal economy.

Public Sector Services

The provision and quality of public sector services are also significant causes of the informal economy. The level and quality of these services are closely tied to government revenues (Schneider et al., 2010; Schneider & Buehn, 2012). As the size of the informal economy increases, so does tax evasion and avoidance, leading to a reduction in government revenues. This decline in revenues can adversely affect the provision and quality of public sector services (Johnson et al., 1998). Consequently, higher tax rates may be implemented, creating further incentives for both firms and individuals to engage in informal economic activities to avoid these higher taxes.

Overall Economic wellbeing

The overall economic well-being and business cycles in a country are also crucial determinants of the informal economy. Several studies suggest that during a recession, people are more likely to engage in informal economic activities to compensate for income losses from the formal economy (Bajada & Schneider, 2005; Dell'Anno, 2007; Vuletin, 2008; Hassan & Schneider, 2016a). Therefore, the level of unemployment can be considered a cause of the informal economy. The level of GDP is another important determinant, as it reflects the overall economic well-being of a country and the availability of formal employment opportunities (Schneider et al., 2010). Additionally, Alm & Embaye (2013) note that inflation plays a vital role in incentivising informal economic activities. Inflation reduces the real income that firms and individuals can generate from the formal economy, leading some individuals to engage in additional economic activities, which may be informal, in an effort to offset the reduction in their

purchasing power (Vuletin, 2008; Elshamy, 2015).

Administrative Bureaucracies and Regulation burden

The level of regulatory burden and administrative bureaucracies is another key driver of the informal economy (Gerxhani, 2004a; Schneider & Enste, 2000). There is significant empirical evidence showing that strict labour regulations can increase the size of the informal economy (Johnson et al., 1998; Schneider et al., 2010). Strict labour regulations in a country can create incentives for individuals to work informally, as such regulations significantly raise labour costs, which are typically passed on to employees by firms. Additionally, Johnson et al. (1997), Friedman et al. (2000), and Hassan & Schneider (2016) provide further evidence that countries with more intensive regulations tend to have larger informal economies relative to their GDP.

Effects of the informal economy

On the other hand, changes in the size of the informal economy can have significant effects or indicators (Schneider, 2005; Dell'Anno & Schneider, 2003). One such effect is the development of monetary indicators, as increased informal activities require more monetary transactions. Changes in the labour market can also provide insights into the size of the informal economy. As worker participation in the informal sector increases, participation in the official economy tends to decrease.

Developments in the production market can also signal a country's informality level. A rise in informal economic activities results in factors of production, especially labour, moving out of the formal sector, which could negatively affect the official growth rate of the economy (Dell'Anno, 2003; Chaudhuri et al., 2006; Dell'Anno et al., 2007; Dell'Anno, 2007; Schneider et al., 2010; Feld & Schneider, 2010; Buehn & Schneider, 2012; Barbosa et al., 2013; Nchor & Adamec, 2015).

The level of the formal economy is also an important indicator of informality. The size of the informal economy can negatively affect GDP growth or GDP per capita, and consequently, the impact of informality will be reflected in the formal GDP (Dell'Anno & Schneider, 2003; Schneider, 2007; Schneider & Savasan, 2007; Feld & Schneider, 2010; Abdih & Medina, 2013; Vo & Ly, 2014; Nchor & Adamec, 2015). Additionally, the informal economy can influence electric power consumption. The hypothesis suggests that as the informal economy grows, electricity consumption per capita also increases, assuming unitary

elasticity, meaning that the growth in electricity consumption mirrors the growth in real GDP (Schneider & Enste, 2000; Arby et al., 2012).

These are just a few of the causes and effects of the informal economy, which form the basis for the main theories used to understand it. Theories of the informal economy arise from these primary causes and effects.

2.5. Measuring the informal economy

It has been established in many studies that measuring the size of the informal economy is a highly challenging task (Schneider & Enste, 2000; Schneider, 2014). Furthermore, different methodologies applied to measure the size of the informal economy can yield varying results, often with a margin of error of approximately +/- 10 to 15 per cent (Schneider, 2014). However, once studies define the informal economy, they typically attempt to measure its size using three main approaches. The definition of the informal economy is crucial for assessing its size (Schneider, 2014). By providing a precise definition, ambiguities and controversies can be avoided (Schneider, 2014). Numerous studies (as identified in the literature review chapter of this study) have measured or estimated the size of the informal economy for many countries around the world. The three main approaches for measuring the size of the informal economy in a country are: the direct approach, the indirect approach, and the statistical modelling approach, which estimates the informal economy as an unobserved variable.

The table below lists various methods currently used to measure the size of the economy, categorising them under each of the three methods described above.

Approaches	**Methods available**
Direct Approach	• Survey method • Tax Auditing method

Indirect Approach	• The Discrepancy between National Expenditure and Income Statistics
	• The Discrepancy between official and actual Labour Statistics (Labour market analysis)
	• The Transaction method
	• The Currency Demand method
	• The Physical Input (Electricity Consumption) Method
	  o The Kaufmann – Kaliberda Method
	  o The Lackó Method

Modelling Approach	• The MIMIC (multiple indicators, multiple causes) model

Table 2.5. 1 - Main approaches and their methods for measuring the Informal Economy

2.5.1. Direct Approach and Methods Available

The direct approach to measuring the size of the informal economy includes survey and tax auditing methods. However, both methods are susceptible to bias, which may affect the accuracy of the results (Schneider & Enste, 2000; Schneider, 2007, 2014).

Survey Method

The survey method relies on questionnaires that include multiple-choice, open-ended, and yes-or-no questions. These surveys must be carefully designed to encourage respondents to provide accurate answers. Surveys aimed at estimating the informal economy are widely used across various countries, with many nations conducting sample Labour Force Surveys annually (Schneider, 2006, 2007; Abdih & Medina, 2013; Vuletin, 2008). The core principle of these surveys is to select a representative sample of households and, within those households, identify own-account workers and employers likely to belong to the informal sector (Wallace et al., 2004). A key advantage of this approach is that, when effectively implemented, it provides direct data from primary sources, making it a valuable tool for analysis (Kazemier, 2005).

The primary drawback of this method is its heavy reliance on respondents' willingness to cooperate, which directly affects the accuracy of the results. Measuring undeclared work and other informal activities through direct questionnaires is challenging, as many respondents may be reluctant to disclose fraudulent behaviour (Schneider, 2007). This hesitancy, combined with the uncertain reliability of responses, makes it difficult to produce an accurate monetary estimate of the extent of undeclared work or other informal activities. Consequently, the results of such surveys are highly sensitive to the way the questionnaire is designed (Mogensen et al., 1995; Pedersen, 2003; Feld & Larsen, 2005; Kazemier, 2005). Additionally, surveys inherently provide only a snapshot of informal economic activity at a given point in time, making it difficult to extrapolate long-term trends regarding its size and development (Schneider, 2002; Alderslade et al., 2006).

Tax Auditing Method

The tax auditing method estimates the informal economy by measuring the discrepancy between income declared for tax purposes and income identified

through selective audits (Thomas, 1992; Alderslade et al., 2006; Schneider, 2007). In recent years, auditing software has played a crucial role in detecting undeclared taxable income in many countries (Alderslade et al., 2006). However, this method also has notable limitations.

Similar to survey-based approaches, tax compliance data represents only a sample of the population, which can introduce bias. Typically, taxpayers are not selected for audits at random; instead, tax authorities focus on returns that exhibit characteristics suggesting a higher likelihood of fraud. These tax returns are usually completed by accountants or self-employed individuals, further contributing to potential inaccuracies in estimating informal economic activities (Schneider, 2006, 2007, 2014; Alderslade et al., 2006).

Moreover, this method can only measure the portion of the informal economy that tax authorities successfully detect—an inevitably small fraction of the total informal sector (Alderslade et al., 2006). Given the complexity and variety of informal activities, this approach provides only a partial view. Additionally, neither tax auditing nor survey methods can effectively track long-term trends in the informal economy, making them insufficient for analysing its development over extended periods.

2.5.2. Indirect Approach and Methods Available

Indirect approaches, often referred to as 'indicator' methods, rely on various economic, social, and other indicators to track the development of the informal economy over time (Schneider & Enste, 2000; Schneider, 2007; Abdih & Medina, 2013). As previously mentioned, there are five primary methods for estimating the informal economy using indirect measures.

The Discrepancy between National Expenditure and Income Statistics

One of these methods relies on discrepancies between income and expenditure statistics. In national accounting and macroeconomic theory, a country's GDP can be measured using three primary approaches: the expenditure method, the income method, and the production method. In principle, these three methods should yield the same result, with any variations attributable to statistical and rounding differences (Carlin & Soskice, 2015). Since these GDP measurement methods are identities that hold at any given time, total income in the economy should equal total expenditure—every transaction involves both a buyer and a seller, meaning one party's expense is another's income. However, in practice, the GDP estimates derived from these methods often differ (Carlin & Soskice,

2015, p.5). The gap between a country's expenditure-based and income-based GDP calculations can therefore serve as an indicator of the size of the informal economy (Thomas, 1992). The advantage of this approach is that, if all components of the expenditure method are measured accurately, it could provide a reasonable estimate of the informal economy's scale. However, this is rarely the case. A key limitation of this method is that the discrepancy between expenditure and income captures not only informal economic activity but also errors and omissions across national accounts. As a result, the estimates produced may be unreliable (Schneider, 2007).

The Discrepancy between Official and Actual labour force statistics

The second method under the indirect approaches involves analysing the labour market, specifically the discrepancy between a country's official employment rate and its actual labour force. Labour market analysis can provide valuable insights into the size and composition of the informal economy workforce (Alderslade et al., 2006). A declining labour force participation rate in the formal economy may indicate increasing activity in the informal sector (Schneider, 2006, 2007, 2014).

According to Schneider & Enste (2000, p.93) and Schneider (2014, p.13), the underlying hypothesis is that if the labour force participation rate is assumed to be constant, any decline in the official rate could suggest a corresponding rise in informal employment, ceteris paribus. Additionally, discrepancies between recorded total employment and the number of jobs reported by employers may also signal the presence of informal employment.

One advantage of this approach, as noted by Alderslade et al. (2006, p.21), is that it allows for tracking trends in the causes, size, and composition of the informal labour force, which is particularly useful for informing policy interventions. However, a key limitation of this method is that it does not account for other factors that may contribute to a decline in official labour force participation (Schneider, 2007; Thomas, 1992). Furthermore, there is a risk of double counting, as some individuals may be employed in both the formal and informal economies simultaneously (Alderslade et al., 2006; Thomas, 1992).

The Transactions method

The third method under the indirect approach is the Transactions Method, originally developed by Feige (1996). This method is based on the assumption that, over time, a stable relationship exists between a country's official GDP and

the volume of transactions. This concept is encapsulated in the quantity equation formulated by Fisher (1991, cited in Friedman, 1971):

$$M \, x \, V = P \, x \, T \qquad (2.5.2.1)$$

where M represents money, V is velocity, P denotes prices, and T signifies total transactions.

This method relies on assumptions regarding the velocity of money and the relationship between the total value of transactions (PxT) and nominal GDP. It also depends on the assumption that *no informal economy exists in a chosen base year*.

A key disadvantage of this approach is its reliance on these assumptions to generate meaningful results (Frey & Pommerehne, 1984; Tanzi, 1982; Thomas, 1999; Giles, 1999a; Pederson, 2003; Breusch, 2005a, 2006; Schneider, 2007; and Schneider & Enste, 2000). Additionally, accurate data on total transaction volumes must be available, which can be particularly challenging when dealing with cash transactions. Another significant assumption of this method is that any deviation in the ratio between total transaction value and officially measured GDP is attributable to the informal economy. This requires a substantial amount of data to distinguish between formal and informal financial transactions. As a result, although this approach is theoretically appealing, "the empirical requirements necessary to obtain reliable estimates are so difficult to fulfil that its application may lead to doubtful results" (Schneider, 2007).

The Currency Demand Method

Another method for estimating the size of the informal economy is the Currency Demand Approach (CDA). This method is based on the assumption that informal economic transactions are primarily conducted in cash (Cagan, 1958; Aldersdale et al., 2006).

Tanzi (1980, 1983) later applied this approach econometrically by estimating a currency demand function for the United States over the period 1929 to 1980 to measure the informal economy. The core hypothesis of this method is that growth in the informal economy leads to an increased demand for currency (Schneider & Enste, 2000; Schneider, 2007).

Tanzi (1983) proposed the following regression model for currency demand,

which accounts for factors such as income growth, payment habits, and interest rates, while also incorporating variables related to direct and indirect tax levels, government regulation, and the complexity of the taxation system:

$$\text{Ln } (C / M_2)_t = \beta_O + \beta_1 \ln (1 + TW)_t + \beta_2 \ln (WS / Y)_t + \beta_3 \ln R_t + \beta_4 \ln (Y / N)_t + u_t \quad (2.5.2.2)$$

$$\text{With } \beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \text{ and } \beta_4 > 0 \quad (2.5.2.3)$$

where: 'Ln' denotes natural logarithms, 'C / M2' is the ratio of cash holdings to current and deposit accounts, 'TW' is a weighted average tax rate (to proxy changes in the size of the informal economy), 'WS / Y' is a proportion of wages and salaries in national income (to capture changing payment and money holding patterns), 'R' is the interest paid on savings deposits (to capture the opportunity cost of holding cash), 't' represents the years, 'Y / N' is the per capita income, and 'u' is the error term.

Estimates of the size of the informal economy can be derived by comparing the difference in currency development under two scenarios: one where direct and indirect tax rates (along with government regulations) are at their lowest, and another where current tax rates and regulations apply (Schneider, 2007a). Although this method has been widely used, it has also faced criticism. The primary concern is that not all transactions are conducted in cash (Isachsen & Strom, 1985), and other influencing factors beyond the tax burden are not considered. Key elements such as tax morality, taxpayer trust in the state or government, the impact of regulations, and other government incentives are omitted, despite their significance. Blades (1982) and Feige (1986, 1996) further argue that Tanzi's (1983) regression model should have accounted for the role of the US dollar as an internationally accepted currency, often held as foreign reserve cash in many countries worldwide.

Physical input or the Electricity Consumption method

The final method under the indirect approaches is the Physical Input or Electricity Consumption Method, developed in two distinct ways by Kaufmann and Kaliberda (1996) and by Lackó (1996, 1998, 1999, 2000). Kaufmann and Kaliberda (1996) propose that electricity consumption is the most reliable physical indicator of overall economic activity, encompassing both official and unofficial sectors. This method assumes a strong relationship between electricity

consumption and GDP, as both share the same elasticity. Any discrepancy between GDP growth and electricity usage is attributed to the informal economy (Schneider, 2007; Aldersdale et al., 2006). Since electricity consumption is considered a fundamental indicator of economic activity, with a unit elasticity between electricity and GDP, Kaufmann and Kaliberda (1996) use this relationship as a proxy for total economic output. By subtracting official GDP from this estimate, they derive an unofficial GDP measure, representing the informal economy. This makes the method relatively simple and straightforward for estimating the size of the informal sector.

However, a major criticism of this approach is that it does not provide a comprehensive measure of the informal economy. Many informal activities do not rely on electricity or may use alternative energy sources (Aldersdale et al., 2006; Lackó, 1998; Johnson et al., 1997; Gerxhani, 2004b). In response to these limitations, Lackó (1999) developed a revised approach known as the Household Electricity Approach, designed to address the inconsistencies in Kaufmann and Kaliberda's (1996) model. This modified method assumes that a portion of the informal economy is linked to household electricity consumption, arguing that the hidden economy is embedded across all economic sectors, including households. Lackó (1998, 1999) further refines this approach through an econometric two-model process, derived by substituting equation (2.5.2.5) into equation (2.5.2.4), as follows:

$$\text{Ln } E_i = \alpha_1 \ln C_i + \alpha_2 \ln PR_i + \alpha_3 G_i + \alpha_4 Q_i + \alpha_5 H_i + u_i \qquad (2.5.2.4)$$

With $\alpha_1 > 0$, $\alpha_2 < 0$, $\alpha_3 > 0$, $\alpha_4 < 0$, and $\alpha_5 > 0$

$$Hi = \beta_1 T_i + \beta_2 (S_i - T_i) + \beta_3 D_i \qquad (2.5.2.5)$$

With $\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 > 0$

Where: 'i' is the number assigned to the country; 'E_i' is per capita household electricity consumption in country 'i' in Mtoe; 'C_i' is per capita real consumption of households without the consumption of electricity in country 'i' in US dollars (at purchasing power parity); 'PR_i'- the real price of consumption of 1 kWh of residential electricity in US dollars (at purchasing power parity), 'G_i' is the relative frequency of months with the need of heating in houses in country 'i'; 'Q_i' is the ratio of energy sources other than electrical energy to all energy sources in household energy consumption; 'H_i' is the per capita output of the hidden economy; 'T_i' is the ratio of the sum of personal income, corporate profit and taxes on goods and services to GDP; 'S_i' is the ratio of public social welfare

expenditures to GDP; and 'Di' is the sum dependants over 14 years of age and of inactive earners, both per 100 active earners.

This econometric estimation was used to assess the extent to which countries' informal economies rely on electricity, using the informal economy of the United States as a reference point. Specifically, it employed Morris's (1993) estimate that the informal economy in the US accounted for 10.5% of GDP to calculate the amount of GDP generated per unit of electricity in the informal sector of each country (Schneider, 2007). However, this method has also faced criticism. A key limitation is that informal economic activities are not confined to the household sector, and many do not rely heavily on electricity, as alternative energy sources may be used (Schneider, 2007).

2.5.3. Modelling Approach

Due to the disadvantages and criticisms associated with the five indirect approaches discussed above, a model-based approach has been developed. This approach has since been widely applied in numerous studies and across various countries—see the literature review chapter for further details. The effects of the informal economy manifest simultaneously in the production, labour, and money markets, rather than being represented by a single indicator or driven by a single cause, such as a country's tax regime. To address this complexity, the model approach considers multiple factors contributing to the existence and growth of the informal economy, as well as multiple indicators reflecting its impact over time. This method is commonly referred to as the MIMIC (Multiple Indicators Multiple Causes) approach.

MIMIC method

This method is based on Structural Equation Models (SEM), which establish statistical relationships between latent (unobserved) and manifest (observed) variables (Dell'Anno, 2006; Schneider, 2007). The Multiple Indicators and Multiple Causes (MIMIC) model was named by Jöreskog and Goldberger (1975), although it had been previously discussed by Zellner (1970)[15], Jöreskog (1970), and Hauser and Goldberger (1971).

The MIMIC model conceptualises the informal economy as a latent variable linked to a set of observable indicators, which reflect changes in its size, and a set of observed causal variables, which represent key determinants of unreported

[15] Cited in Jöreskog and Goldberger (1975)

economic activity. The model explains the relationship between observable and unobservable variables by minimising the difference between the sample covariance matrix and the covariance matrix predicted by the model (Dell'Anno, 2006; Buehn & Schneider, 2008). The observable variables are classified into two categories: causes of the latent variable and its indicators.

Formally, the MIMIC model consists of two components: the structural equation model and the measurement model (Schneider et al., 2010). Mathematical representations of the MIMIC model can be found in several studies, including Dell'Anno (2006, 2007), Schneider (2006, 2007), Buehn and Schneider (2008), Schneider et al. (2010), and Hassan and Schneider (2016a). The specific mathematical formulation depends on the chosen causes and indicators for a given country. A detailed discussion of the econometric theory underpinning the MIMIC model is provided in the methodology chapter.

MIMIC models can be applied to both time-series and panel data to estimate the size and evolution of the informal economy over time. When variables are expressed in first differences, the model is referred to as the DYMIMIC model (Aigner et al., 1988). However, using first differences results in a loss of long-run information from the data, even if the variables are co-integrated. The MIMIC model is the primary method applied in this research. Further details on its application and justification are provided in the following pages.

2.6. Conclusion

The impact of the informal economy on the overall economy can be seen from various perspectives. Different schools of thought explain how the informal economy arises, including the dualists', structuralists', legalists', and voluntarists' schools of thought. This chapter examines all four schools of thought, providing insight into the leading theories of the informal economy.

Understanding how the informal economy arises in a country and identifying the primary drivers of informality is crucial for developing effective policies to address it. It is equally important to understand the size and development of the informal economy. To estimate its size, several methods have been developed and tested, which have been discussed in detail in this chapter, highlighting their advantages and disadvantages.

The theory acknowledges that measuring the size of the informal economy is challenging, and the estimates are often vulnerable to the methods and data used. However, estimating the size of the informal economy can provide insight into

the level of economic informality in a country and inform policy decisions aimed at addressing it. Whether these policies are effective or not, further estimation can track the development trends of the informal economy.