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Mapping the Informal Economy Around the World with an Enhanced MIMIC Approach: New Estimates for 110 Countries from 1997-2022

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Mapping the Informal Economy Around the World with an Enhanced MIMIC Approach: New Estimates for 110 Countries from 1997-2022

Abstract

Using an enhanced MIMIC method, this paper presents new estimates of the Informal Economy (IE) for 110 countries from 1997 to 2022. We address several limitations found in previous estimates of the IE, notably issues surrounding the missing values, time-invariant country characteristics, and calibration issues with exogenous variables. We enhance the MIMIC model by including fixed effects for country-specific characteristics of IE, thereby providing more reliable estimates. Our findings show a significant variation in the key drivers of IE between high-income and not-high-income countries, exhibiting distinct causal effects on the IE depending on different economic developments. In terms of normative implications, our results highlight the need for specific and tailored policies in dealing with the formalisation of informal activities in countries with different levels of income.

JEL-Codes: O170, C390, H260.

Keywords: informal economy, shadow economy, structural equation modelling, MIMIC approach.

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Code availability: STATA software code (Do file) used during this study will be shared upon request after publication.

1. INTRODUCTION AND BACKGROUND

Over the last three decades, attention to the Informal Economy (IE hereafter) has grown significantly, predominantly focusing on four key areas: defining what constitutes it;¹ estimating its size and impact through various approaches, analysing its main drivers, causes, and effects, and finally, proposing potential policy measures that governments can implement to transition it into the formal economy. Estimating IE in a country can be challenging since the agents involved in informal activities purposefully hide from being identified to avoid taxes and regulations imposed by the government (Gerxhani, 2004; Buehn and Schneider, 2012; Medina and Schneider, 2021). The existence of the IE, however, is known and it is more common in developing nations (ILO, 2018) and can affect the reliability of the official economic data, which consequently affects other socio-economic indicators based on that official data (Schneider and Enste, 2000; Dell’Anno and Schneider, 2003). This evidence usually comes from surveys of leading organisations, such as the World Bank and the International Labour Organisation (ILO). Their accuracy, on the other hand, is questionable because surveys tend to produce biased results, as participants may not fully disclose their involvement (Gerxhani, 2004).

The IE can have many political, social, and economic implications. It can reduce market efficiency, weaken institutions, decrease tax revenues, and limit public spending on key areas such as infrastructure, education, and healthcare – thereby affecting the main objectives of social and economic policymaking (Dell’Anno, 2021; 2022; Arby et al., 2012). The size of the IE can also indirectly impact society, and its presence can indicate regulatory burdens or government-induced distortions (Dell’Anno, 2023). However, it also provides additional value that can be spent in the official economy. It acts as a social buffer by offering opportunities for low-skilled workers, particularly in less developed economies with high unemployment (de Soto, 1989; Chen, 2012).

This paper focuses on the measurement issue, with emphasis on the Multiple-Indicators and Multiple-Causes (MIMIC) model, which is a widely used but often controversial method. The MIMIC model was first used by Zellner (1970) and Goldberger (1972) and later adopted by Frey and Weck-Hanneman (1984) – who are considered the pioneers in its application. While National Accounts (NA) methods are generally seen as the most reliable for estimating the size of the IE, they have several limitations (Dell’Anno, 2023; Dybka et al., 2019). NA estimates are often

¹ We have adopted the narrower definition of the IE as suggested by Pedersen (2003) and Kazemier (2003). They define the IE as all market-based legal production of goods and services deliberately concealed from public authorities for tax evasion and avoidance. The definition of the IE can also vary depending on the terminology employed to describe it. Terms such as the hidden economy (Frey and Pommerehne, 1984), IE (Andrews et al., 2011; Dell’Anno, 2022), Shadow Economy (Feige, 2016; Williams and Schneider, 2016; Schneider, 2023), black economy (Thomas, 1999) and underground economy (Bajada, 1999) use various definitions of the IE, but they are predominantly similar – that is tax evasion and avoidance.

delayed, vary in reliability across countries, lack detailed data access for external researchers, and are not peer-reviewed, which raises concerns about transparency. Additionally, NA estimates may not be easily comparable across countries or periods. Therefore, econometric methods like MIMIC offer valuable complementary approaches (although there are still controversies, as discussed later) to estimate the size of the IE. The MIMIC model requires calibration using exogenous values of the IE, with NA estimates being the best candidates for this. Conversely, NA methods can benefit from MIMIC in sectors or periods lacking data.

We present a novel approach to measuring the size of the IE and estimates for 110 countries worldwide by employing an enhanced MIMIC model, which accounts for multiple interactions between the latent variable, causes, and indicators rather than focusing solely on causes and effects. We use the MIMIC model because it offers a more robust framework for assessing the drivers that affect the IE compared to direct or indirect methods. Cassar (2001) highlights that the MIMIC approach does not rely on restrictive or unreasonable assumptions, except for the requirement to employ an exogenous variable to calibrate the estimates of the IE. As a result, the model is more flexible and broadly applicable in various contexts. Zhou and Oostendorp (2014) show that compared to direct and indirect techniques, the MIMIC model provides a relatively more accurate estimation. This implies that the precision of the model is influenced by its capacity to capture complex data.

However, while the MIMIC model has some advantages, it still faces some criticism and challenges in the validity and reliability of its estimates, necessitating further investigation and methodological improvements. Breusch (2005, 2016), Feige (2016), Kirchgässner (2016), Slemrod and Weber (2012), and later Dybka et al. (2019) and Dell'Anno (2023) express doubts about the robustness of the specifications and results of the MIMIC model. They contest the results' generalisability across various datasets and situations, arguing that its predictions might not always hold under specific circumstances. This debate underscores the need for a cautious approach to interpreting MIMIC estimates, with some scholars (Dybka et al., 2019; Dell'Anno, 2023) suggesting that further refinement in methodology and variable selection is required to enhance the model's predictive accuracy and reliability.

With this in mind, we thoroughly examine some criticism of the earlier, widely used MIMIC methodology and make several significant methodological contributions. Firstly, a key contribution of this paper is that we control for time-invariant effects across countries, by incorporating fixed effects by a within transformation of observed variables. This MIMIC specification allows for interpreting the effect of a one-unit change in a covariate on the informality ratio while holding constant not only other observable causes (e.g., self-employment, corruption, poverty, economic

development, etc.) but also the unobserved, time-invariant characteristics specific to each country that influence informality. In other words, by including time-invariant country characteristics in the MIMIC model, we account for unobserved "structural" factors like culture, religion, tax morale, the structure of the economy, and the average efficiency of tax inspections—factors that do not vary over the period studied but still impact informality. Thus, our MIMIC model estimates the extent to which changes in causes result in deviations in the IE ratio from its long-term level. This step is taken before applying a calibration approach in the panel dataset, allowing for more accurate cross-country comparisons over time. Secondly, the approach contributes to the literature by addressing the issue of missing values (MVs) through an innovative replacement method, thereby enhancing the robustness of the analysis and mitigating potential biases caused by incomplete data. Thirdly, the study presents exogenous estimates derived from reliable official data, including those from the International Labour Organisation (ILO) and national accounts (NA). By calibrating the MIMIC estimations, these parameters enhance the model's validity and precision. Furthermore, we use a consistent statistic for the reference indicator of the MIMIC (i.e. an index of IE ratio) by adjusting the statistics used in the model for the different definitions of informal economy used by the ILO and NA approach to estimate the IE. This maintains consistency in measuring, enabling more apparent comparisons and accurate data interpretations in different situations. These methodological innovations strengthen the study's analytical rigour and provide a more nuanced understanding of the subject matter.

The paper is organised as follows: first, we present a brief literature review on the various methods used to estimate the IE, outlining arguments for and against each approach. Second, we examine the fundamental driving forces of informality – justifying their inclusion in our model. Third, we detail our new methodology and explain the calibration process in a longitudinal dataset. The fourth section presents our results and economic interpretation of the estimated coefficients, offering insights into the findings. Finally, we summarise the key outcomes and provide recommendations for future research.

2. LITERATURE REVIEW

This section offers a general overview of the existing literature on estimating the size and evolution of the IE using various approaches. It presents the advantages and drawbacks of each approach and discusses the theoretical underpinnings of the main drivers of informality. The growing literature on the IE underpins one key observation: the size of the IE, however measured, will always be merely an estimate at best.

2.1. Methods to Estimate the IE

The IE cannot be measured directly, so different methods have been generated to estimate its magnitudes (Breusch, 2005). The measurement is not an easy task either (Schneider and Enste, 2000; Dell’Anno and Schneider, 2003), and yet it is critical to measure the IE since its size around the world has been reported to be of significant size (Alm and Embaye, 2013; Hassan and Schneider, 2016; Elgin et al, 2021; Dybka et al., 2019; Schneider, 2023; Dell’Anno, 2023). Different methodologies often yield varying results, with a margin of error of around +/- 10 to 15 per cent (Schneider, 2014). Despite these challenges, once the IE is defined, its size is typically measured using three main approaches. A clear definition is crucial to avoid ambiguities and controversies in the estimation process (Schneider et al., 2010). Based on the definition of IE, one applies the three primary approaches to measurement, which are direct, indirect, and statistical modelling, with the latter treating the IE as an unobserved variable. Later, Dybka et al. (2019) emphasised hybrid approaches, too.

The direct approach to measuring the IE includes surveys and tax auditing approaches. The survey asks respondents about their economic activities through multiple-choice, closed-ended questions. These surveys, often part of labour force surveys conducted annually in many countries, aim to capture data on informal sector workers (Abdih and Medina, 2013; Vuletin, 2008). One primary benefit of surveys is their ability to yield insightful first-hand information (Medina and Schneider, 2021). However, the data is unreliable and perhaps biased because accuracy depends on respondents' willingness to disclose undeclared work (Schneider and Enste, 2000; Gerxhani, 2004; Medina and Schneider, 2021). Additionally, survey results provide only a snapshot of informal activity and are influenced by how questions are framed (Pedersen, 2003; Feld et al., 2012), often not capturing all informal activities. The tax auditing method estimates the IE by comparing declared income with income uncovered through audits (Thomas, 1992; Schneider, 2008). Recent software advances have improved the ability to detect undeclared income (Alderslade et al., 2006; Asllani and Schneider, 2024), but results can still be biased, and in many cases, most developing countries lack funding for such effective monitoring. Furthermore, audits are often not random but targeted at tax returns suspected of fraud (Schneider, 2008, 2014; Schneider and Buehn, 2017). This method only captures the portion of the IE that tax authorities detect, usually a tiny fraction (Alderslade et al., 2006). Thus, it is not suitable for long-term trend analysis.

The indirect methods, on the other hand, use economic, social, and other indicators to estimate the IE over time (Schneider and Enste, 2000; Abdih and Medina, 2013; Medina and

Schneider, 2021). One such method is the Labour Force Discrepancies². This approach examines gaps between official employment rates and the actual labour force. A declining labour force participation rate in the formal sector may signal an increase in informal work (Schneider, 2014; Schneider and Buehn, 2017). However, this method risks double-counting workers involved in both formal and informal economies (Aldersdale et al., 2006). Transactions Method, based on Feige's (1996) work, assumes a constant relationship between official Gross Domestic Product (GDP) and total transactions over time. The gap between these two variables may reflect the size of the IE. However, it relies heavily on assumptions, such as the velocity of money and a base year without informal activity, which can lead to unreliable estimates (Schneider, 2008; Dybka et al. 2019). Another indirect method is the Currency Demand Approach (CDA)³. This method, enhanced by Tanzi (1980, 1983), assumes that informal transactions use cash. By comparing the demand for currency under low tax rates with current demand, one can estimate the size of the IE (Alm and Embaye, 2013). However, this method does not account for non-cash transactions or key factors like tax morality and government trust (Blades, 1982; Feige, 1996). Finally, the Electricity Consumption Method, developed by Kaufmann and Kaliberda (1996), uses electricity consumption to indicate overall economic activity. The difference between electricity consumption and GDP growth is attributed to the IE. While simple, this method assumes all economic activities require electricity, which is not always true (Lackó, 1998).

The direct and indirect approaches are limited in that they need to account for multiple factors influencing the size and development of the IE. Moreover, a vital drawback of the direct approach is its inability to provide estimates of the IE's growth and development over extended periods. A further significant criticism of the direct and indirect methods is that the causes determining the size of the IE are only considered in some monetary approach studies, which often focus on a single factor, such as the burden of taxation, rather than the multiple causes that could influence changes in the size and development of the IE (Dell'Anno et al., 2007; Schneider, 2008).

Due to these limitations of direct and indirect methods, the MIMIC model, based on the Structural Equation Modelling approach (SEM), has become widely used (Dell'Anno and Schneider, 2006). The MIMIC model treats the IE as a latent variable, explained by observable causes and indicated by observable indicators. This model provides a more comprehensive

² The National Accounts Discrepancies approach, which compares income and expenditure statistics, is no longer applied in IE estimation as a direct method. This method also captures errors and omissions in national accounts, making it unreliable (Schneider, 2007).

³ Cagan (1958) made an early contribution to the development of CDA, observing that changes in the ratio of cash to a broader monetary aggregate may reflect the evolution of the IE. Later, Gutmann (1977) provided a more simplified CDA method, which observed an increased ratio and deduced that this growing 'surplus' of cash in circulation was linked to the IE. For a detailed discussion on the evolution of the CDA method and its drawbacks, see Dybka et al. (2019).

overview of the IE by accounting for multiple causes and indicators (Buehn and Schneider, 2012; 2017). The MIMIC model can be applied to both time series and panel data and is the central method used in this research. However, this approach is open to criticism too. Breusch (2005; 2016) and Dybka et al. (2019) are some of the strongest critics of using the MIMIC approach, as outlined in the following section. Dybka et al. (2019) propose a new hybrid approach to measure the IE over time. This approach combines CDA and MIMIC methods into one. Dybka et al. (2019) claim that this hybrid model addresses the long-standing identification problem in the MIMIC model, clearly defining the scale and unit of measurement, avoiding obscure ad-hoc adjustments, and constructing a sensible confidence interval. Dell'Anno (2023), using a Monte Carlo simulation, provide general conclusions on the reliability and limitations of the MIMIC approach to estimate the IE. He also proposes a calibration approach that addresses the most important shortcoming of the MIMIC approach, i.e. how to convert the index of the latent variable to the actual measure of the IE. Even though the MIMIC model and related approaches are still being debated, they nevertheless offer a thorough framework for analysing the dynamics of the IE because they consider a variety of variables and indicators, including public sector governance and economic conditions (Schneider and Enste, 2000).

2.2. Potential issues with the MIMIC model approach

Several potential problems and limitations can arise when using the MIMIC approach (Breusch, 2016; Dybka et al., 2019). The first problem faced when using the MIMIC model is the completeness, availability and quality of data. This problem is particularly evident when dealing with panel datasets, which constitute many countries. For many countries, reliable data is either unavailable or incomplete, with several missing data points across many countries and over many years. For many countries, updating and collecting data regularly can be challenging and costly (Dybka et al., 2019).

Most literature on measuring the IE for large panel datasets avoids discussing this fundamental data missing issue, and often, in publications, this is not raised. One solution applied to treat missing data in this context was that of Medina and Schneider (2021), who used predictive mean matching (PMM). However, PMM assumes data is missing at random (MAR) (Sinharay et al., 2001). However, economic data is generally not missing at random (data is MNAR), making the imputation unreliable (Lang and Little, 2016). PMM can face several other challenges when applied to panel data. One key issue is that it may fail to preserve the temporal correlations within subjects, leading to inconsistencies in how values are imputed across time (Lee et al., 2016; Cai et al., 2022).

PMM also tends to ignore individual-specific effects, which are essential for panel data and struggles with unbalanced panels where missingness patterns vary across time (Sinharay et al., 2001). Moreover, it may not capture time-dependent relationships like autocorrelation, leading to biased imputations in time-varying covariates (Cai et al., 2022; Kleinke, 2018). These limitations can distort the natural structure of panel data, making the imputed values less reliable. We address this by applying a panel regression imputation method to replace the missing values with predicted values.

The second issue is the model specification. The construct of the MIMIC model relies on identifying and reasonably justifying observable causes and indicators of the IE. If the wrong causes or indicators are selected or important ones are omitted, it can lead to biased or inaccurate estimates. Breusch (2005; 2016) argues that the MIMIC model is flawed in its specification, particularly in identifying the IE as a latent variable. He claims that the model's causes and indicators are often selected arbitrarily, leading to weak identification and specification. The lack of a robust theoretical foundation may make it difficult to determine whether the MIMIC specification captures the actual size of the IE or whether the specification produces just statistical noise. With our model specification, we clearly justify the use of each variable as a cause and indicator and provide robust connections between each cause, indicator and latent variable.

Third, there are concerns with endogeneity. The relationship between causes and indicators might be more complex than the model assumes, leading to biased estimations (Dybka et al., 2019; Medina and Schneider, 2021). For example, some of the indicators used may also influence the causes. Moreover, there may be a measurement error since indicator variables such as the unemployment rate, taxation burden, or the labour market participation rate may not fully account for the IE's hidden nature, leading to various measurement errors (Dybka et al., 2019). This could give rise to confusion about the causality of some of the causes and indicators used in the MIMIC specification. Breusch (2016) argues that while the MIMIC model does evaluate potential correlations between variables used as causes and indicators in the model specification, it may not always capture causality. The identification of variables that are either causes or indicators can be challenging and open to discussion, which may also give rise to reverse causality issues. We deal with this issue by also including a direct effect of some causes on indicators in order to control for interactions among observed variables that are not mediated by the latent construct (i.e. the IE).

The fourth issue concerns the theoretical underpinnings and assumptions made with and within MIMIC models. The MIMIC approach relies on assumptions about the relationship between the IE and its indicators, which may not hold in every context. For instance, the exact causes might not lead to the same informal economic behaviours across different countries or regions (Dybka et

al., 2019). The causes and indicators of informal economies can vary significantly from country to country (Breusch, 2005; Dybka et al., 2019; Dell’Anno, 2023). Applying a single MIMIC model across multiple countries can produce inconsistent results that are not fully comparable due to differences in institutional structures, tax regimes, economic behaviour and society’s attitudes towards the IE and the state in general. We account for this by clustering the dataset into high-income and not-high-income countries.

Fifth is the issue of the definition of IE and the absence of a model that would directly measure informality or IE (Gerxhani, 2004; Losby et al., 2002). The MIMIC model treats the IE as an unobservable (latent) variable in the MIMIC model, meaning the estimates are based purely on indirect observations. This may lead to higher uncertainty with results not accurately reflecting the actual size of the IE. Furthermore, depending on the definition used, different key drivers of informality could be applied (Schneider et al., 2010). We test our model with various exogenous variables to capture different definitions of informality and estimation approaches. We use a definition and measurement approach of the IE that accounts for the prevalent nature of informality across countries. Precisely for not high-income countries, we link the latent construct to the ILO statistics because they focus on informal employment. In contrast, for high-income countries, we use as a reference indicator a proxy of the IE that includes underground production, informal production, and illegal production.

Finally, there is generally an issue with the benchmarking procedures or calibration of the latent scores to meaningful values where the IE is usually presented as a percentage of official GDP (Dybka et al., 2019). The MIMIC model needs to be calibrated using an external reference (e.g., surveys or other estimates of the IE). If the calibration is inconsistent or outdated, it may lead to distortion of the overall estimates. Different calibration methods often yield different results and, at times, have high degrees of variance (Breusch, 2005; 2016; Dell’Anno, 2022; 2023). This calibration is usually based on independent studies or expert opinions, introducing substantial subjectivity into the estimation process. Breusch (2005; 2016) criticises that the final estimates are susceptible to these calibration choices, making the results unreliable. Several benchmarking procedures use an exogenous value of the IE as the base year, calibrate the index values generated from the MIMIC results into absolute values of the IE, and convert them into percentages (Buehn and Schneider, 2012). Some prefer that the exogenous base value of the IE be taken from the first year of the dataset to understand and capture the dynamics and development of the IE across the periods in the dataset (Schneider et al., 2010; Buehn and Schneider, 2012). Others (such as Dell’Anno and Schneider, 2003; Dell’anno, 2023) use the last available exogenous values to calibrate the intercept. The idea is that the most recent values are more reliable than the oldest.

There is no clear consensus in the literature regarding which of the above benchmarking procedures can be used to calculate the absolute values of the IE from the MIMIC results (Buehn and Schneider, 2012). Our methodology, adapting Dell’Anno’s (2023) calibration approach to a longitudinal dataset, addresses most of these challenges to provide more robust and reliable estimates of the IE.

2.3. Main causes and indicators of the IE

The main drivers of the IE have been extensively studied in the literature. General macroeconomic conditions play a significant role in the expansion of the IE across many countries worldwide. These include the unequal distribution of income and higher levels of poverty (Dell’Anno, 2024), lower levels of GDP per capita (Feld and Schneider, 2010; Schneider et al., 2010; Medina and Schneider, 2021), high inflation or cost of living, and elevated unemployment rates (Elgin et al., 2021; Dybka et al., 2019; Dell’Anno, 2024) all contribute towards increased IE activities. Fiscal policy drivers, such as the tax burden, government expenditure, and the size of the government, alongside social security contributions, are also critical determinants of informality (Kelmanson et al., 2019; Schneider, 2023; Asllani and Schneider, 2024). Excessive regulation and administrative bureaucracy incentivise engagement in informal economic activities. Regulatory indicators such as the burden of the regulation (Kelmanson et al., 2019), bureaucratic red tape for business activities, and the quality of regulatory enforcement are critical drivers towards greater informality (Enste, 2010; Buehn and Schneider, 2012; Schneider, 2023). Furthermore, judicial and rule of law factors, including government effectiveness in monitoring and enforcement, are also significant (Schneider, 2023; Dybka et al., 2023). Strong government effectiveness and the rule of law can lead to lower levels of the IE.

Additionally, social factors such as the level of education and human development indicators (e.g. HDI) are countercyclically influential (Medina et al., 2017). High levels of poverty and inequality, alongside vulnerable employment (Dell’Anno, 2023; 2024), self-employment (Mai and Schneider, 2016; Dell’Anno, 2024), and higher employment in agriculture (Dybka et al., 2019), are crucial determinants shaping labour market dynamics and leading towards greater levels of the IE. Lastly, trust in institutions plays a vital role, with factors such as a higher level of corruption, lower tax morale (Giles et al., 2002; Schneider, 2005; Torgler and Schneider, 2009; Kirchgässner, 2011), and lower political and governmental stability being important procyclical drivers of the IE (Canh et al., 2021).

Conversely, IE's size change may be reflected in indicators (Schneider, 2005; Dell’Anno and Schneider, 2003; Medina and Schneider, 2021). Such effects are the development of monetary indicators because additional monetary transactions are required if activities in the IE rise (Mai and

Schneider, 2016; Schneider, 2023). Development in the labour market can indicate how large the IE will be (Dell’Anno, 2023). Increasing workers' participation in the IE results in a decrease in participation in the official economy, thus increasing the level of IE employment and vulnerable employment for both men and women (Dell’Anno, 2024). Developments in the production market may also indicate a country's informality level. An increase in the IE means that factors of production (especially labour) move out of the formal economy, and this displacement might harm the official growth rate of the official economy (Dell’Anno, 2003; Chaudhuri et al., 2006; Dell’Anno et al., 2007; Dell’Anno, 2007; Schneider et al., 2010; Feld and Schneider, 2010; Buehn and Schneider, 2012; Barbosa et al., 2013; Nchor and Adamec, 2015; Medina and Schneider, 2019).

Given the above discussion, we include most of these causes and indicators within our model and aim to directly and indirectly test several hypotheses, as outlined in Table 1. These hypotheses are designed to examine the key drivers of informality, as previously identified, and assess their marginal effects on the size and development of the IE.

Causes:		(Expected sign) Hypothesis
Fiscal Policy Drivers		(+) The higher the tax burden, the larger the size of the IE, ceteris paribus (+) The higher the level of social security contributions, the larger the size of the IE, ceteris paribus. (+) The more significant the central government spending, indicating the larger the size of the government, the more significant the IE, ceteris paribus.
Official Macroeconomic indicators		(+) The higher the unemployment, the larger the size of the IE, ceteris paribus. (-) Conversely, the higher the employment rate, the lower the size of the IE, ceteris paribus. (+) The higher the cost of living, the larger the size of the IE, ceteris paribus. (-) Higher GDP per capita leads to lower informal economic activity, ceteris paribus.
Regulatory framework		(+) The more intensive the regulatory burden is, the larger the size of the IE, ceteris paribus. (+) Higher levels of bureaucracy in doing business can lead to higher levels of IE, ceteris paribus.
Institutional Quality		(-) The more robust the institutional framework, the more willing people are to pay taxes and reduce their participation in the IE, ceteris paribus. (-) Greater government effectiveness leads to lower levels of the IE, ceteris paribus. (+) Higher levels of corruption lead to higher levels of IE, ceteris paribus. * (-) The stronger the rule of law and judiciary system, the lower the IE, ceteris paribus. (-) Higher tax morale leads to lower levels of the IE, ceteris paribus.
Social Factors		(+) The higher the level of income inequality, the higher the level of the IE, and vice versa, ceteris paribus. (+) Higher poverty levels can boost the size of the IE, ceteris paribus. * (-) Enhanced education system and human development indicators can lead to lower levels of IE, ceteris paribus. *
Labour market structural characteristics		(+) The higher the self-employment rate, the larger the size of the IE, ceteris paribus. * (+) The more significant the employment rate in the agriculture sector, the larger the IE, ceteris paribus. * (-) Greater labour freedom, lower IE, ceteris paribus. *
Political stability		(-) Greater government and political stability, the lower the size of the IE, ceteris paribus.
Indicators:		
Informal Sector Employment/Income		(+) A higher IE needs higher workforce levels, thus increasing the informal sector's employment and income generation. *
Currency in Circulation		(+) The higher the IE, the greater the currency in circulation/currency held by the public, ceteris paribus.
Official economic distortions		(-) The higher the IE, the lower the GDP per capita and GDP growth, ceteris paribus. (-) The higher the IE level, the lower the labour force participation rate, ceteris paribus.
Labour market structural characteristics		(+) The larger the size of the IE, the higher the rate of vulnerable-employment rate, ceteris paribus. *
*Confirmed or partly confirmed with our results. See section 4 for discussion.		

Table 1. Hypothesis on the leading causes and indicators of the IE.

3. AN ENHANCED MIMIC APPROACH TO ESTIMATE THE IE

The estimation of informality consists of three main steps: The first step deals with preparing the dataset and replacing missing values. The second step involves selecting the more reliable model specification and estimating coefficients. The third step explains how we assign a unit of measure to the latent scores, the so-called calibration procedure.

3.1 *First step: Variable selection and treatment of missing data*

According to the MIMIC approach, the IE is a “latent” variable that is both affected by a set of observed variables (the so-called structural model) and affects other observable indicators (i.e. the measurement model). We refer to the former variables as causes or drivers of the IE, while the latter are typically referred to as indicators, hence the MIMIC construct. Accordingly, following the ample economic literature on drivers of informality (e.g., Andrews et al. 2011; Schneider and Enste 2013; Goel and Nelson 2016; Pham 2017; Dell’Anno 2022; Zhanabekov 2022; Dell’Anno 2024 and others), we collect twelve variables to account for potentially relevant drivers of Informality as a percentage of official GDP. Specifically, we include in the structural equation: Tax revenue as a percentage of GDP (*TaxRev*); Index of Labor Freedom (*LabFreed*); Employment in agriculture as a percentage of total employment (*EmplAgric*); Self-employed, total as a percentage of total employment (*SelfEmpl*); Employment rate (*Empl*); Index of Corruption (*Corrupt*); an index of bureaucracy quality (*BureacrQ*); an index that accounts for the change and level of actual standards of life of the population: the Human Development Index (*HDI*); Poverty headcount ratio at national poverty lines as a percentage of the population (*Poverty*); A linear time-trend (*LinTrend*) to control for spurious relationships that might arise due to the presence of non-stationarity and an index of public investment in human capital measured by the share of expenditure on tertiary education to total government expenditure on education (*ExpTertEdu*). This variable is also included in three measurement equations as a covariate to control for the direct effect (i.e. not mediated by the IE) of human capital on male and female vulnerable employment and the income generated by employment in the informal sector.

We collect four potential indicators of the IE (i.e. measurement equations). The most relevant indicator (hereinafter reference indicator, i.e. the observed variable with the highest correlation with the latent construct) is *IE_Index*. It is calculated considering the different nature of informality between developed and developing countries. Accordingly, for high-income and European countries, we employ the projections of the estimates of Non-Observed

Economy (NOE) provided by the National Institutes of Statistics (as estimated by Dell’Anno (2024, Online Appendix E)⁴ and Fernandes (2022, Table A.1 and A.2)⁵. For non-high-income countries, we estimate the income generated by informal employment by multiplying the size of informal employment, as estimated by the ILO (2019, Appendix B, Table B.1), by the expected informal wage that we assume is equal to the household’s final consumption per worker. To combine the two measures of informality ratio based on NA and ILO sources into the same metric, i.e., IE/observed economy, we convert the projections of NOE adjustments that are reported as a ratio between unobserved and total (i.e., unobserved + observed) economy, into a ratio of unobserved (or IE) and observed GDP.⁶

The second and third indicators of the latent construct are the ratios between male vulnerable employment⁷ and male employment (*VulnMal*) and female vulnerable employment and female employment (*VulnFem*).

The fourth indicator is a proxy for income generated by the informal sector calculated as total employment outside the formal sector and the final consumption of households and Non-Profit Institutions Serving Households per person over 15 years old (*InfSectInc*).

The second part of this data collection involves replacing missing values in the dataset to preserve the quality of predictions and include as many countries as possible in our worldwide analysis. Appendix A explains the applied approach in detail.

3.2 Second Step: the MIMIC Model

3.2.1 The MIMIC model specification

The basic intuition of the MIMIC model is that the IE as a percentage of the official GDP is an endogenous (i.e. related to a set of variables that explain them) latent construct

⁴ Dell’Anno’s (2024) estimates are adjusted by adding country-specific constants (${}_{neg}^N\hat{\beta}_i^c$) that the author suggests to use in order to solve the issue of negative projections in NOE adjustments in some countries.

⁵ Precisely, Table A.1: Allowances for exhaustiveness in the national accounts in the EU-28 and EFTA (1997-2008) (% GDP) and Table A.2: Allowances for exhaustiveness in the national accounts in the EU-28 and EFTA (2009-2019) (% GDP). From these tables we extract data for countries not included in Dell’Anno (2024), such as United Kingdom (2005), Ireland (1998); Germany (2010, 2016), Greece (2015), Bulgaria (2000, 2001), Spain (2000), Bulgaria (1998, 1999), Latvia (1997, 1998, 2000), Lithuania (1997-2002).

⁶ We apply the following formula: $\frac{IE}{OE} = \left[\left(\frac{IE}{IE+OE} \right)^{-1} - 1 \right]^{-1}$.

⁷ ILO defines vulnerable employment as the sum of the employment status groups of own-account workers and contributing family workers. They are less likely to have formal work arrangements and are therefore more likely to lack decent working conditions, adequate social security and a ‘voice’ through effective representation by trade unions and similar organizations. Vulnerable employment is often characterised by inadequate earnings, low productivity and difficult conditions of work that undermine workers’ fundamental rights (see: http://www.ilo.org/global/about-the-ilo/newsroom/features/WCMS_120470/lang--en/index.htm).

($\eta_1 = IE$). In symbols, the widest structural equation assumes that IE depends on a linear combination of eleven observable causes:

$$IE_{it} = const_0 + \sum_{j=1}^{11} \gamma_j x_{it}^j + f_i + \zeta_{it}, \quad (1)$$

Where: $i = 1, \dots, 110$; $t = 1997, \dots, 2022$; and f_i are country fixed-effects.⁸

As far as the measurement model is concerned, the four indicators (y_h) of the IE are as follows:⁹

$$IE_Index = const_1 + \beta_1 IE_{it} + f_i + \varepsilon_{it}^1 \quad (2)$$

$$VulnMal_{it} = const_2 + c_1 ExpTertEdu_{it} + f_i + \varepsilon_{it}^2 \quad (3)$$

$$VulnFem_{it} = const_3 + c_2 ExpTertEdu_{it} + f_i + \varepsilon_{it}^3 \quad (4)$$

$$InfSecInc_{it} = const_4 + c_3 ExpTertEdu_{it} + f_i + \varepsilon_{it}^4 \quad (5)$$

To address the omitted variables problem, we remove unobserved time-invariant (country-specific) effects in the model specification by centring (i.e. demeaning) all the observed variables at the country level. Since the latent construct (IE) metric depends on observed variables, this implies that the IE is also measured as a deviation from its country's means.¹⁰ This data transformation works in structural equation modelling (SEM) as a (within) fixed-effects estimator in the standard panel data regression.¹¹ In conclusion, following the usual conventions to graph SEM models,¹² the MIMIC representation of the selected model MIMIC 11(causes) – 1 (latent construct) – 4 (indicators) is described by the path diagram of Figure 1.

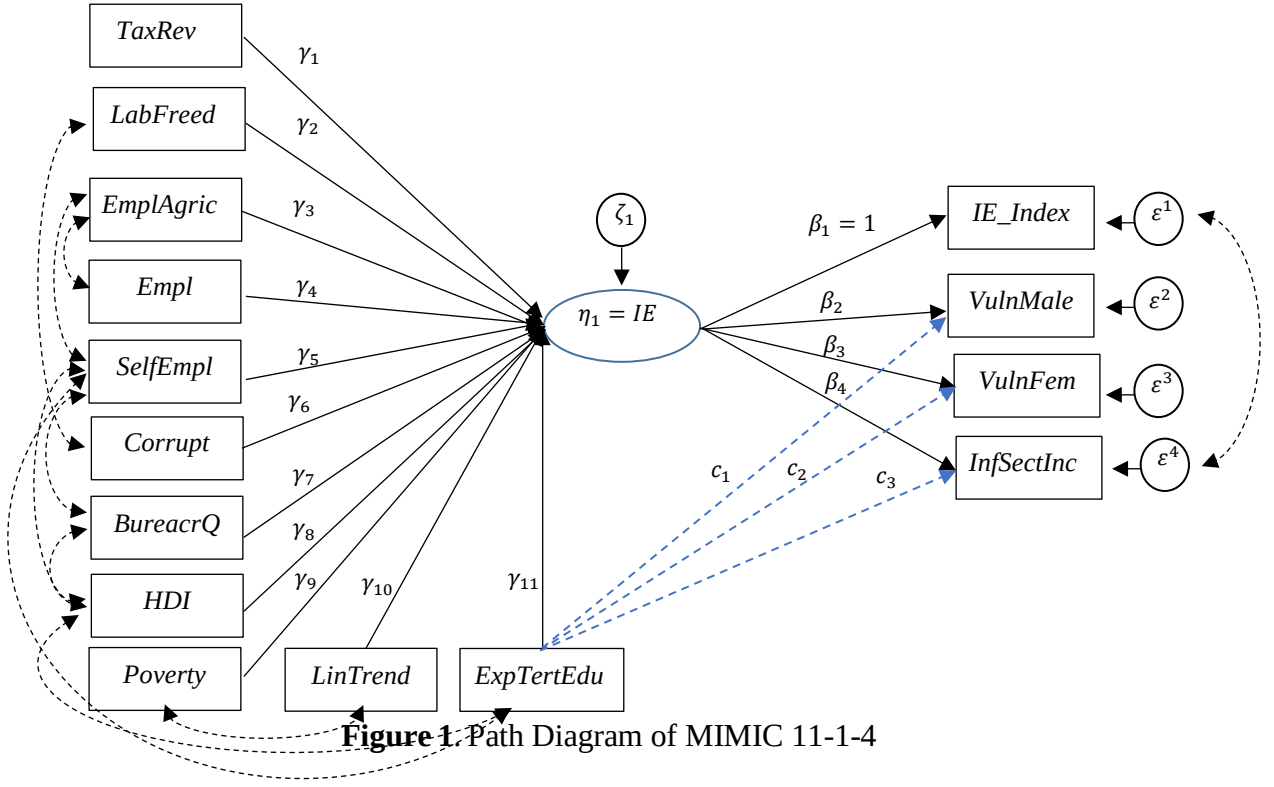
⁸ We also test for unobserved country-invariant effects, e.g., time-fixed effects or two-time dummies (The Great Recession and COVID-19), and a deterministic linear time trend. Although we often have problems with the SEM algorithm's non-convergence, the only statistically significant variable is the linear time trend.

⁹ We also allow to covariate the measurement errors of measurement equations that account for the income of informal employment in an informal sector (i.e. $Cov(\varepsilon_{it}^1, \varepsilon_{it}^4)$), and covariances among causes (see figure 1) to control for multicollinearity in the structural equation.

¹⁰ Precisely, we transform all observed variables: $x_{it}^j = x_{it}^j - \bar{x}_{it}^j$.

¹¹ The advantage of within transformation respect to the inclusion of $i-1$ dummy variables is that the former transformation saves the degrees of freedom (e.g. by constraining intercepts of structural and measurement equations equal to zero ($const=0$ in eqs 1-5)).

¹² Specifically, we indicate observed variables as rectangles, the latent variables and error terms by circles or ovals, paths or loadings (or regression effects) that connect variables or error terms as single-headed arrows. The covariances (double-headed arrows) are shown if they are estimated in the MIMIC (i.e. we are not constrained to be equal to zero), and this occurs if, in an initial estimation of the model where all the covariances are unconstrained, they are not statistically different from zero. This specification of covariances among the “causes” of the latent construct makes it possible to control for multicollinearity in the structural model.



3.2.2 The MIMIC estimates

To select the best estimator of the SEM model, we test if the observed variables are not multivariate normally distributed. Indeed, the standard estimator (i.e. Likelihood-ratio test comparing the fitted model with the saturated model, from now on ML) is derived assuming that the observed variables are normally distributed. If they are not, the ML estimator produces biased standard errors and an ill-behaved χ^2 test of the overall model fit indexes. Because of that, we apply four tests for multivariate normality,¹³ and all suggest rejecting the null hypothesis of multivariate normality. In this case, the literature suggests applying Satorra and Bentler's (1994) rescaled Likelihood ratio- χ^2 test statistics adjustments to obtain standard errors and goodness-of-fit statistics that are robust to nonnormality.

A further contribution of this research is that we implement in the econometric model the theoretical argument that considers the qualitative differences in the composition of IE across developed (i.e. High-income countries) and developing economies (not high-income

¹³ Doornik-Hansen (2008) omnibus test, Henze-Zirkler's (1990) consistent test, Mardia's (1970) measure of multivariate kurtosis and multivariate skewness.

countries) (See among the others Dell’Anno 2022, Goel and Nelson, 2016). In particular, marginal effects of the IE determinants are estimated separately between developed and developing countries, i.e. (80 Low and medium-income countries as “Not-High income” and 30 high-income countries according to World Bank classification; see Appendix A for the list of countries included in two sub-samples).

As the first step, we estimate the model simultaneously in both groups and constrain the parameters to be equal between groups. Then, we replicate the estimation fitting the MIMIC for not high-income and high-income country groups.

Table 2 reports estimates based on demeaning variables comparing coefficients based on whole sample and two groups. We perform a likelihood-ratio test to compare if the estimated coefficients differ between groups of countries. In particular, we test the statistical significance that structural and measurement coefficients and covariances among structural errors are different between groups against the alternative hypothesis that they should be constrained (i.e. “all countries” estimated in the same sample) and verify if the differences between structural (γ_j^d and γ_j^z) and measurement coefficients (β_h^d and β_h^z) are statistically significant.¹⁴ In Table 2, we complete this analysis by reporting the p-values of *Score tests* that compare the single structural and measurement coefficients.¹⁵

¹⁴ The LR $\chi^2(17) = 826.36$ with a p-value equal to 0.000 suggests that there is a statistically significant difference between high-income and not high-income countries in the structural, measurement coefficients and structural error.

¹⁵ Results of these tests should be considered with caution because this test is based on the χ^2 test that assumes normal distribution, and this hypothesis does not hold for our variables.

Table 2: Score tests for group invariance: Not High-income vs. High-income Countries

Structural Eq. (2) - Dep. Var: IE (latent var.)	χ^2
<i>TaxRev</i>	0.679
<i>LabFreed</i>	9.275***
<i>EmplAgric</i>	7.976***
<i>Empl</i>	4.935**
<i>SelfEmpl</i>	3.290*
<i>Corruption</i>	1.610
<i>ExpTertEdu</i>	10.381***
<i>BureacrQ</i>	0.884
<i>HDI</i>	5.755**
<i>Poverty</i>	3.183*
<i>LinTrend</i>	7.490***
Measur. Eq. (3) - Dep. Var: IE_Index	
IE (latent)	9.059***
Measur. Eq. (4) - Dep. Var: VulnEmpl_Mal	
IE (latent)	45.642***
<i>ExpTertEdu</i>	9.786***
Measur. Eq. (5) - Dep. Var: VulnEmpl_Fem	
IE (latent)	23.789***
<i>ExpTertEdu</i>	55.612***
Measur. Eq. (6) - Dep. Var: Inf_Sect_inc	
IE (latent)	13.197***
<i>ExpTertEdu</i>	29.895***

Notes: ***, **, * represents p-values < 1%, 5% and 10%.

Based on these results, we conclude that splitting the sample into two groups improves the explanatory power of the MIMIC model because (at the 5% level) estimating two different structural and measurement coefficients significantly improves the model's fitting rather than one coefficient for all countries. This difference is not statistically significant for Tax revenue, Self-Employment, Corruption, Quality of bureaucracy and Poverty.

Table 3 reports estimates of two MIMIC models (with and without Tax revenue) based on the whole sample “All countries” and “Two groups”.¹⁶

¹⁶ Appendix B reports the estimates based on MIMIC 11-1-4 (1 group and 2 groups) and, as a robustness check, provides the estimates based on Maximum Likelihood with Missing Values (MLMV) and robust standard errors instead of ML and Satorra Bentler standard errors. This method includes observations with missing values in the analysis rather than omitting them (listwise deletion). This approach assumes that the data are either missing completely at random or missing at random and requires the data to be multivariate normal.

Table 3: Estimates MIMIC 10-1-4 Estimator ML – All sample Vs two groups

Sample Composition		All countries	All countries	Two groups
Structural Eq. (2) - Dep. Var: IE		11 - 1 - 4	10- 1 - 4	10 - 1 - 4
<i>TaxRev</i>		0.001	0 (constr.)	
	Not High-income Countries			0 (constr.)
	High-income Countries			0 (constr.)
<i>LabFreed</i>		-0.006***	-0.006***	
	Not High-income Countries			-0.003**
	High-income Countries			0.015***
<i>EmplAgric</i>		0.014***	0.014***	
	Not High-income Countries			0.007**
	High-income Countries			0.303***
<i>Empl</i>		0.017***	0.016***	
	Not High-income Countries			0.010**
	High-income Countries			0 (constr.)
<i>SelfEmpl</i>		0.095***	0.094***	
	Not High-income Countries			0.051**
	High-income Countries			0.652***
<i>Corruption</i>		0.111***	0.112***	
	Not High-income Countries			0.069*
	High-income Countries			-0.504**
<i>ExpTertEdu</i>		-0.048*	-0.048*	
	Not High-income Countries			-0.049*
	High-income Countries			0.234***
<i>BureacrQ</i>		0.066**	0.064**	
	Not High-income Countries			0 (constr.)
	High-income Countries			-0.201**
<i>HDI</i>		-0.535***	-0.541***	
	Not High-income Countries			-0.299**
	High-income Countries			4.531*
<i>Poverty</i>		0.005***	0.005***	
	Not High-income Countries			0.003**
	High-income Countries			0 (constr.)
<i>LinTrend</i>		0.006***	0.006***	
	Not High-income Countries			0.004**
	High-income Countries			0.036***
Measur. Eq. (3) - Dep. Var: IE_Index				
IE		1 (constr.)	1 (constr.)	
	Not High-income Countries			1 (constr.)
	High-income Countries			1 (constr.)
Measur. Eq. (4) - Dep. Var: VulnEmpl_Mal				
IE		7.949***	8.017***	
	Not High-income Countries			14.943**
	High-income Countries			0.932***
<i>ExpTertEdu</i>		0.404*	0.407*	
	Not High-income Countries			0.759
	High-income Countries			-0.155***
Measur. Eq. (5) - Dep. Var: VulnEmpFem				
IE		7.586***	7.659***	
	Not High-income Countries			13.766**
	High-income Countries			1.253***
<i>ExpTertEdu</i>		0.386*	0.389*	
	Not High-income Countries			0.709
	High-income Countries			-0.448***
Measur. Eq. (6) - Dep. Var: InfSectInc				
IE		0.941***	0.942***	
	Not High-income Countries			2.424**
	High-income Countries			-0.430***
<i>ExpTertEdu</i>		0.066***	0.066***	

	Not High-income Countries			0.131*
	High-income Countries			0.334***
# observations	2,287	2,287	2079/208	
# countries	110	110	80/30	
$\chi^2(\text{SB})$	3,363.7	3,388.2	4556.6/1692.1	
p-value($\chi^2(\text{SB})$)	0.000	0.000	0.000/0.000	
degrees of freedom	92	80	79/80	
CD	0.969	0.968	0.989	
$R^2(\text{IE})$	0.905	0.883	0.935/0.997	
mc (IE)	0.951	0.939	0.967/0.999	

Notes: ***, **, * represents p-values < 1%, 5% and 10%. (s.e. are not reported for the sake of space, but they are shown in Appendix B (Table B.1)). We apply Satorra Bentler with ML; CD is the coefficient of determination; $R^2(\text{IE})$ indicates the R^2 concerning the latent variable (IE); mc reports the correlation between the dependent variable (IE) and its prediction. "(constr.)" indicates that we fix the coefficients equal to zero (because it is not statistically significant). Additional constraints on covariances, means, and variances are applied to save degrees of freedom (see Figure 1).

Regarding overall model evaluation, the χ^2 test is statistically significant and is not an ideal result (i.e. our model-implied covariance matrix fails to reproduce the databased covariance matrix). However, this is not a conclusive negative evaluation of our MIMIC specification for several reasons. First, the χ^2 test is sensitive to sample size; the larger the sample size, the greater the chances of obtaining a statistically significant χ^2 , and with more than 3,950 observations, this may affect the result. Second, our MIMIC models have complex specifications considering the multifaceted nature of latent construct (IE). Although we drop out the statistically insignificant variables from the final models, we do not modify the model to increase the goodness of fitting if the statistical parameters (e.g. suggested by modification indexes) have no economic meaning. This is because by modifying the model, we alter the economic meaning of the latent construct (i.e. IE) and the risk of measuring different macroeconomic variables rather than informality (e.g. socio-economic development). Accordingly, in the trade-off between better statistical fitting and a consistent definition of the meaning of the latent variable, we prioritise the second one. Finally, due to the predictive aim of this model, we are interested in explaining mainly the latent construct rather than the overall fitting of the model and the estimated measurement equations of the MIMIC. In this sense, looking at the indexes of the explanatory power of structural equation (i.e. coefficient of determination, i.e. CD, the R^2 of the latent construct, and the correlation between the dependent variable and its prediction, i.e. mc) have major relevance than other statistics of overall model evaluation. That being stated, we find that the structural equation has satisfactory performance in term of prediction and degree of variance explanation of the latent variable (i.e. IE).

3.3 Third Step: Identification and Calibration of the MIMIC model

The third step of analysis deals with the most controversial issue of the MIMIC approach, i.e., how SEM estimates can be converted into actual values of IE. A complete treatment of this issue is outside the scope of this paper, so we refer to Dell’Anno (2023). In brief, this issue is strictly related to the identification issue that generates an indeterminacy of the estimated parameters in SEM. Generally, each latent variable needs a scale, and the most popular scaling method uses a scaling or reference indicator. We select a proxy of the IE (*IE_index*) as a reference indicator of the IE based on two primary sources. For European and high-income countries, we use Dell’Anno’s (2024) projections and Fernandes’s (2022) collection of the estimates of the NOE as calculated by national institutes of statistics, while for not high-income countries, we use our estimation of income generated by informal employment based on ILO (2019) estimates of informal employment (see Appendix E). This variable is selected as the reference indicator because, in line with Bollen et al.’s (2022) recommendation, it is expected to have the highest positive correlation with the latent variable. Consequently, we fix equal to unit the measurement coefficient of the latent variable with this indicator. As demonstrated by Dell’Anno (2023), this anchoring approach does not “solve” the indeterminacy of MIMIC estimates - because all the absolute values of parameters are still arbitrary - but they make it possible to estimate the SEM by fixing a (unknown) scale for all the parameters of the model. To obtain the latent variable’s fundamental metric, the MIMIC model’s latent scores must be calibrated by estimating a “factor of scale” to adjust estimated SEM coefficients and, consequently, predict the latent scores.

In particular, taking into account that the source of bias of the MIMIC coefficients is the constraint on the coefficient of scale ($\beta_1 = 1$), the first method “adjusts” the identification bias of structural coefficients ($\hat{\gamma}_j^d$) to predict the IE in its real metric. In the following sections, we report the steps applied to calibrate the best model specification MIMIC 10-1-4. Following Dell’Anno’s (2023) taxonomy: the first method aims to adjust structural coefficients, and the second method seeks to adjust structural coefficients based on the measurement equation of the reference variable.

3.3.1 Adjusting structural coefficients by estimating the structural equation of the MIMIC

We calibrate structural coefficients by rescaling the MIMIC structural coefficients (i.e. ${}^d\hat{\gamma}_{ij}^* = \hat{\gamma}_j^d / \hat{\beta}_{i1}^*$) by an exogenous (OLS) estimate of the coefficient of scale (i.e. ${}^1\hat{\beta}_{i1}^*$). Once all the structural coefficients are rescaled, the IE is predicted by multiplying them by the centred observed causes (${}^d\mathbf{x}_{it}^j$). The step-by-step procedure follows Dell’Anno (2023):

Step 3.1 - Computing “first-stage” latent scores through structural coefficients:

$${}^{FS}\widehat{IE}_{it}^d = \sum_{j=1}^{10} \hat{\gamma}_j^d {}^d\mathbf{x}_{it}^j, \quad \text{with } j=1, \dots, 10; i=1, \dots, 110; t=1997, \dots, 2022 \quad (8)$$

Step 3.2 - Estimating the “coefficients of scale” by auxiliary OLS regressions:

Defining the exogenous estimate of the IE as ${}^{exog}IE_{it}^d$, we centre the exogenous estimates with the country mean to have the same metric of the latent scores (i.e. eq. 8) ${}^{exog}IE_{it}^d = {}^{exog}IE_{it}^d - {}^{exog}\overline{IE}_t^d$. This variable is used as a dependent variable of OLS regressions that, separately for each i-th country, estimate the (inverse of) “true” value of the coefficient of scale, i.e. ${}^1\hat{\beta}_1^*$ by the following 110 regressions:

$$\forall i = 1, \dots, 110: \quad {}^{exog}IE_{it}^d = {}^{ols}\hat{\rho}_{i1} \overbrace{{}^{FS}\widehat{IE}_{it}^d}^{eq.8} + \varepsilon_{it}^*, \quad \text{with } t^* \quad (9)$$

Where the estimated coefficient of scale is equal to ${}^1\hat{\beta}_{i1}^* = 1/{}^{ols}\hat{\rho}_{i1}$ and t^* indicate the years with available exogenous estimates of the IE. To increase the reliability of exogenous values, ${}^{exog}IE_{it}^d$ include the estimates based on NA projections (i.e. extracted by Dell’Anno 2024) and ILO (2019) only for the years with available official estimates of the NOE published by the NA institutes of statistics or with available estimates of informal employment published by ILO (2019). If these values are lower than three, therefore the reliability of OLS estimates is weak; we include the four closer values to t^* (i.e. two years before and two years later of the year with available official estimates of NOE or informl employment Finally, we use all the IE values (i.e., $t^* = t$) for countries without official estimates of the IE but where all the estimates of exogenous estimates are imputed according to the imputation approach based on clustering explained in Appendix A.¹⁷ As robustness check we calibrate our model by using

¹⁷ E.g. Let’s assume that for the j-th country, there is only one exogenous estimate of the IE based on NA approach or ILO informal employment in 2010, then we replace missing from 2008 to 2009 and from 2011 and 2012, i.e. $t^* \in [2008, 2012]$; if there are 2 (or 3) exogenous values (e.g. 2010 and 2015), we replace the following missing values 2009, 2011, 2014, 2016). Precisely, 5 countries have at least 4 exogenous values, 33 countries have at least 5 exogenous values, 16 have at least 6 exogenous values, 46 countries have between 7 and 25 exogenous values and for 10 countries we use all the 26 estimates values (i.e. ${}^{exog}IE_t^d = IE_Index_t$).

alternative exogenous estimates of the IE such as Elgin et al. (2021, i.e. DGE and MIMIC1) and Medina and Schneider (2021, i.e. MIMIC2).¹⁸

Step 3.3 - “Adjusting” SEM coefficients -

we rescale the structural coefficients in each country ${}^{1d}\hat{\gamma}_{ij}^*$ by dividing the estimated coefficients ($\hat{\gamma}_j^d$) by ${}^1\hat{\beta}_{i1}^*$ estimated by step 2:

$${}^{1d}\hat{\gamma}_{ij}^* = \frac{\hat{\gamma}_j^d}{{}^1\hat{\beta}_{i1}^*}, \quad (10)$$

Step 3.4 - Calculating the “adjusted” latent score:

$${}^{LS}\widehat{IE}_{it}^d = {}^{1d}\hat{\gamma}_{ij}^* d_{x_{it}}^j, \quad (11)$$

Step 3.5 - Estimating the intercepts for each country (i.e. fixed effects) of the structural model (${}^1\hat{\gamma}_{i0}^*$) -

For each country, the intercept is calculated as the value that equalises the most recent exogenous estimate of the IE based on the NA approach or ILO estimates of informal employment¹⁹ and the transformed values of the IE as estimated by eq. 11:²⁰

$${}^1\hat{\gamma}_{i0}^* = {}^{exog}IE_{it}^d{}_{max} - {}^{LS}\widehat{IE}_{it}^d{}_{max}. \quad (12)$$

Step 3.6 - Calculating the “absolute” values of the IE:

Predicting the IE by using transformed latent scores of step 4 and the intercept of step 5:

$$\widehat{IE}_{it}^{m-1} = {}^1\hat{\gamma}_{i0}^* + {}^{LS}\widehat{IE}_{it}^d. \quad (13)$$

3.3.2 Adjusting structural coefficients by estimating measurement coefficient of reference factor

This method is only applied to three countries (Nepal, the Republic of Congo, and Morocco) because the first calibration approach generates some negative IE estimates.²¹ In

¹⁸ As explained by Dell’Anno (2023), calibration methods may lead to a biased estimate of the factor of scale, which may cause an inverted trend of the predicted values. To take into account this issue, we use the absolute value of the coefficient of scale (${}^{ols}\hat{\rho}_{i1} = 1/|{}^1\hat{\beta}_{i1}^*|$) in order to prevent the inverted trend at the country level (i.e. the estimate of ${}^{ols_est}\hat{\rho}_1$ has a negative sign).

¹⁹ For Exogenous values based on DGE, MIMIC1 and MIMIC2, we use the most recent available values.

²⁰ Alternative hypotheses can be possible, e.g. equalize the mean between exogenous and adjusted latent scores.

²¹ See Dell’Anno (2023) for a general discussion of this issue. In this analysis the reason of negative values is that ${}^1\hat{\beta}_{i1}^* \approx 0$, therefore the rescaled structural coefficients ${}^d\hat{\gamma}_j^*$ are very high. The source of this issue may be the limited available exogenous values for Republic of Congo (5 values), Morocco (5 values) and Nepal (6 values).

this case, applying the second calibration approach proposed by Dell’Anno (2023) is sufficient to get more reliable estimates. According to this second method, we estimate the measurement coefficient at the country level (${}^2\hat{\beta}_{i1}^*$) by regressing the exogenous estimate of the IE (${}^{exog}IE_{it}^d$) on the reference indicator ($IE_Index_{it}^d = IE_Index_{it}^d - \overline{IE_Index_t^d}$). Later, we calculate the intercepts of the structural model as the differences between first-stage latent scores and an exogenous value of the IE.

The step-by-step procedure is:

Step 3.7 - Estimating the “coefficient of scale” by auxiliary OLS regressions -

Estimating the “coefficient of scale” (i.e. ${}^2\hat{\beta}_{i1}^*$) through the first measurement equation (eq. 2) after replacing the (unobserved) latent variable with the external estimate (i.e. ${}^{exog}IE_{it}^d$) by the following 110 regressions:

$$\forall i = 1, \dots, 110: IE_Index_{it}^d = {}^2\hat{\beta}_{i1}^* {}^{exog}IE_{it}^d + \varepsilon_{it}^* \quad (14)$$

Step 3.7 - “Adjusting” SEM coefficients -

Rescaling the MIMIC coefficients $\hat{\gamma}_j^d$ by using the coefficient of scale estimated by eq. 14:

$${}^{2d}\hat{\gamma}_{ij}^* = \frac{\hat{\gamma}_j^d}{{}^2\hat{\beta}_{i1}^*} \quad \text{with } j = 1, \dots, 10; \text{ and } i=1, \dots, 110 \quad (15)$$

Step 3.8 - Computing “first-stage” latent scores by adjusted structural coefficients:

To compute “first-stage” latent scores (${}^{FS}\widehat{IE}_{it}^d$) using ${}^{2d}\hat{\gamma}_{ij}^*$ we apply the same approach as the first method:

$${}^{FS}\widehat{IE}_{it}^d = {}^{2d}\hat{\gamma}_{ij}^* d_{x_{it}}^j, \quad (16)$$

Step 3.9 - Estimating the intercepts for each country (i.e. fixed effects) of the structural model (${}^2\hat{\gamma}_{i0}^*$) -

The intercepts are calculated as the values that equalise, in each country, the first-stage latent scores (${}^{FS}\widehat{IE}_{it}^d$) and the exogenous estimates at the t^{**} (${}^{exog}IE_{it}^d$), where t^{**} indicates the period with available exogenous estimates of the IE published by the national institutes of statistics for the NA approach or ILO (2019) for the estimate of income generated by informal employment. For the exogenous values extracted from academic sources, t^{**} corresponds to the most recent available exogenous estimates published by Elgin et al. (2021) or Medina and Schneider (2021). In symbols:

$${}^2\hat{\gamma}_{i0}^* = {}^{exog}IE_{it}^d - {}^{FS}\widehat{IE}_{it}^d, \quad (17)$$

Step 3.10 - Calculating the “absolute” values of the IE -

Predicting the IE by using latent scores of step 3 (eq. 16) and the intercepts of step 4 (eq. 17):

$$\widehat{IE}_{it}^{m.2} = {}^2\hat{\gamma}_{i0}^* + {}^{FS}\widehat{IE}_{it}^d. \quad (18)$$

3.4 Estimates of the IE

This section presents estimates of the IE as a percentage of observed GDP, derived from the MIMIC 10-1-4 model estimated using the ML estimator, with Satorra-Bentler adjustments for non-normality. The estimates are based on separate estimations of the sample's MIMIC coefficients in two groups: 20 high-income European countries and 80 non-high-income countries, as classified by the World Bank. For 107 countries, we use the first calibration method, while the second calibration method is applied to the remaining three countries.

For brevity, we report only the three-year average estimates obtained using the NA approach and ILO estimates to calibrate the latent score. Detailed annual estimates and alternative exogenous calibration values—such as those from Elgin et al. (2021) using the DGE and MIMIC approaches and Medina and Schneider (2021) using the MIMIC model—are provided in Appendix C.

Table 3: Estimates (average 3-year) – Exogenous values for Calibration based on NA and ILO

Country	'97-'99	'00-'02	'03-'05	'06-'08	'09-'11	'12-'14	'15-17	'18-'20	'21-'22
Angola	24.86	24.67	24.61	24.70	24.91	24.68	24.45	24.37	24.46
Argentina	14.92	14.98	14.93	14.63	14.40	14.34	14.45	14.58	14.81
Austria	2.81	1.94	1.99	3.38	3.43	4.96	4.28	3.91	3.73
Bangladesh	37.11	37.04	37.00	36.94	36.91	36.81	36.66	36.66	36.62
Belarus	36.05	36.53	36.71	37.01	37.65	37.73	37.95	38.54	39.02
Belgium	6.01	5.52	5.44	5.37	5.39	5.51	5.52	5.43	5.51
Benin	49.25	47.95	47.54	48.07	49.49	44.13	43.08	41.83	40.89
Bolivia	38.00	38.12	37.66	37.72	37.12	38.42	40.79	41.20	42.42
Bosnia Hzeg.	26.45	25.95	26.08	26.31	26.47	26.55	26.78	26.78	26.81
Botswana	17.40	17.30	17.18	17.13	16.95	16.81	16.66	16.50	16.37
Brazil	15.32	15.30	15.44	15.48	15.39	15.25	15.34	15.46	15.51
Bulgaria	30.84	30.59	30.10	30.11	30.09	30.07	30.08	30.09	29.98
Burkina Faso	40.31	40.12	40.04	39.86	39.55	39.39	39.31	39.17	39.06
Burundi	51.48	50.03	55.95	54.42	56.54	54.35	57.77	59.63	60.77
Cambodia	50.57	50.45	50.31	50.14	49.98	49.69	49.45	49.38	49.34
Cameroon	50.66	48.99	49.02	50.09	47.78	46.69	44.96	44.28	44.22
Canada	2.79	2.28	2.39	2.70	2.95	3.02	3.16	3.32	3.02
Chad	45.06	44.89	44.65	44.49	44.59	44.01	44.09	44.00	43.88
China	13.77	13.65	13.52	13.38	13.31	13.29	13.27	13.25	13.24
Colombia	25.49	25.55	27.14	25.05	26.72	26.66	25.57	25.18	25.16
Comoros	43.28	41.93	41.53	39.68	38.96	37.83	36.94	36.75	36.29
Congo, De.R.	62.06	62.50	61.69	57.62	51.05	45.14	41.83	41.58	41.44
Congo, Rep.	16.54	16.83	16.99	17.30	17.54	17.71	17.93	21.94	18.01
Costa Rica	11.75	11.75	11.75	11.69	11.66	11.65	11.62	11.65	11.63
Cote d'Ivoire	36.08	36.23	36.27	35.81	35.68	35.39	35.19	35.34	34.98
Croatia	10.82	10.41	10.86	9.66	9.74	8.44	6.97	6.36	6.69
Cyprus	8.50	7.83	8.75	7.97	7.02	6.53	5.29	5.31	4.80
Czechia	10.87	11.01	11.17	11.23	11.33	11.34	11.12	11.22	11.18
Denmark	0.78	0.96	0.84	0.83	0.78	0.90	0.71	0.63	0.74
Djibouti	6.13	6.69	7.15	7.40	7.59	7.81	7.98	8.17	8.61
Domin. R.	6.91	10.20	12.96	16.03	19.06	19.52	20.61	21.84	23.55
Ecuador	36.81	35.63	33.62	31.71	29.20	28.11	26.65	26.15	25.21
Egypt, A. R.	20.05	20.10	20.23	20.27	20.31	20.37	20.29	20.25	20.32
El Salvador	31.73	33.09	30.75	30.32	30.87	32.48	32.05	30.65	29.98
Estonia	4.14	3.75	4.05	4.18	4.41	4.86	5.20	5.61	5.67
Eswatini	12.79	13.29	13.57	13.90	14.31	14.64	15.02	15.24	15.51
Finland	2.48	2.46	2.45	2.45	2.46	2.45	2.45	2.44	2.45
France	4.03	3.84	3.80	3.73	3.69	3.64	3.58	3.55	3.55
Gambia, The	36.24	36.13	37.03	37.85	38.31	38.04	38.48	39.17	39.43
Germany	7.25	7.33	7.52	7.55	7.57	7.52	7.43	7.41	7.33
Ghana	43.02	43.28	41.56	38.41	38.43	39.11	37.25	36.70	36.52
Greece	6.74	6.72	6.71	6.70	6.71	6.73	6.72	6.72	6.73
Guatemala	41.06	41.20	41.14	40.68	40.46	40.28	39.71	39.60	39.44
Guinea-B.	39.21	40.64	40.97	40.07	40.11	40.78	41.24	41.70	41.88
Haiti	48.49	48.59	48.69	48.77	48.88	49.01	49.14	49.32	49.50
Honduras	31.84	33.01	33.96	34.82	36.55	37.87	38.29	39.47	39.65
Hungary	9.40	8.28	7.43	6.70	7.17	6.04	5.12	5.79	6.24
Iceland	2.88	2.87	2.84	2.84	2.83	2.83	2.83	2.83	2.83
India	25.02	24.99	24.98	24.95	24.88	24.87	24.83	24.80	24.78
Indonesia	30.42	30.46	30.47	30.52	30.48	30.33	30.33	30.40	30.43
Ireland	4.17	4.16	4.16	4.16	4.16	4.16	4.15	4.15	4.15

Italy	19.30	18.85	17.56	16.07	14.76	14.52	13.50	12.85	12.41
Jamaica	29.52	29.45	29.45	29.39	29.20	29.83	29.64	29.68	29.80
Kyrgyz Rep.	30.80	30.80	30.76	30.74	30.70	30.74	30.74	30.72	30.73
Lao PDR	44.37	44.00	43.89	43.65	43.10	43.33	42.75	42.53	42.48
Latvia	17.76	15.72	14.56	13.82	13.64	14.24	14.67	14.67	15.21
Lebanon	21.96	21.98	22.02	21.85	21.82	21.74	22.03	22.14	22.08
Lesotho	32.41	32.89	31.12	30.05	31.19	30.89	30.72	31.41	30.67
Lithuania	23.13	23.19	22.97	22.39	22.12	22.38	22.32	22.34	22.35
Luxembourg	2.10	2.09	2.08	2.06	2.09	2.16	2.30	2.41	2.55
Madagascar	58.39	58.37	58.52	58.58	58.65	58.74	59.03	58.98	58.97
Mali	48.40	48.22	48.03	47.93	47.74	47.78	47.64	47.46	47.48
Mauritania	24.05	23.91	23.63	22.62	22.12	22.47	21.42	21.20	21.20
Mauritius	21.01	21.01	21.01	21.01	21.01	21.02	21.02	21.02	21.02
Mexico	24.40	23.90	23.87	22.82	22.30	21.53	21.25	21.02	20.90
Moldova	54.58	58.89	58.39	58.00	58.34	60.36	64.00	59.48	58.47
Mongolia	16.76	16.75	16.72	16.73	16.86	16.50	16.62	16.61	16.58
Montenegro	36.13	36.33	36.13	36.52	36.33	36.67	37.36	37.59	37.71
Morocco	21.67	21.68	21.66	21.33	21.27	21.12	20.91	14.36	20.60
Mozambique	45.91	47.72	48.44	50.43	48.17	47.44	48.05	49.31	50.24
Namibia	20.94	20.74	20.65	20.59	20.19	19.69	19.42	19.42	19.24
Nepal	18.13	23.82	25.23	23.02	23.49	22.84	22.97	23.03	23.19
Netherlands	0.74	0.65	1.09	1.91	2.27	2.63	3.01	3.07	3.04
Nicaragua	30.83	31.33	31.76	31.83	32.08	32.24	32.29	32.39	32.61
Niger	46.40	45.78	44.93	43.99	43.34	42.38	42.29	41.36	40.60
North Mcdn.	16.88	18.37	18.38	19.21	19.50	19.73	20.05	19.85	19.43
Norway	6.54	6.03	7.14	7.59	6.94	6.33	6.13	6.42	5.96
Pakistan	37.14	36.86	36.58	36.42	36.40	35.85	36.05	35.33	35.19
Paraguay	32.43	32.37	32.31	31.76	31.20	31.04	30.78	30.57	30.43
Peru	31.96	32.79	33.91	32.03	31.03	29.82	29.58	29.78	29.72
Poland	23.99	23.77	23.51	21.59	21.53	21.35	20.79	20.62	20.50
Portugal	5.22	5.21	5.21	5.20	5.19	5.17	5.15	5.14	5.13
Romania	56.76	59.27	47.32	43.68	45.63	43.11	34.72	31.55	24.60
Russian Fed.	35.81	36.72	35.87	35.44	35.39	35.19	35.19	34.89	34.50
Rwanda	34.59	34.54	34.53	34.42	34.32	34.28	34.06	34.06	34.18
Senegal	30.82	30.77	30.73	30.69	30.64	30.58	30.60	30.54	30.51
Serbia	47.07	47.02	46.89	46.80	46.64	46.61	46.61	46.50	46.41
Sierra Leone	47.36	47.35	47.24	46.54	46.30	45.80	44.62	44.45	43.93
Slovak Rep.	14.51	15.72	18.71	20.25	21.83	22.24	22.55	22.42	23.82
Slovenia	5.98	5.94	5.92	5.94	5.96	5.95	5.91	5.89	5.89
South Africa	9.86	10.13	10.51	10.45	8.28	7.21	6.32	7.06	7.87
Spain	12.95	12.57	12.37	12.28	12.18	12.30	12.21	12.17	12.16
Sri Lanka	20.71	20.70	20.56	20.88	21.03	20.67	21.17	20.55	20.66
Sudan	11.80	11.98	12.20	12.32	12.49	12.51	12.67	12.69	12.89
Sweden	4.78	4.30	4.13	3.72	4.59	3.14	2.60	2.71	3.76
Switzerland	4.47	4.23	4.59	4.09	3.93	4.23	3.88	3.81	4.03
Tajikistan	32.87	32.02	31.69	30.10	29.46	28.76	28.27	27.36	26.49
Tanzania	49.94	49.74	49.67	48.93	48.45	48.70	48.17	47.84	47.70
Thailand	22.00	21.99	21.97	21.96	21.98	21.99	21.96	21.97	21.98
Timor-Leste	27.36	27.43	27.48	27.58	27.59	27.65	27.70	27.75	27.72
Togo	43.21	44.19	43.87	43.28	43.79	40.00	39.37	38.46	38.62
Tunisia	17.30	17.17	16.99	17.06	16.81	16.56	16.50	16.17	16.06
Turkiye	15.62	14.51	13.16	11.20	10.86	9.84	9.01	8.45	7.88
Uganda	46.38	46.03	45.51	45.00	44.59	43.70	43.55	43.16	42.92
Ukraine	15.33	15.04	15.26	15.35	15.30	15.30	15.32	15.19	15.15
United King.	2.02	1.83	2.18	2.05	2.18	2.88	3.09	3.00	2.97

Vietnam	31.39	32.01	30.94	29.12	30.23	29.93	28.69	27.79	27.77
Yemen, Rep.	18.82	18.99	19.10	19.42	20.22	21.19	22.58	24.13	24.59
Zambia	20.17	21.84	21.91	23.56	23.54	23.53	24.10	24.83	25.29
Zimbabwe	33.57	34.16	34.72	35.21	35.73	36.15	36.52	36.90	36.92

Note: A graphical comparison of these estimates at the country level is available in Appendix D. Annual estimates for each country are provided in Appendix C for various exogenous calibration values.

4. DISCUSSIONS ON ESTIMATED COEFFICIENTS

As stated in previous sections, our model incorporates time-invariant characteristics (i.e. fixed effects at country level); therefore, the coefficients reflect the effect of a covariate on the dependent variable based on within-country changes over time. Unlike how coefficients are usually commented on in a MIMIC model (similar to pooled models, that is, a specification that does not use the information on the longitudinal structure of the dataset), in the proposed model, the coefficients are always interpreted as the effect of a one-unit change in the covariate on the dependent variable (IE/GDP), holding everything else constant, with the difference that, in this case, what is kept constant is not only the covariates (self-employment, HDI, size of agriculture sector, corruption, etc.) but also the unobserved, time-invariant characteristics of each country that affect the informality. In other words, if we consider these country-specific characteristics such as the "structural or long-term" components of the IE/GDP ratio (which depend on factors like culture, religion, tax morale, the country's economic structure, the average efficiency of tax inspections, etc.), the structural coefficients of our MIMIC then describe how much a change in the causes makes the IE/GDP ratio deviate from its long-term level.

Consequently, our findings show a significant variation in the key drivers of IE between high-income and not-high-income countries, exhibiting distinct causal effects on IE depending on different economic developments. These results highlight the inherent complexity and rigidity in altering historical levels of the IE using policy interventions that target specific causes of informality. The presence of IE in a country is deeply rooted in the very structural and cultural fabrics of the society in many economies, which are often shaped by fundamental socio-economic factors (such as weak institutional and legal frameworks, inadequate education systems, lack of social protection etc) (Schneider and Enste, 2000; Zhanabekov, 2022). These act as barriers to reducing informality with short-run policy measures. Additionally, any attempt to reduce the size of the IE in a country is often complicated by the fact that in some countries, particularly low-income countries, many

people's livelihoods depend on informal activities (Williams, 2014; Berdiev, Saunoris and Schneider, 2020). Even for high-income countries, reducing levels of informality may be a slow process, as some industries or sectors might favour informal labour practices due to fluctuations in economic conditions, cost-saving practices, or taking advantage of potential regulatory loopholes (Loayza, 2018). This necessitates a more nuanced, multifaceted and longer-term approach by governments, as targeted short-term policy measures can face resistance from economic agents involved in informal activities.

Having stated the above, our study has shown mixed results with respect to labour market characteristics between two samples of countries. The labour freedom index (*LabFreed*) has mixed effects on our two groups of countries. While it shows a significant negative impact on all countries and not high-income country samples, labour freedom's effect on the IE in high-income countries is found to be positive. This is a very interesting result, meaning that while in not-high-income countries, labour freedom can be used to formalise the rather large informal sector, in high-income countries, it can act as a paradox since more labour freedom and relaxation of red tape in this regard might increase the flexibility for potential informal economic activities.

There is a significant positive relationship between the level of agricultural employment (*EmplAgric*) and the IE for all countries of the sample. A very strong positive effect is seen for high-income countries (Schneider, Morkunas, and Quendler, 2023), indicating that employment in agriculture drives informality more in these countries than in less wealthy countries. The model shows a positively significant impact of self-employment (*SelfEmpl*) on the IE too. This indicates that higher levels of self-employment in an economy may give rise to informal economic activities (Torrini, 2005; Cabral, Gemmell and Alinaghi, 2012; Hassan and Schneider, 2016; Dell'anno, 2023), particularly so in high-income countries since the size of the coefficient is significantly higher than in not-high-income countries.

Our model has also incorporated human development and capital indicators, such as education and HDI. Our findings reveal that countries with better education and higher human development have lower levels of IE, particularly for not high-income countries. This highlights the cruciality of investing in education and skills development as a long-term strategy for curbing higher levels of informality. Such investment would, in turn, encourage more employment in the formal sector, reduce levels of poverty, and lead to higher economic growth in the long term (Togler, 2006). We observe a significant negative relationship between expenditure on tertiary education (*ExpTertEdu*) and the IE in all-country and not high-income country samples. At the same time, we observe a strong positive impact is found

in high-income countries where more *ExpTertEdu* correlates with higher IE. The relationship between education and attitude toward tax evasion is, therefore, not uniform across countries and cultures. Several other studies find a significant and positive relationship between education and tax non-compliance behaviour, indicating higher education can lead to more tax evasion and, hence, informality (Alm and Torgler, 2006; Togler, 2006). The HDI coefficients are also different for the two samples. The results indicate that for less developed countries, the effect of HDI on the IE is negative and significant. This is also true for the overall sample of 110 countries. However, the impact of HDI on IE is positive for high-income countries.

Poverty impacts both the all-country and not-high-income countries samples positively and significantly. This indicates that higher levels of poverty lead to greater informal activities, as economic agents look for opportunities in the informal sector to secure incomes in the absence of such opportunities in the formal sectors of the economy (Chen, 2005). The informal sector offers opportunities for those who are poor to escape their poverty (Williams, 2014). On the other hand, poverty has no significance in the model for the high-income countries sample. This might be a result of lower levels of poverty and stronger welfare states in wealthier countries.

A country with a higher level of corruption (*Corruption*) tends to have higher levels of informality. We use the Control of Corruption index from the World Bank Governance Indicators in our model. This ranges between -2.5 to 2.5, with +2.5 indicating the highest level of corruption. This is due to public mistrust in government institutions and their services, which can potentially influence an economic agent's decision to seek informal opportunities to avoid dealing with corrupt or less efficient public services and institutions (Alm and McClellan, 2012; Elgin, 2020; Dell'Anno and Teobaldelli, 2015). However, for high-income countries, this variable has a negative and significant impact on the size of the IE.

The quality of bureaucratic burden, as measured by the Bureaucratic Quality Index (*BureacrQ*) from ICRG, exhibits mixed results, too, between the samples. We find a significant negative impact of this variable with the IE, indicating that better Bureaucratic Quality reduces the size of the IE (Schneider and Enste, 2013). However, this same impact is not found in the sample of all countries and for lower-income countries.

In contrast to previous literature, our study has shown that tax revenue, which we proxy to capture the tax burden, is not significant. Gaspareniene and Remeikiene (2015) argue that a high tax burden is not always associated with higher informality, providing results that

countries with a high tax burden have small informality (such as Scandinavian countries), while some developing countries have low tax rates, but large informal sectors. Similarly, the results for the employment rate are somewhat unexpected too. We also see that the IE has a positive and significant impact on the employment rate in low-income countries. This may be due to underemployment, where people may be employed only part-time, leading to an increase in the employment rate. Still, most are also actively involved in informal activities. In contrast, there is no causal effect on the IE from the employment rate in high-income countries.

Our rationale for including the linear trend (*LinTrend*) in our MIMIC model is that it captures the broader structural transformations in the economy and production systems over the past 25 years. Specifically, we observe widespread trends such as increasing agricultural productivity per worker, a growing share of value added in the services sector relative to manufacturing in advanced economies, and a rise in manufacturing relative to agriculture in low-income countries. Additionally, phenomena such as increased globalisation, higher female labour force participation, greater labour market vulnerability, digitisation, and the proliferation of electronic payments have emerged (Dybka et al., 2019). Although these variables undoubtedly impact the size of the informality, they are not explicitly included in the model due to data unavailability. Thus, the inclusion of a linear trend can be considered a second-best approach. It functions as a "black box" that captures the cumulative effects of these unmeasured variables. We find that the linear trend is significant and positively related to the size of the IE. Our results suggest that the size of the IE grows over time more rapidly in high-income countries than in low-income countries (about ten times faster).

On the other hand, a large size of the IE is strongly and positively associated with vulnerable employment for males (*VulnEmplMal*) in all samples of countries. Similarly, we see a positive relationship between IE and informal sector income (*InfSectInc*) for not high-income countries. However, we see a negative relationship for high-income countries. This suggests that while in high-income countries, informal sector income is very low due to the nature and quality of jobs available in the informal sector, in the not high-income group of countries, the quality and available opportunities to work informally are higher.

5. CONCLUSIONS

In comparison to the existing literature dealing with the measurement issue of IE, our study has offered several contributions while addressing various existing methodological limitations. Firstly, our study provides robust estimates of the IE ratio in 110 countries of the sample for the longest period (from 1997 to 2022). Secondly, we provide a novel approach to dealing with missing data to measure the IE using the MIMIC approach and mitigate potentially biased estimates with an incomplete dataset. Unbalanced datasets are particularly an issue in less developed countries. Since a large sample of our countries is not high-income countries, the treatment of missing values is essential to ensure robust and more reliable estimates.

Thirdly, we demeaned all the variables used in the MIMIC specification to account for time-invariant and country-specific characteristics such as cultural, religious and economic structures. This has ensured that these various country-specific characteristics do not interfere with the cross-country comparisons. This approach, we believe, provides more robust and reliable estimates of the IE across diverse levels of economic development, and in particular between high-income and not-high-income countries.

Fourth, our MIMIC model with fixed effects highlights that, even after controlling for country-specific factors, the potential to significantly reduce informality levels in the short term remains limited due to the strength and persistence of the long-term component (such as tax morale, geography, culture, social capital, etc.). The methodological improvement of the MIMIC specification proposed in this research enables us to obtain unbiased estimates of the marginal effects of the causes of informality, which provides more reliable country estimates at the international level.

Fifth, the MIMIC model is theoretically constructed to account for the multifaceted characteristics of the IE, where we account for multiple interactions between the latent variable, causes and indicators, but also between the causes and indicators themselves. This is a new approach, which we believe is enhanced when estimating the IE using the MIMIC model. Additionally, the inclusion of the linear trend in our model provides us with insights into the development of the IE in all our sample countries.

We show that the size of the IE is still significant in both developed and less developed countries (on average, 8.7% in high-income and 31.1% in not high-income countries). Our model distinguishes between high- and not high-income countries, thus providing insights that factors that affect the size of the IE positively or negatively cannot be assumed to be homogenous. We test that this approach improves the explanatory power of the MIMIC model and the accuracy of the estimates because estimating two distinct sets of structural and

measurement coefficients significantly enhances both the overall model fit statistics and the precision of marginal effects, compared to assuming the same coefficients for both groups of countries.

From our results and estimates, we can state that the relatively low variation in the IE estimates within individual countries (owing to the low absolute values of the structural coefficients) reflects how complex and rigid it is to alter historical levels of informality through interventions targeting specific causes. While these causes are statistically significant, their impacts tend to affect the size of informality marginally. From a positive viewpoint, it may explain why countries with similar economic structures can exhibit significantly different IE levels over time despite having similar underlying drivers (MIMIC causes).

Overall, we conclude that factors like self-employment levels, labour freedom, and employment in the agriculture sector can significantly increase the IE for high-income countries. At the same time, control of corruption and bureaucratic quality decreases it.

For not high-income countries, factors like poverty levels, the level of agriculture employment, and the control of corruption positively influence the IE, while labour freedom, education spending, and higher HDI reduce it. Such nuanced differences highlight the need for specific and tailored long-term policies in dealing with the formalisation of economic informality in countries with different levels of development.

From a normative viewpoint, the low variation in the IE/GDP within individual countries (due to the low marginal impacts relative to the country average) indicates the complexity of modifying the historical levels of informality through simple interventions on one or only a few, causes of informality (e.g. tax revenue, labour regulation, etc). Indeed, these causes are statistically significant, they have generally minor impacts. This result also helps explain why, historically, countries with similar economies have IE/GDP levels, one double that of the other, even though the drivers (MIMIC causes) are not so different between them.

What our MIMIC model with fixed effects does is precisely to make visible that while controlling for country-specific effects (such as geography, culture, etc.), the possibilities of changing IE levels are quite limited because the “long-term component” is very strong and ultimately decisive. This is another contribution that we offer with this paper.

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APPENDIX: SUPPLEMENTARY MATERIAL

APPENDIX A – DESCRIPTIVE STATISTICS AND TREATMENT OF MISSING VALUES

Replacement of Missing Values

The treatment of missing values is a relevant issue in this econometric exercise. In general, we have three possibilities: to apply the standard ML estimator with listwise deletion. According to this method, this observation will not be used if an observed variable has a missing value in the i -th country and t -th year. As a consequence of panel data structure and data availability, by applying the listwise deletion approach, the adequate sample decreased at an unreliable level, e.g. considering the final MIMIC model 10-1-4, we lost about 98% of observations (i.e. we have 2801 rows on 2860 - i.e. 110 countries * 26 years - with at least one missing value over fourteen observed variables). The second option is to apply a maximum likelihood (ML) estimator that retrieves as much information as possible from observations containing missing values (i.e. it does not exclude the observation if there is a missing in one of the variables). However, this ML estimator dealing with missing values (MLMV) assumes both joint normality of all variables and missing values are assumed to be missing at random. Unfortunately, the first hypothesis is rejected, and the second is from a flawed theoretical viewpoint. Accordingly, we apply a third option for this analysis, and it consists of replacing missing values dealing with non-normality and non-missing at random by applying ML with Satorra Bentler adjustments and omitting, by listwise deletion method, the loss of about the 22% of sample observations due to remaining missing values.

The replacement of missing values is based on three steps. In the first step, we apply a regression imputation method to replace the missing values with predicted values. In particular, we specify a fixed effects model that includes - time-invariant country-effects (f_i), a set of country-specific linear trends ($f_i\#LinTrend$), and four control variables without missing values. These four variables account for the socioeconomic development of the country and characteristics of the labour market, such as urbanisation rate ($Urbanper$), annual growth of population ($Popgr$), net migration as a percentage of the population ($Netmigr$), and vulnerable employment as a percentage of total employment ($VulnTot$). In symbols, replaced values are calculated as:²²

²² This regression allows for the replacement of all missing values between 1997 and 2022 for all variables where at least one observation exists for each country, with the exception of Ukraine in 2022. Due to the war in Ukraine, several variables, including vulnerable employment as a percentage of total employment ($VulnTot$), have missing values for this

$$\begin{aligned}\hat{M}_{it} = & \hat{\alpha}_1 Urbanper_{it} + \hat{\alpha}_2 Popgr_{it} + \hat{\alpha}_3 Netmigr_{r_{it}} + \hat{\alpha}_4 VulnTot_{it} \\ & + f_i + LinTrend + \alpha_i(f_i \# LinTrend) + \zeta_{it},\end{aligned}\quad (1)$$

We further reduce predicted values to the minimum or maximum if they are outside the theoretical ranges (e.g., *TaxRev*, *LabFreed*, *Empl* from 0 to 100, *Corrupt* ranges between -2.5 and +2.5; *HDI* from 0 to 1, *BureacrQ* from 0 to 6).

In the second step, we replace missing values in variables without observation in the country. In this case, we define two clusters based on expected similarities in formal and informal economies among countries and over time. Specifically, the first set of clustering considers the formal economy. It consists of 1163 groups' including countries in the same region with comparable official real GDP per capita levels in the same period.²³ The second set of clusters accounts for the IE. It comprises 1612 groups, including countries in the same region, with comparable levels of vulnerable employment as a percentage of total employment in the same period.²⁴ In the last step, we calculate the average of two imputed values (i.e., based on clusters defined in terms of similarities in the formal and informal economies) and replace them in the data. Similarly, to the first stage, we cut off predicted values if they are outside the theoretical ranges of the variables.

year. Consequently, equation (1) is unable to predict $\hat{M}_{Ukr,2022}$ which explains the missed estimate of the informal economy in Ukraine in 2022 (see Appendixes C and D).

²³ We consider 13 periods, each about two years long, with the first period (1997-1999) and 2020 excluded because the COVID-19 pandemic generates outliers in several variables.

²⁴ There are still missing values in the Poverty headcount ratio at national poverty lines as a percentage of the population. For *Poverty*, we replace missing values in Australia, Canada, Japan and the United States with values extracted by the variable *povertyhead* because, for developed countries, the differences between the two measures of poverty are minor. I.e. *Poverty* reports "Data compiled from official government sources or computed by World Bank staff using national (i.e. country-specific) poverty lines, while *povertyhead* is defined as "Poverty headcount ratio at \$3.65 a day (2017 PPP) (% of the population) extracted by World Bank, Poverty and Inequality Platform.

TABLE A.1: Definition and descriptive statistics of the dataset

Var.	Definition	N	Mean	Min	Max
<i>TaxRev</i>	Tax revenue (% of GDP) - WDI	1913	17.59	3.86	62.79
<i>TaxRev (imputed)</i>		2860	17.04	0	100
<i>LabFreed</i>	Index of Labor Freedom - Heritage Foundation	1949	57.78	21.7	100
<i>LabFreed (imputed)</i>		2860	58.28	.16	100
<i>EmplAgric</i>	Employment in agriculture (% of total employment) (ILO) - WDI	2859	30.5	.68	92.48
<i>EmplAgric (imputed)</i>		2859	30.5	.68	92.48
<i>Empl</i>	Employment to population ratio, 15+, total (%) (modeled ILO estimate) - WDI	2859	55.98	22.63	85.87
<i>Empl (imputed)</i>		2859	55.98	22.63	85.87
<i>SelfEmpl</i>	Self-employed, total (% of total employment) (ILO) - WDI	2750	45.26	3.77	95.29
<i>SelfEmpl (imputed)</i>		2859	45.15	3.77	95.29
<i>Corrupt</i>	(reversed) Control of Corruption: Estimate. - WDI	2528	.12	-2.46	1.71
<i>Corrupt(imputed)</i>	It ranges between -2.5 to 2.5, with +2.5 indicating the highest level of corruption	2860	.12	-2.46	1.71
<i>ExpTertEdu</i>	Expenditure on tertiary education (% of government expenditure on education) - WDI	1200	20.11	.01	59.02
<i>ExpTertEdu (imputed)</i>		2859	20.59	0	100
<i>BureacrQ</i>	Bureaucracy Quality – ICRG - WDI	2274	2.16	0	4
<i>BureacrQ (imputed)</i>		2859	2.06	0	4.08
<i>HDI</i>	Human Development Index –ICRG - WDI	2753	.66	0	.96
<i>HDI (imputed)</i>		2859	.66	0	1
<i>Poverty</i>	Poverty headcount ratio at national poverty lines (% of the population) with the exclusion of Australia, Canada, Japan and the United States, where we use Poverty headcount ratio at \$3.65 a day (2017 PPP) (% of the population) - WDI	837	22.84	0	73.2
<i>Poverty (imputed)</i>		2859	28.97	0	76.19
<i>LinTrend</i>	Linea Trend (0=1997, 25=2022)	2860	12.5	0	25
<i>IE_Index</i>	Exogenous estimates based on imputed NA projections (Dell’Anno, 20224) and ILO (2019) estimates of informal employment *Households and NPISHs final consumption/population 15+	2859	24.52	0	82.7
<i>VulnMal</i>	Vulnerable employment, male (% of male employment) (ILO) - WDI	2859	39.56	3.27	92.51
<i>VulnFem</i>	Vulnerable employment, female (% of female employment) (ILO) - WDI	2859	45.32	1.79	98.9
<i>InfSectInc</i>	(Employment outside the formal sector, total; ILO 2019)*	438	22.08	.11	58.39
<i>InfSectInc(imputed)</i>	(Households and NPISHs final consumption/population 15+; WDI)	2287	24.55	0	93.75
<i>Exog Cal</i>	Exogenous estimates based on imputed NA and ILO estimates in t** (own estimation)	1178	23.29	0	68.72
<i>Exog Cal D</i>	Exogenous estimates based on Elgin et al. (2021) – DGE (https://www.worldbank.org/en/research/brief/informal-economy-database)	2520	31.37	7.91	64.44
<i>Exog Cal M1</i>	Exogenous estimates based on Elgin et al. (2021) – MIMIC (https://www.worldbank.org/en/research/brief/informal-economy-database)	2520	33.39	8.17	68.2
<i>Exog Cal M2</i>	Exogenous estimates based on Medina and Schneider (2021) - MIMIC	2600	29.87	4.6	70.5
<i>Urbanper</i>	Urban population (% of total population) - WDI	2860	54.33	7.62	98.15
<i>Popgr</i>	Population growth (annual %) - WDI	2860	1.28	-14.19	13.25
<i>Netmigr</i>	Net migration (% of total population) - WDI	2860	-.06	-17.56	17.85
<i>VulnTot</i>	Vulnerable employment, total (% of total employment) - WDI	2859	41.83	2.93	94.68

<i>IE 1 all Exog Cal</i>	MIMIC 10-1-4; all countries – 1st method of calibration – NA and ILO	2859	25.07	-40.55	66.8
<i>IE f Exog Cal</i>	MIMIC 10-1-4; 2 groups countries – 1st method of calibration for 107 c., 2° meth. for three countries – NA and ILO	2859	25.01	.56	64.2
<i>IE 1 Exog Cal D</i>	MIMIC 10-1-4; 2 groups countries, 106 countries – 1st method of calibration – Elgin et al. (2021) – DGE	2729	29.51	7.89	60.44
<i>IE 1 Exog Cal M1</i>	MIMIC 10-1-4; 2 groups countries, 105 countries – 1st method of calibration – Elgin et al. (2021) – MIMIC	2729	33.2	8.45	64.7
<i>IE1 Exog Cal M2</i>	MIMIC 10-1-4; 2 groups countries, 104 c. – 1st method of calibration – Medina and Schneider (2021) – MIMIC	2703	26.74	3.78	58.61

Note: (imputed) indicates the descriptive statistics of the variable after imputation of missing values.

SAMPLE COMPOSITION:

Our sample includes 30 high-income countries: Austria, Belgium, Canada, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

Our sample includes 80 Not High-income countries: Angola, Argentina, Bangladesh, Belarus, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Chad, China, Colombia, Comoros, Congo, Dem. Rep., Congo, Rep., Costa Rica, Cote d'Ivoire, Djibouti, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Eswatini, Gambia, Ghana, Guatemala, Guinea-Bissau, Haiti, Honduras, India, Indonesia, Jamaica, Kyrgyz Republic, Lao PDR, Lebanon, Lesotho, Madagascar, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, North Macedonia, Pakistan, Paraguay, Peru, Russian Federation, Rwanda, Senegal, Serbia, Sierra Leone, South Africa, Sri Lanka, Sudan, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tunisia, Turkiye, Uganda, Ukraine, Viet Nam, Yemen, Rep., Zambia, Zimbabwe.

APPENDIX B – FULL ESTIMATES OF TABLE 3 AND ROBUSTNESS CHECKS

TABLE B.1: Estimates of MIMIC coefficients

<i>MIMIC specification</i>	<i>11-1-4</i>	<i>10-1-4</i>	<i>10-1-4</i>	<i>11-1-4</i>	<i>10-1-4</i>
<i># group</i>	<i>All countries</i>	<i>All countries</i>	<i>All countries</i>	<i>Two groups</i>	<i>Two groups</i>
<i>Estimator, standard error adj.</i>	<i>ML, SB</i>	<i>ML, SB</i>	<i>MLMV, robust</i>	<i>ML, SB</i>	<i>ML, SB</i>
<i>TaxRev (all countries)</i>	0.001 (0.77)	0 (constr)	0 (constr)		
<i>TaxRev (Not High-income)</i>				0.001 (0.80)	0 (constr)
<i>TaxRev (High-income)</i>				-0.056* (-1.86)	0 (constr)
<i>LabFreed (all countries)</i>	-0.006*** (-3.49)	-0.006*** (-3.47)	-0.006*** (-2.79)		
<i>LabFreed(Not High-income)</i>				-0.003** (-2.14)	-0.003** (-2.11)
<i>LabFreed (High-income)</i>				0.014*** (2.65)	0.015*** (2.80)
<i>EmplAgric (all countries)</i>	0.014*** (3.53)	0.014*** (3.49)	0.016** (2.42)		
<i>EmplAgric(Not High-income)</i>				0.008** (2.14)	0.007** (2.10)
<i>EmplAgric (High-income)</i>				0.324*** (7.44)	0.303*** (6.82)
<i>Empl (all countries)</i>	0.017*** (3.31)	0.016*** (3.32)	0.014** (2.51)		
<i>Empl (Not High-income)</i>				0.011** (2.08)	0.01** (2.05)
<i>Empl (High-income)</i>				0 (constr)	0 (constr)
<i>SelfEmpl (all countries)</i>	0.095*** (4.39)	0.094*** (4.36)	0.106*** (3.02)		
<i>SelfEmpl (Not High-income)</i>				0.052** (2.29)	0.051** (2.25)
<i>SelfEmpl (High-income)</i>				0.639*** (15.55)	0.652*** (15.88)
<i>Corrupt (all countries)</i>	0.111*** (2.58)	0.112*** (2.61)	0.12** (2.05)		
<i>Corrupt (Not High-income)</i>				0.069* (1.91)	0.069* (1.91)
<i>Corrupt (High-income)</i>				-0.467** (-2.28)	-0.504** (-2.45)
<i>ExpTertEdu (all countries)</i>	-0.048* (-1.90)	-0.048* (-1.90)	-0.048* (-1.93)		
<i>ExpTertEdu (Not High-income)</i>				-0.049* (-1.92)	-0.049* (-1.91)
<i>ExpTertEdu (High-income)</i>				0.241*** (6.94)	0.234*** (6.60)
<i>BureacrQ (all countries)</i>	0.066** (2.08)	0.064** (2.06)	0.068* (1.75)		
<i>BureacrQ (Not High-income)</i>				0 (constr)	0 (constr)
<i>BureacrQ (High-income)</i>				-0.216** (-2.50)	-0.201** (-2.38)
<i>HDI (all countries)</i>	-0.535*** (-3.28)	-0.541*** (-3.33)	-0.559** (-2.44)		
<i>HDI (Not High-income)</i>				-0.297** (-2.12)	-0.299** (-2.11)
<i>HDI (High-income)</i>				3.425 (1.50)	4.531* (1.93)
<i>Poverty (all countries)</i>	0.005*** (3.26)	0.005*** (3.23)	0.005** (2.36)		

<i>Poverty (Not High-income)</i>				0.003** (2.08)	0.003** (2.04)
<i>Poverty (High-income)</i>				0 (constr)	0 (constr)
<i>LinTrend (all countries)</i>	0.006*** (3.47)	0.006*** (3.45)	0.005** (2.01)		
<i>LinTrend (Not High-income)</i>				0.004** (2.13)	0.004** (2.10)
<i>LinTrend (High-income)</i>				0.043*** (7.08)	0.036*** (5.85)
Measur. Eq. (3) - Dep. Var: IE_Index					
<i>IE (all countries)</i>	1 (constr)	1 (constr)	1 (constr)		
<i>IE (Not High-income)</i>				1 (constr)	1 (constr)
<i>IE (High-income)</i>				1 (constr)	1 (constr)
Measur. Eq. (4) - Dep. Var: VulnEmpl_Mal					
<i>IE (all countries)</i>	7.949*** (4.46)	8.017*** (4.43)	7.104*** (3.10)		
<i>IE (Not High-income)</i>				14.685** (2.30)	14.943** (2.27)
<i>IE (High-income)</i>				0.931*** (32.31)	0.932*** (31.21)
<i>ExpTertEdu (all countries)</i>	0.404* (1.79)	0.407* (1.79)	0.356* (1.65)		
<i>ExpTertEdu (Not High-income)</i>				0.746 (1.45)	0.759 (1.44)
<i>ExpTertEdu (High-income)</i>				-0.155*** (-4.17)	-0.155*** (-4.09)
Measur. Eq. (5) - Dep. Var: VulnEmpFem					
<i>IE (all countries)</i>	7.586*** (4.42)	7.659*** (4.40)	6.824*** (3.03)		
<i>IE (Not High-income)</i>				13.512** (2.29)	13.766** (2.25)
<i>IE (High-income)</i>				1.254*** (33.03)	1.253*** (31.85)
<i>ExpTertEdu (all countries)</i>	0.386* (1.78)	0.389* (1.78)	0.342 (1.62)		
<i>ExpTertEdu (Not High-income)</i>				0.696 (1.46)	0.709 (1.45)
<i>ExpTertEdu (High-income)</i>				-0.448*** (-9.21)	-0.448*** (-9.08)
Measur. Eq. (6) - Dep. Var: InfSectInc					
<i>IE (all countries)</i>	0.941*** (4.27)	0.942*** (4.24)	0.867*** (2.63)		
<i>IE (Not High-income)</i>				2.395** (2.45)	2.424** (2.41)
<i>IE (High-income)</i>				-0.431*** (-23.22)	-0.43*** (-22.01)
<i>ExpTertEdu (all countries)</i>	0.066*** (2.63)	0.066*** (2.66)	0.062** (2.26)		
<i>ExpTertEdu (Not High-income)</i>				0.13* (1.68)	0.131* (1.67)
<i>ExpTertEdu (High-income)</i>				0.334*** (15.93)	0.334*** (14.86)
# observations	2287	2287	2860	2287	2287
χ^2 (SB)	3363.67	3388.22		4776.34	4587.26
p-value(χ^2 (SB))	0.000	0.000		0.000	0.000
Degrees of freedom	92	80		187	159

Notes: ***, **, * represents p-values < 1%, 5% and 10%. Robust test statistic in parentheses

APPENDIX C – ANNUAL ESTIMATES OF IE USING DIFFERENT EXOGENOUS SOURCES FOR CALIBRATION

Table C.1: Estimates of the IE using Dell’Anno (2024); NA projections and ILO (2019) for calibration (see Excel file: Meth_f_g_NA_ILO)

Country name	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Angola	24.95	24.89	24.74	24.69	24.68	24.62	24.61	24.59	24.62	24.65	24.70	24.75	24.84	24.91	25.00	24.82	24.67	24.53	24.47	24.44	24.44	24.37	24.33	24.40	24.37	24.54
Argentina	15.15	14.58	15.03	14.87	15.06	15.01	15.01	14.84	14.94	14.66	14.61	14.64	14.53	14.31	14.35	14.29	14.35	14.39	14.46	14.54	14.34	14.53	14.62	14.59	14.93	14.69
Austria	2.21	3.14	3.08	2.34	1.86	1.61	1.48	1.80	2.70	2.79	3.86	3.49	3.36	4.02	2.91	4.91	4.83	5.14	4.73	4.33	3.77	3.56	3.95	4.24	3.80	3.66
Bangladesh	37.15	37.11	37.05	37.06	37.04	37.02	37.04	37.00	36.96	36.95	36.96	36.93	36.92	36.86	36.95	36.86	36.79	36.77	36.73	36.54	36.70	36.68	36.66	36.64	36.61	36.63
Belarus	35.92	36.00	36.21	36.46	36.49	36.65	36.72	36.79	36.63	36.41	37.43	37.19	37.42	37.75	37.77	37.69	37.72	37.79	37.82	37.99	38.03	38.44	38.53	38.64	38.72	39.32
Belgium	6.04	5.94	6.05	5.67	5.37	5.53	5.44	5.39	5.51	5.47	5.43	5.20	5.50	5.33	5.35	5.38	5.60	5.54	5.61	5.56	5.40	5.32	5.41	5.56	5.40	5.62
Benin	49.43	49.16	49.16	46.91	50.30	46.64	47.32	48.45	46.84	47.13	47.14	49.95	49.31	52.45	46.70	42.08	45.21	45.10	42.67	43.53	43.04	42.20	41.32	41.95	41.17	40.60
Bolivia	37.91	37.99	38.11	37.85	37.87	38.65	37.81	37.32	37.85	38.18	37.59	37.39	36.42	37.12	37.82	37.44	38.28	39.54	38.89	41.74	41.74	41.83	40.01	41.76	42.25	42.59
Bosnia and Herzeg.	26.52	26.46	26.36	25.96	25.91	25.98	26.03	26.10	26.12	26.19	26.26	26.47	26.54	26.46	26.41	26.71	26.55	26.39	26.60	26.77	26.96	26.70	27.16	26.47	26.60	27.01
Botswana	17.43	17.41	17.37	17.34	17.29	17.26	17.21	17.20	17.14	17.15	17.17	17.06	16.99	16.96	16.91	16.87	16.81	16.76	16.71	16.66	16.61	16.56	16.50	16.44	16.38	16.37
Brazil	15.32	15.31	15.35	15.31	15.32	15.27	15.41	15.45	15.46	15.51	15.49	15.45	15.44	15.39	15.34	15.27	15.24	15.25	15.22	15.39	15.42	15.45	15.47	15.47	15.55	15.48
Bulgaria	30.73	31.10	30.69	30.63	30.49	30.66	30.12	29.88	30.30	30.17	30.28	29.87	29.65	30.56	30.06	29.82	30.35	30.05	30.05	30.04	30.16	30.15	30.06	30.06	29.93	30.04
Burkina Faso	40.38	40.33	40.21	40.16	40.14	40.08	40.04	39.99	40.09	40.00	39.78	39.81	39.67	39.42	39.56	39.41	39.18	39.57	39.47	39.24	39.21	39.19	39.13	39.18	39.13	38.98
Burundi	51.31	51.25	51.87	49.86	49.18	51.05	52.68	56.60	58.58	54.21	54.55	54.52	56.21	56.45	56.97	54.71	51.81	56.53	57.30	57.64	58.36	59.15	59.44	60.29	60.50	61.03
Cambodia	50.60	50.57	50.54	50.50	50.45	50.40	50.36	50.31	50.25	50.21	50.14	50.08	50.03	49.97	49.94	49.80	49.68	49.60	49.48	49.44	49.43	49.41	49.38	49.36	49.34	49.35
Cameroon	51.22	50.76	49.99	49.48	48.57	48.92	49.01	49.51	48.55	49.99	50.00	50.27	49.81	48.80	44.73	48.61	46.02	45.45	45.30	44.93	44.66	44.40	43.87	44.56	44.17	44.26
Canada	2.77	2.79	2.82	2.51	2.14	2.17	2.32	2.35	2.51	2.49	2.94	2.65	3.13	2.91	2.81	2.94	3.05	3.06	3.10	3.21	3.17	3.24	3.30	3.41	2.99	3.04
Chad	45.29	44.84	45.05	44.95	44.89	44.84	44.78	44.63	44.54	44.54	44.49	44.45	44.79	44.43	44.56	43.96	43.93	44.14	44.09	44.09	44.08	44.03	43.99	43.99	43.95	43.80
China	13.81	13.77	13.73	13.69	13.65	13.60	13.56	13.52	13.47	13.42	13.38	13.33	13.32	13.32	13.31	13.30	13.29	13.28	13.27	13.27	13.26	13.26	13.25	13.24	13.24	13.24
Colombia	25.93	25.25	25.29	25.21	25.50	25.94	26.03	27.94	27.45	25.38	24.52	25.25	26.95	26.40	26.83	26.36	27.47	26.15	25.78	25.37	25.57	25.40	24.96	25.17	25.26	25.07
Comoros	43.05	43.77	43.02	42.14	41.97	41.67	41.73	41.66	41.20	40.68	40.17	38.19	39.32	38.93	38.64	38.52	37.38	37.59	36.99	36.93	36.88	36.73	36.73	36.79	36.58	35.99
Congo, Dem. Rep.	61.71	61.85	62.62	62.84	62.41	62.23	62.59	61.53	60.95	59.84	57.77	55.26	53.99	50.64	48.51	45.90	46.55	42.98	41.19	42.10	42.21	40.43	41.42	42.89	42.45	40.43
Congo, Rep.	16.45	16.54	16.63	16.70	16.81	17.00	16.97	17.05	16.95	17.19	17.30	17.40	17.44	17.58	17.61	17.65	17.72	17.76	17.86	17.94	18.00	18.01	18.01	29.80	18.06	17.96
Costa Rica	11.76	11.74	11.75	11.72	11.76	11.77	11.75	11.77	11.73	11.72	11.68	11.68	11.70	11.67	11.62	11.64	11.67	11.65	11.63	11.61	11.62	11.64	11.67	11.65	11.65	11.60
Cote d'Ivoire	36.32	35.79	36.14	35.96	36.26	36.46	36.36	36.22	36.23	35.99	35.73	35.70	35.85	35.78	35.41	35.40	35.26	35.52	35.50	35.38	34.71	35.93	34.96	35.13	35.01	34.96
Croatia	11.17	10.64	10.65	10.27	10.45	10.51	10.77	10.68	11.14	10.14	9.25	9.59	9.30	9.71	10.22	9.16	8.57	7.58	7.64	6.89	6.37	6.22	6.36	6.49	6.73	6.65
Cyprus	8.89	8.58	8.04	8.34	7.54	7.62	8.78	8.76	8.71	8.18	7.80	7.92	7.86	6.67	6.53	6.21	6.60	6.78	5.54	5.23	5.10	5.08	5.38	5.48	4.96	4.63
Czechia	10.82	10.86	10.93	10.96	11.01	11.07	11.22	11.20	11.10	11.27	11.24	11.19	11.24	11.32	11.43	11.40	11.32	11.30	11.07	11.04	11.25	11.23	11.22	11.23	11.15	11.20
Denmark	0.89	0.65	0.80	0.89	1.01	0.97	0.91	0.85	0.77	0.81	0.86	0.81	0.88	0.70	0.75	0.99	0.73	0.96	0.78	0.73	0.62	0.57	0.64	0.70	0.74	0.75
Djibouti	5.89	6.19	6.32	6.55	6.67	6.85	7.03	7.09	7.31	7.36	7.42	7.40	7.55	7.67	7.56	7.72	7.85	7.84	7.89	7.97	8.07	8.09	8.10	8.32	8.50	8.72
Dominican Republic	6.15	6.75	7.84	8.59	10.33	11.68	12.15	12.08	14.66	15.12	15.11	17.87	18.44	19.16	19.57	19.34	19.22	20.00	20.32	19.77	21.74	22.13	21.28	22.12	21.89	25.21
Ecuador	37.28	37.07	36.09	36.78	35.54	34.57	33.65	34.14	33.07	32.55	31.69	30.89	30.05	28.32	29.24	28.96	28.99	26.36	26.28	26.96	26.70	26.35	26.04	26.07	25.93	24.48
Egypt, Arab Rep.	20.04	20.06	20.05	20.10	20.08	20.12	20.21	20.27	20.22	20.21	20.31	20.30	20.30	20.30	20.34	20.32	20.38	20.41	20.37	20.23	20.28	20.27	20.24	20.23	20.23	20.41
El Salvador	31.43	32.06	31.72	33.37	31.96	33.95	31.45	29.91	30.89	29.32	30.23	31.40	31.10	29.64	31.87	33.19	33.04	31.21	32.40	32.32	31.45	30.56	31.05	30.34	30.14	29.82
Estonia	4.17	4.25	4.01	3.76	3.76	3.72	4.11	4.13	3.91	4.16	4.46	3.91	4.24	4.27	4.71	4.51	5.13	4.94	5.12	5.16	5.31	5.51	5.66	5.65	5.60	5.75
Eswatini	12.69	12.82	12.88	12.64	13.59	13.65	13.51	13.50	13.71	13.88	13.92	13.91	13.95	14.34	14.63	14.54	14.66	14.71	14.90	15.04	15.11	15.17	15.26	15.30	15.38	15.63
Finland	2.49	2.48	2.47	2.47	2.46	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.46	2.46	2.46	2.45	2.45	2.45	2.45	2.44	2.44	2.44	2.44	2.44	2.46	2.45
France	4.09	4.02	3.97	3.88	3.84	3.81	3.86	3.79	3.76	3.79	3.74	3.65	3.67	3.71	3.70	3.66	3.63	3.63	3.59	3.60	3.55	3.54	3.56	3.54	3.54	3.56
Gambia, The	36.12	36.23	36.36	36.45	36.05	35.89	36.04	37.41	37.63	37.71	37.54	38.29	38.32	38.15	38.45	38.46	38.10	37.57	37.91	38.68	38.86	39.01	39.03	39.47	39.45	39.41
Germany	7.25	7.24	7.27	7.28	7.34	7.35	7.41	7.53	7.61	7.55	7.54	7.55	7.52	7.55	7.62	7.56	7.50	7.49	7.45	7.41	7.43	7.44	7.41	7.37	7.25	7.40
Ghana	43.31	43.13	42.60	42.16	45.62	42.07	41.88	42.20	40.60	41.12	37.29	36.82	37.45	35.17	42.66	39.35	38.88	39.09	37.03	37.30	37.43	36.94	36.23	36.93	36.43	36.62
Greece	6.75	6.75	6.74	6.72	6.72	6.72	6.71	6.70	6.71	6.70	6.70	6.70	6.71	6.71	6.72	6.72	6.73	6.72	6.72	6.72	6.72	6.72	6.71	6.71	6.72	6.74
Guatemala	41.04	41.06	41.07	41.16	41.19	41.25	41.24	41.18	40.98	40.65	40.72	40.67	40.56	40.60	40.21	40.61	40.22	40.01	39.76	39.46	39.92	39.90	39.46	39.42	39.32	39.55
Guinea-Bissau	38.11	39.56	39.97	40.25	40.63	41.04	41.31	41.83	39.76	39.78	40.17	40.27	40.51	40.89	38.93	39.68	41.56	41.08	41.24	41.25	41.23	41.36	41.20	42.53	42.43	41.33
Haiti	48.46	48.48	48.52	48.55	48.59	48.63	48.66	48.69	48.72	48.75	48.76	48.81	48.83	48.93	48.88	48.98	49.02	49.04	49.09	49.15	49.18	49.22	49.26	49.49	49.52	49.47

Hungary	10.41	8.95	8.84	8.68	8.33	7.82	7.32	7.69	7.26	6.79	6.73	6.57	7.33	6.71	7.46	6.37	6.52	5.23	4.82	5.15	5.37	5.42	5.59	6.34	6.47	6.01
Iceland	2.87	2.88	2.88	2.87	2.87	2.87	2.84	2.84	2.85	2.85	2.84	2.83	2.83	2.84	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.84	2.83
India	25.03	25.02	25.00	24.99	24.99	24.99	24.98	24.98	24.98	24.98	24.94	24.93	24.88	24.88	24.88	24.88	24.89	24.85	24.84	24.83	24.82	24.81	24.80	24.79	24.79	24.77
Indonesia	30.30	30.47	30.48	30.49	30.45	30.45	30.49	30.47	30.44	30.43	30.55	30.58	30.56	30.47	30.42	30.33	30.32	30.34	30.27	30.35	30.36	30.38	30.40	30.43	30.43	30.43
Ireland	4.17	4.17	4.17	4.17	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.15	4.15	4.15	4.15	4.15	4.15	4.15
Italy	19.32	19.10	19.48	19.57	18.02	18.96	17.88	17.99	16.80	16.53	16.24	15.45	14.33	15.18	14.77	14.43	14.64	14.51	13.84	13.67	12.99	12.73	12.86	12.95	12.25	12.57
Jamaica	29.36	29.55	29.66	29.58	29.33	29.44	30.20	29.45	28.69	29.32	28.80	30.06	29.33	28.98	29.29	29.87	29.82	29.79	29.83	29.63	29.47	29.43	29.77	29.84	29.85	29.74
Kyrgyz Republic	30.78	30.79	30.82	30.82	30.80	30.78	30.77	30.76	30.76	30.75	30.74	30.72	30.71	30.69	30.71	30.70	30.74	30.78	30.74	30.76	30.74	30.72	30.71	30.72	30.72	30.73
Lao PDR	44.65	44.24	44.21	44.17	43.76	44.08	43.93	43.89	43.83	43.76	43.66	43.55	42.87	43.42	43.00	43.32	43.38	43.30	42.85	42.75	42.65	42.58	42.48	42.54	42.46	42.49
Latvia	18.40	17.73	17.15	15.74	15.97	15.45	14.88	14.66	14.15	14.41	14.00	13.05	13.22	13.47	14.24	14.18	14.14	14.41	15.04	14.19	14.77	14.32	14.57	15.11	15.37	15.04
Lebanon	21.96	21.95	21.97	21.99	22.02	21.93	22.09	22.27	21.70	21.86	21.99	21.70	21.85	21.78	21.84	21.57	21.77	21.88	21.98	22.02	22.08	22.15	22.19	22.08	22.09	22.08
Lesotho	32.49	32.00	32.73	33.57	33.11	31.99	31.89	31.82	29.64	29.51	31.48	29.15	31.29	31.16	31.11	30.97	30.87	30.84	30.77	30.68	30.70	32.95	30.62	30.65	30.66	30.69
Lithuania	23.14	23.09	23.16	23.11	23.15	23.30	23.20	22.96	22.75	22.70	22.43	22.03	22.06	22.09	22.21	22.31	22.36	22.46	22.43	22.16	22.36	22.33	22.33	22.36	22.34	22.35
Luxembourg	2.09	2.11	2.09	2.11	2.07	2.08	2.08	2.08	2.07	2.08	2.07	2.05	2.10	2.08	2.10	2.11	2.16	2.22	2.25	2.31	2.35	2.36	2.40	2.46	2.52	2.58
Madagascar	58.35	58.48	58.32	58.36	58.36	58.40	58.42	58.49	58.65	58.59	58.61	58.54	58.58	58.75	58.62	58.55	58.81	58.86	59.03	59.02	59.03	58.96	58.97	59.02	59.01	58.92
Mali	48.43	48.40	48.36	48.31	48.20	48.15	48.07	48.03	47.98	47.86	47.89	48.04	48.03	47.67	47.52	47.78	47.92	47.63	47.69	47.46	47.79	47.51	47.41	47.46	47.43	47.54
Mauritania	24.79	24.03	23.35	23.94	23.96	23.82	23.69	23.66	23.55	23.10	22.81	21.94	22.49	21.24	22.64	22.69	22.89	21.84	21.68	21.27	21.32	21.17	21.10	21.32	21.03	21.37
Mauritius	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.01	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02	21.02
Mexico	25.67	23.97	23.55	23.61	24.78	23.32	24.17	23.90	23.54	23.31	22.80	22.34	22.24	22.02	22.63	22.02	21.23	21.34	21.25	21.22	21.28	21.23	21.29	20.53	21.03	20.76
Moldova	53.88	54.41	55.45	57.75	59.01	59.90	58.09	58.38	58.70	57.74	58.12	58.13	57.90	58.49	58.64	58.91	60.56	61.60	64.20	64.20	63.61	60.74	58.74	58.95	59.26	57.67
Mongolia	16.77	16.75	16.76	16.76	16.76	16.74	16.75	16.66	16.75	16.74	16.74	16.72	16.74	16.90	16.93	16.49	16.50	16.52	16.60	16.56	16.71	16.60	16.63	16.61	16.60	16.56
Montenegro	36.11	36.04	36.23	36.27	36.34	36.39	36.06	36.13	36.19	36.40	36.60	36.57	36.45	36.29	36.24	36.54	36.55	36.94	37.19	37.36	37.53	37.60	37.56	37.61	37.66	37.76
Morocco	21.68	21.63	21.70	21.70	21.67	21.65	21.63	21.70	21.64	21.38	21.30	21.32	21.31	21.26	21.24	21.19	21.12	21.07	20.98	20.91	20.83	20.76	20.72	1.59	20.63	20.58
Mozambique	46.58	46.67	44.49	47.65	47.51	47.99	48.47	48.40	48.46	53.52	48.69	49.07	48.16	48.07	48.30	48.37	45.79	48.15	48.11	47.99	48.03	48.44	49.07	50.42	50.70	49.78
Namibia	21.11	21.02	20.69	20.67	20.71	20.85	20.84	20.59	20.52	20.67	20.34	20.77	20.21	20.30	20.06	19.97	19.93	19.17	19.51	19.33	19.41	19.48	19.42	19.35	19.27	19.20
Nepal	20.63	15.18	18.58	17.82	27.23	26.41	28.88	23.63	23.18	22.96	23.31	22.79	24.03	22.71	23.73	22.99	23.13	22.41	22.63	23.20	23.10	23.23	22.66	23.18	22.94	23.44
Netherlands	0.95	0.67	0.60	0.56	0.68	0.70	0.64	0.98	1.65	1.81	1.91	2.01	2.21	2.30	2.32	2.44	2.60	2.86	2.89	3.11	3.03	2.98	2.98	3.26	2.76	3.32
Nicaragua	30.66	30.88	30.95	31.15	31.30	31.55	31.82	31.71	31.75	31.72	31.86	31.91	32.01	32.08	32.15	32.22	32.23	32.26	32.29	32.28	32.28	32.35	32.55	32.56	32.67	
Niger	46.45	46.48	46.26	46.06	45.76	45.53	45.24	44.99	44.55	44.16	43.75	44.04	43.99	43.22	42.79	40.96	42.41	43.76	44.00	41.71	41.15	41.64	41.28	41.16	40.79	40.41
North Macedonia	16.40	16.75	17.48	17.68	18.66	18.78	18.42	17.88	18.83	19.23	19.08	19.33	19.50	19.38	19.62	19.43	19.93	19.82	20.09	19.97	20.09	20.23	19.97	19.37	19.23	19.62
Norway	6.64	6.63	6.36	5.92	5.97	6.20	6.86	7.24	7.33	7.88	7.54	7.37	7.28	6.93	6.59	6.44	5.99	6.55	5.89	6.07	6.43	6.47	6.45	6.33	5.57	6.34
Pakistan	37.20	37.15	37.09	37.01	36.99	36.58	36.51	36.64	36.59	36.42	36.38	36.45	36.42	36.42	36.36	36.17	35.31	36.06	36.05	36.15	35.96	35.44	35.29	35.25	35.12	35.26
Paraguay	32.51	32.46	32.33	32.25	32.35	32.51	32.32	32.56	32.07	31.93	31.87	31.50	31.62	31.54	30.44	31.34	30.98	30.81	30.77	30.93	30.65	30.57	30.51	30.62	30.58	30.28
Peru	32.57	30.69	32.64	32.46	32.61	33.31	33.82	33.46	34.45	32.55	32.31	31.24	31.61	31.45	30.02	29.36	29.47	30.62	29.61	29.36	29.78	29.51	29.97	29.85	29.72	29.73
Poland	24.19	24.62	23.16	23.14	23.66	24.50	23.64	23.56	23.35	21.93	21.44	21.39	21.25	21.68	21.67	21.55	21.42	21.06	21.25	20.46	20.65	20.56	20.45	20.87	20.38	20.62
Portugal	5.22	5.22	5.21	5.20	5.22	5.21	5.21	5.20	5.20	5.20	5.21	5.20	5.19	5.19	5.18	5.18	5.18	5.16	5.15	5.15	5.14	5.14	5.14	5.14	5.13	5.13
Romania	53.88	56.32	60.08	63.02	63.13	51.64	51.44	44.46	46.06	42.97	44.55	43.53	44.25	47.92	44.72	44.58	43.60	41.16	36.48	33.71	33.97	32.77	31.28	30.60	20.91	28.28
Russian Federation	35.29	35.13	37.00	37.26	36.41	36.50	35.98	36.04	35.60	35.38	35.79	35.16	35.70	35.25	35.22	35.19	35.25	35.14	35.34	35.30	34.92	34.89	35.05	34.74	34.60	34.40
Rwanda	34.59	34.59	34.59	34.50	34.57	34.55	34.54	34.51	34.52	34.47	34.43	34.36	34.38	34.26	34.32	34.40	34.33	34.12	33.98	34.10	34.09	33.93	34.07	34.17	34.16	34.20
Senegal	30.84	30.80	30.81	30.79	30.78	30.76	30.75	30.73	30.73	30.71	30.69	30.69	30.66	30.65	30.62	30.62	30.55	30.58	30.54	30.64	30.60	30.55	30.53	30.54	30.53	30.50
Serbia	47.08	47.07	47.06	47.06	47.01	46.98	46.94	46.89	46.85	46.80	46.82	46.78	46.70	46.65	46.56	46.57	46.64	46.62	46.56	46.65	46.61	46.52	46.50	46.47	46.36	46.47
Sierra Leone	47.36	47.34	47.37	47.34	47.38	47.32	47.31	47.29	47.13	46.94	46.39	46.27	46.31	46.26	46.32	46.00	45.83	45.58	45.14	44.52	44.19	44.77	44.36	44.23	44.04	43.81
Slovak Republic	14.01	14.59	14.94	15.13	16.14	15.90	16.71	19.83	19.58	20.28	19.90	20.57	21.49	21.44	22.56	22.24	22.56	21.93	23.85	21.45	22.34	22.04	22.56	22.67	22.73	24.92
Slovenia	5.99	5.99	5.97	5.93	5.95	5.93	5.91	5.94	5.92	5.94	5.95	5.92	5.95	5.96	5.96	5.94	5.94	5.97	5.93	5.89	5.91	5.92	5.89	5.88	5.89	5.88
South Africa	10.14	10.12	9.33	9.87	10.22	10.28	10.74	11.01	9.77	12.48	10.34	8.53	8.24	7.63	8.96	8.27	7.03	6.32	6.16	6.99	5.82	4.60	8.02	8.55	8.04	7.69
Spain	13.18	12.93	12.76	12.61	12.63	12.46	12.37	12.38	12.37	12.29	12.27	12.28	12.16	12.20	12.18	12.27	12.35	12.29	12.24	12.18	12.21	12.17	12.14	12.20	12.20	12.12
Sri Lanka	20.40	20.98	20.75	20.86	20.57	20.66	20.65																			

Togo	43.64	43.00	43.00	44.81	43.96	43.80	43.73	43.85	44.02	43.95	42.89	42.99	44.92	43.41	43.05	41.56	39.38	39.06	40.27	39.17	38.66	38.41	38.15	38.82	38.55	38.69
Tunisia	17.43	17.28	17.20	17.23	17.17	17.10	17.01	16.86	17.10	17.17	17.03	16.97	16.85	16.85	16.72	16.57	16.61	16.50	16.71	16.47	16.33	16.27	16.20	16.03	15.99	16.13
Turkiye	15.56	15.48	15.81	14.83	14.82	13.87	13.75	13.60	12.14	11.48	11.14	10.98	11.02	10.85	10.72	10.33	9.97	9.23	9.09	8.94	8.99	8.80	8.52	8.04	7.91	7.86
Uganda	46.51	46.40	46.22	46.17	46.01	45.90	45.72	45.36	45.46	45.23	44.99	44.78	44.63	44.44	44.69	43.88	43.65	43.57	43.64	43.56	43.44	43.26	43.13	43.10	42.87	42.97
Ukraine	15.69	15.17	15.13	15.02	15.06	15.04	15.15	15.25	15.37	15.37	15.38	15.30	15.30	15.34	15.27	15.32	15.35	15.24	15.25	15.27	15.45	15.20	15.20	15.17	15.15	
United Kingdom	1.91	2.14	2.00	1.76	1.70	2.03	2.07	2.11	2.35	2.23	2.05	1.88	1.84	2.09	2.60	2.65	2.89	3.11	2.96	3.28	3.03	2.99	3.12	2.88	2.87	3.07
Viet Nam	31.42	30.59	32.17	32.25	31.69	32.10	31.67	30.73	30.42	29.92	29.56	27.89	30.64	30.45	29.58	29.83	29.78	30.18	29.16	28.62	28.29	28.06	27.70	27.60	27.18	28.35
Yemen, Rep.	18.59	18.91	18.95	19.00	18.96	19.01	19.05	19.11	19.14	19.26	19.43	19.58	19.83	20.05	20.79	20.97	21.15	21.47	21.89	22.65	23.21	23.68	24.04	24.67	24.53	24.65
Zambia	19.67	20.37	20.49	22.35	21.26	21.90	22.21	23.50	20.01	23.20	23.45	24.03	23.75	23.39	23.50	23.60	23.35	23.63	24.05	23.44	24.81	24.47	24.29	25.72	25.98	24.60
Zimbabwe	33.46	33.51	33.73	33.97	34.16	34.36	34.60	34.75	34.81	34.87	35.17	35.59	35.66	35.73	35.79	35.99	36.13	36.32	36.42	36.52	36.62	36.71	36.95	37.06	37.09	36.76

Table C.2: Estimates of the IE using Elgin et al. (2021) - DGE for calibration (see Excel file: Meth_f_g_Elg_DGE)

Country name	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Angola	41.37	41.27	41.00	40.92	40.90	40.78	40.77	40.73	40.79	40.84	40.92	41.02	41.17	41.29	41.46	41.15	40.87	40.63	40.51	40.46	40.45	40.34	40.27	40.39	40.34	40.64
Argentina	21.97	21.13	21.79	21.55	21.85	21.76	21.76	21.51	21.66	21.25	21.17	21.22	21.06	20.73	20.79	20.70	20.79	20.85	20.96	21.07	20.78	21.06	21.19	21.15	21.65	21.29
Austria	8.88	9.00	9.00	8.90	8.84	8.81	8.79	8.83	8.95	8.96	9.10	9.05	9.03	9.12	8.98	9.23	9.22	9.26	9.21	9.16	9.09	9.06	9.11	9.15	9.09	9.07
Bangladesh	38.40	37.43	35.79	35.99	35.68	35.10	35.60	34.51	33.69	33.36	33.50	32.80	32.53	31.02	33.28	31.17	29.33	28.82	27.99	23.27	27.11	26.62	26.05	25.73	25.01	25.35
Belarus	28.80	29.04	29.65	30.38	30.48	30.95	31.14	31.34	30.89	30.23	33.24	32.54	33.20	34.18	34.23	33.99	34.09	34.28	34.38	34.87	34.99	36.20	36.47	36.77	37.03	38.79
Belgium	20.79	20.67	20.80	20.36	20.00	20.18	20.08	20.02	20.16	20.11	20.08	19.80	20.15	19.95	19.97	20.01	20.27	20.20	20.29	20.22	20.03	19.94	20.05	20.22	20.03	20.30
Benin	47.33	47.15	47.15	45.67	47.89	45.50	45.94	46.68	45.62	45.81	45.82	47.66	47.24	49.30	45.53	42.51	44.55	44.48	42.89	43.45	43.14	42.58	42.01	42.42	41.91	41.53
Bolivia	49.08	49.19	49.37	48.98	49.02	50.19	48.92	48.19	48.99	49.48	48.59	48.29	46.83	47.88	48.95	48.37	49.63	51.53	50.54	54.84	54.84	54.98	52.24	54.87	55.61	56.13
Bosnia and Herzeg.	28.78	28.32	27.57	24.53	24.17	24.64	25.04	25.58	25.76	26.23	26.83	28.41	28.93	28.31	27.92	30.21	29.01	27.81	29.41	30.63	32.10	30.12	33.64	28.40	29.39	32.49
Botswana	36.80	36.65	36.16	35.80	35.30	34.97	34.38	34.20	33.51	33.64	33.94	32.63	31.87	31.55	31.00	30.51	29.90	29.28	28.76	28.12	27.57	27.03	26.40	25.67	24.97	24.92
Brazil	33.25	33.24	33.28	33.25	33.26	33.21	33.32	33.36	33.37	33.41	33.39	33.36	33.35	33.31	33.27	33.21	33.19	33.19	33.17	33.31	33.33	33.36	33.37	33.38	33.44	33.38
Bulgaria	32.90	35.82	32.66	32.19	31.06	32.39	28.15	26.30	29.58	28.57	29.42	26.26	24.51	31.58	27.73	25.85	29.96	27.62	27.63	27.55	28.52	28.40	27.73	27.76	26.74	27.54
Burkina Faso	43.06	42.54	41.34	40.82	40.57	39.98	39.60	39.10	40.16	39.24	37.00	37.25	35.86	33.33	34.80	33.21	30.90	34.87	33.85	31.53	31.25	31.03	30.46	30.89	30.44	28.93
Burundi	34.02	34.00	34.17	33.62	33.43	33.95	34.39	35.46	36.00	34.81	34.90	34.89	35.36	35.42	35.57	34.95	34.15	35.44	35.65	35.75	35.94	36.16	36.24	36.47	36.53	36.67
Cambodia	51.45	51.07	50.61	50.05	49.40	48.81	48.21	47.58	46.87	46.22	45.31	44.59	43.92	43.07	42.69	40.89	39.23	38.15	36.66	36.13	35.97	35.69	35.27	34.99	34.72	34.86
Cameroon	31.35	31.12	30.75	30.49	30.04	30.21	30.26	30.51	30.03	30.74	30.75	30.88	30.65	30.15	28.14	30.06	28.78	28.50	28.42	28.24	28.10	27.98	27.71	28.05	27.87	27.91
Canada	12.90	12.92	12.97	12.48	11.92	11.96	12.18	12.24	12.48	12.46	13.16	12.70	13.45	13.11	12.95	13.16	13.33	13.34	13.40	13.58	13.52	13.62	13.71	13.89	13.23	13.32
Chad	52.73	47.11	49.72	48.42	47.74	47.02	46.32	44.40	43.34	43.33	42.70	42.16	46.40	41.90	43.60	36.08	35.71	38.35	37.70	37.66	37.48	36.95	36.42	36.39	35.92	34.02
China	15.38	14.83	14.32	13.78	13.25	12.70	12.12	11.56	10.96	10.36	9.77	9.16	9.04	8.96	8.83	8.73	8.59	8.51	8.42	8.35	8.27	8.18	8.09	8.02	7.96	8.01
Colombia	29.00	28.70	28.71	28.68	28.81	29.01	29.05	29.91	29.69	28.76	28.37	28.70	29.46	29.21	29.41	29.20	29.70	29.10	28.93	28.75	28.84	28.76	28.56	28.66	28.70	28.61
Comoros	44.61	45.02	44.60	44.10	44.00	43.84	43.87	43.83	43.57	43.28	42.99	41.87	42.51	42.29	42.13	42.06	41.42	41.54	41.20	41.17	41.14	41.05	41.06	41.09	40.97	40.64
Congo, Dem. Rep.	44.84	44.86	44.97	45.00	44.94	44.91	44.97	44.81	44.73	44.57	44.27	43.90	43.72	43.23	42.92	42.54	42.64	42.12	41.86	41.99	42.01	41.75	41.89	42.11	42.04	41.75
Congo, Rep.	30.46	30.88	31.35	31.65	32.19	33.13	32.98	33.39	32.87	34.07	34.61	35.07	35.29	35.97	36.08	36.32	36.63	36.83	37.33	37.73	37.98	38.08	38.04	38.41	38.32	37.83
Costa Rica	23.18	22.82	23.09	22.33	23.29	23.66	23.11	23.51	22.51	22.12	21.30	21.23	21.65	21.04	19.69	20.18	21.00	20.35	20.02	19.30	19.55	20.25	20.89	20.50	20.39	19.24
Cote d'Ivoire	43.15	40.69	42.31	41.47	42.90	43.80	43.34	42.69	42.73	41.62	40.42	40.27	40.99	40.67	38.95	38.87	38.22	39.44	39.33	38.81	35.67	41.34	36.83	37.66	37.08	36.84
Croatia	31.03	30.73	30.74	30.52	30.62	30.66	30.81	30.76	31.01	30.45	29.96	30.15	29.99	30.22	30.50	29.91	29.58	29.03	29.06	28.65	28.36	28.27	28.36	28.42	28.56	28.51
Cyprus	26.91	26.75	26.48	26.63	26.22	26.26	26.86	26.84	26.82	26.55	26.35	26.41	26.38	25.77	25.70	25.54	25.74	25.83	25.20	25.04	24.97	24.96	25.11	25.16	24.90	24.73
Czechia	16.41	16.43	16.48	16.49	16.52	16.56	16.65	16.64	16.58	16.69	16.67	16.64	16.67	16.72	16.79	16.77	16.72	16.70	16.56	16.54	16.67	16.66	16.66	16.66	16.61	16.64
Denmark	16.40	16.02	16.26	16.40	16.61	16.54	16.44	16.34	16.21	16.29	16.37	16.28	16.40	16.11	16.19	16.58	16.15	16.53	16.23	16.16	15.97	15.89	16.00	16.09	16.17	16.18
Djibouti																										
Dominican Republic	20.99	21.18	21.52	21.76	22.30	22.73	22.88	22.85	23.66	23.81	23.81	24.67	24.85	25.08	25.21	25.14	25.10	25.34	25.44	25.27	25.89	26.01	25.74	26.01	25.94	26.98
Ecuador	28.99	28.96	28.82	28.92	28.74	28.59	28.46	28.53	28.37	28.29	28.17	28.05	27.92	27.67	27.80	27.76	27.76	27.37	27.36	27.46	27.42	27.37	27.33	27.31	27.10	
Egypt, Arab Rep.	25.08	25.54	25.50	26.48	26.09	26.86	28.78	30.22	29.00	28.77	31.01	30.81	30.72	31.66	31.26	32.61	33.13	32.21	29.25	30.42	30.24	29.52	29.33	29.38	33.23	
El Salvador	41.10	41.32	41.20	41.78	41.29	41.99	41.11	40.56	40.91	40.35	40.68	41.09	40.98	40.47	41.26	41.72	41.67	41.02	41.44	41.41	41.11	40.79	40.96	40.71	40.64	40.53
Estonia	23.25	23.41	22.89	22.37	22.36	22.27	23.10	23.15	22.69	23.23	23.86	22.68	23.38	23.46	24.41	23.96	25.31	24.90	25.28	25.38	25.68	26.13	26.44	26.43	26.30	26.6

France	15.25	15.07	14.96	14.75	14.65	14.58	14.71	14.55	14.46	14.55	14.41	14.22	14.27	14.34	14.33	14.24	14.16	14.17	14.06	14.09	13.99	13.96	14.01	13.96	13.96	14.01
Gambia, The	35.42	35.56	35.74	35.86	35.32	35.10	35.30	37.18	37.49	37.60	37.35	38.39	38.44	38.20	38.61	38.62	38.13	37.40	37.86	38.93	39.17	39.38	39.41	40.01	39.99	39.93
Germany	14.68	14.67	14.70	14.72	14.79	14.81	14.87	15.01	15.11	15.04	15.03	15.03	15.00	15.04	15.13	15.05	14.98	14.97	14.92	14.87	14.89	14.91	14.87	14.82	14.68	14.86
Ghana	39.10	39.00	38.71	38.46	40.39	38.41	38.31	38.49	37.59	37.89	35.75	35.49	35.83	34.56	38.74	36.90	36.63	36.75	35.60	35.75	35.82	35.55	35.16	35.55	35.27	35.37
Greece	26.80	26.71	26.46	26.23	26.15	26.12	26.01	25.77	25.80	25.80	25.74	25.74	25.86	25.97	26.08	26.17	26.34	26.30	26.20	26.11	26.15	26.16	26.00	26.00	26.16	26.65
Guatemala	48.84	48.88	48.89	49.04	49.09	49.20	49.18	49.08	48.74	48.17	48.30	48.22	48.03	48.09	47.42	48.10	47.44	47.08	46.66	46.16	46.93	46.90	46.16	46.09	45.91	46.31
Guinea-Bissau	41.01	41.83	42.06	42.22	42.44	42.67	42.82	43.11	41.94	41.95	42.17	42.23	42.37	42.58	41.47	41.90	42.96	42.69	42.78	42.79	42.77	42.85	42.76	43.51	43.45	42.83
Haiti*																										
Honduras	38.33	38.54	38.79	39.01	39.25	39.52	39.69	39.85	39.98	40.22	40.32	40.55	41.06	41.65	41.56	42.21	42.32	42.14	42.25	42.22	42.97	43.11	43.19	43.31	43.39	43.22
Hungary	24.95	24.06	23.99	23.89	23.68	23.36	23.06	23.29	23.02	22.74	22.70	22.60	23.07	22.69	23.14	22.48	22.57	21.78	21.53	21.73	21.87	21.90	22.00	22.46	22.54	22.25
Iceland	15.59	15.71	15.68	15.59	15.44	15.44	14.89	14.85	15.05	15.03	14.93	14.74	14.63	14.84	14.73	14.71	14.68	14.69	14.67	14.66	14.63	14.69	14.66	14.66	14.82	14.59
India	23.75	23.45	22.96	22.43	22.66	22.39	22.29	22.22	22.30	22.07	20.84	20.48	18.95	18.98	18.77	18.79	19.26	17.76	17.61	17.12	16.91	16.50	16.05	15.94	15.73	15.31
Indonesia	13.81	15.27	15.32	15.42	15.04	15.11	15.43	15.25	14.96	14.92	15.91	16.19	16.02	15.21	14.82	14.08	13.97	14.14	13.58	14.23	14.30	14.48	14.62	14.88	14.88	14.89
Ireland	17.51	16.70	16.46	16.72	16.08	15.80	15.20	15.07	14.70	14.50	14.44	14.64	15.07	14.78	14.50	14.47	14.64	14.48	14.71	14.03	13.72	13.49	13.10	13.16	12.82	12.73
Italy	27.52	27.47	27.55	27.57	27.24	27.44	27.21	27.23	26.97	26.91	26.85	26.68	26.43	26.62	26.53	26.45	26.50	26.47	26.33	26.29	26.14	26.08	26.11	26.13	25.98	26.05
Jamaica	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36
Kyrgyz Republic	33.87	34.05	34.29	34.34	34.13	33.90	33.76	33.62	33.65	33.59	33.47	33.18	33.04	32.84	33.13	33.01	33.40	33.86	33.39	33.60	33.41	33.18	33.12	33.18	33.23	33.30
Lao PDR	36.59	33.38	33.16	32.83	29.61	32.10	30.96	30.65	30.17	29.57	28.78	27.94	22.56	26.94	23.64	26.12	26.58	25.98	22.41	21.59	20.82	20.27	19.51	20.00	19.36	19.61
Latvia	26.54	26.35	26.19	25.79	25.85	25.71	25.54	25.48	25.34	25.41	25.30	25.03	25.07	25.14	25.36	25.35	25.33	25.41	25.59	25.35	25.51	25.39	25.46	25.61	25.68	25.59
Lebanon	29.15	29.12	29.16	29.20	29.25	29.07	29.40	29.76	28.61	28.95	29.20	28.61	28.91	28.78	28.90	28.36	28.76	28.97	29.18	29.26	29.39	29.51	29.60	29.37	29.40	29.37
Lesotho	26.42	26.07	26.59	27.19	26.86	26.06	25.99	25.94	24.39	24.29	25.70	24.04	25.56	25.47	25.43	25.33	25.27	25.24	25.19	25.12	25.14	26.75	25.09	25.11	25.11	25.13
Lithuania	29.21	29.10	29.27	29.13	29.25	29.63	29.35	28.75	28.23	28.11	27.41	26.40	26.49	26.56	26.86	27.11	27.24	27.49	27.40	26.73	27.24	27.15	27.16	27.23	27.20	27.22
Luxembourg	8.83	8.84	8.83	8.84	8.81	8.82	8.82	8.82	8.81	8.81	8.81	8.79	8.83	8.82	8.83	8.84	8.89	8.94	8.96	9.01	9.04	9.05	9.09	9.14	9.19	9.24
Madagascar	32.67	33.24	32.53	32.69	32.72	32.88	32.98	32.88	34.03	33.76	33.87	33.55	33.71	34.48	33.90	33.60	34.78	34.99	35.81	35.75	35.78	35.46	35.51	35.74	35.71	35.27
Mali	44.42	44.11	43.49	42.91	41.43	40.74	39.74	39.20	38.47	37.01	37.37	39.32	39.21	34.45	32.42	35.92	37.76	33.86	34.66	31.63	35.97	32.35	30.95	31.71	31.23	32.69
Mauritania	32.82	32.32	31.87	32.26	32.28	32.18	32.09	32.08	32.00	31.71	31.51	30.93	31.30	30.46	31.40	31.43	31.56	30.87	30.76	30.48	30.52	30.42	30.38	30.52	30.33	30.55
Mauritius	14.62	14.81	15.03	15.25	16.09	15.22	16.91	15.67	16.47	16.78	16.90	17.11	16.31	17.54	17.87	18.49	18.61	18.78	19.35	19.52	19.64	19.07	19.87	19.34	18.95	19.73
Mexico	29.95	29.04	28.81	28.85	29.47	28.69	29.15	29.00	28.81	28.69	28.41	28.17	28.11	28.00	28.32	27.99	27.57	27.63	27.58	27.57	27.60	27.57	27.61	27.20	27.47	27.32
Moldova	41.98	42.07	42.23	42.59	42.79	42.93	42.65	42.69	42.74	42.59	42.65	42.65	42.62	42.71	42.73	42.78	43.04	43.20	43.61	43.61	43.52	43.07	42.75	42.78	42.83	42.58
Mongolia	15.75	15.70	15.73	15.73	15.74	15.69	15.72	15.50	15.70	15.69	15.68	15.65	15.68	16.05	16.12	15.13	15.14	15.19	15.38	15.29	15.62	15.37	15.45	15.41	15.38	15.29
Montenegro*																										
Morocco	35.59	35.19	35.77	35.80	35.57	35.40	35.23	35.77	35.31	33.28	32.62	32.82	32.69	32.32	32.20	31.76	31.21	30.84	30.18	29.59	28.97	28.45	28.07	27.84	27.40	27.00
Mozambique	22.66	22.73	20.89	23.56	23.43	23.84	24.25	24.19	24.24	28.50	24.43	24.75	23.98	23.91	24.10	24.16	21.99	23.97	23.95	23.84	23.88	24.22	24.75	25.89	26.13	25.35
Namibia	30.21	29.92	28.88	28.82	28.94	29.41	29.36	28.58	28.36	28.81	27.78	29.13	27.37	27.65	26.89	26.63	26.49	24.08	25.15	24.60	24.83	25.08	24.89	24.66	24.39	24.19
Nepal	30.63	29.30	30.13	29.94	32.23	32.03	32.63	31.35	31.24	31.19	31.28	31.15	31.45	31.13	31.38	31.20	31.23	31.06	31.11	31.25	31.22	31.26	31.12	31.25	31.19	31.31
Netherlands	11.75	11.66	11.64	11.63	11.67	11.68	11.66	11.76	11.97	12.02	12.05	12.09	12.15	12.17	12.18	12.22	12.27	12.35	12.36	12.43	12.40	12.39	12.39	12.48	12.32	12.49
Nicaragua	36.97	37.36	37.48	37.83	38.10	38.53	39.00	38.81	38.88	38.83	39.07	39.16	39.34	39.47	39.58	39.71	39.72	39.79	39.83	39.82	39.81	39.82	39.94	40.28	40.31	40.49
Niger	37.11	37.12	37.06	37.00	36.92	36.86	36.78	36.71	36.59	36.48	36.37	36.45	36.44	36.23	36.11	35.61	36.00	36.37	36.44	35.81	35.66	35.80	35.70	35.66	35.56	35.46
North Macedonia	31.17	31.35	31.72	31.82	32.33	32.39	32.20	31.93	32.42	32.62	32.55	32.67	32.76	32.70	32.82	32.73	32.98	32.92	33.07	33.00	33.06	33.13	33.00	32.69	32.62	32.82
Norway	16.56	16.56	16.48	16.36	16.38	16.44	16.62	16.73	16.75	16.90	16.81	16.76	16.74	16.64	16.55	16.51	16.38	16.53	16.35	16.40	16.50	16.51	16.51	16.48	16.27	16.48
Pakistan	33.18	33.15	33.10	33.04	33.02	32.69	32.63	32.74	32.70	32.56	32.53	32.59	32.57	32.56	32.51	32.36	31.67	32.28	32.27	32.34	32.20	31.78	31.66	31.63	31.52	31.63
Paraguay	36.16	36.10	35.93	35.82	35.96	36.17	35.91	36.22	35.58	35.40	35.31	34.82	34.99	34.89	33.43	34.61	34.14	33.92	33.86	34.07	33.71	33.60	33.53	33.66	33.61	33.21
Peru	48.96	44.57	49.13	48.72	49.07	50.69	51.90	51.05	53.36	48.93	48.37	45.85	46.73	46.35	43.00	41.47	41.71	44.41	42.05	41.46	42.45	41.82	42.90	42.61	42.31	42.32
Poland	26.70	27.20	25.51	25.49	26.08	27.05	26.06	25.97	25.73	24.09	23.52	23.46	23.31	23.80	23.79	23.65	23.50	23.09	23.30	22.40	22.61	22.50	22.38	22.87	22.30	22.58
Portugal	24.15	24.21	23.97	23.81	24.13	24.00	24.03	23.76	23.80	23.69	23.89	23.66	23.58	23.52	23.22	23.28	23.14	22.79	22.59	22.49	22.36	22.30	22.31	22.29	22.04	22.04
Romania	31.08	31.64	32.49	33.16	33.19	30.57	30.52	28.93	29.29	28.59	28.95	28.71	28.88	29.72	28.99	28.95	28.73	28.17	27.10	26.47	26.53	26.26	25.92	25.76	23.55	25.23
Russian Federation	39.20	39.17	39.51	39.56	39.40	39.42	39.32	39.34	39.25	39.21	39.29	39.17	39.27	39.19	39.18	39.18	39.19	39.1								

Spain	23.28	22.58	22.12	21.72	21.77	21.29	21.06	21.09	21.04	20.83	20.78	20.81	20.48	20.58	20.54	20.77	21.00	20.84	20.70	20.52	20.61	20.50	20.42	20.58	20.58	20.35
Sri Lanka	32.00	34.23	33.35	33.75	32.65	32.98	32.95	32.38	32.54	33.98	33.62	33.92	33.42	35.00	34.83	33.57	32.75	32.80	33.49	35.82	35.54	31.60	33.22	32.88	32.58	33.43
Sudan	20.08	20.74	21.27	21.58	22.23	22.55	23.06	23.76	24.36	24.34	24.66	25.04	25.51	26.14	26.05	26.20	25.57	26.46	27.13	27.45	27.21	26.87	27.38	27.98	28.16	29.69
Sweden	17.80	17.47	17.60	17.53	17.48	17.51	17.50	17.46	17.44	17.39	17.35	17.35	17.51	17.69	17.53	17.19	17.29	17.18	17.16	16.98	17.12	17.07	17.12	17.15	17.38	17.37
Switzerland	8.07	7.96	8.02	7.97	7.98	7.99	8.12	8.03	7.95	7.97	7.98	7.93	7.89	7.95	7.96	7.97	7.98	7.99	7.92	7.92	7.94	7.94	7.90	7.91	7.97	7.93
Tajikistan	50.28	50.26	50.26	50.01	49.62	47.96	48.86	49.28	48.23	48.08	47.38	44.92	45.56	46.08	46.33	45.16	45.16	45.01	44.93	44.43	44.12	43.71	43.35	43.00	42.65	41.88
Tanzania	55.92	55.59	55.03	54.69	54.11	53.57	52.75	55.34	52.87	50.30	49.12	46.04	43.22	46.06	46.32	46.05	45.34	49.36	44.12	43.19	42.33	41.53	40.45	40.74	40.01	39.90
Thailand	45.85	45.62	45.51	45.71	45.34	45.44	45.38	45.02	44.94	44.70	45.24	45.02	45.00	45.31	45.80	45.94	45.39	45.07	44.96	44.90	44.89	45.08	44.95	45.03	45.21	45.22
Timor-Leste*																										
Togo	33.53	33.24	33.24	34.06	33.68	33.60	33.57	33.63	33.70	33.67	33.19	33.24	34.11	33.42	33.26	32.59	31.60	31.45	32.00	31.50	31.27	31.16	31.04	31.34	31.22	31.28
Tunisia	38.15	37.56	37.25	37.37	37.14	36.89	36.53	35.94	36.87	37.15	36.59	36.38	35.88	35.91	35.39	34.80	34.95	34.53	35.33	34.43	33.86	33.64	33.35	32.71	32.54	33.06
Turkiye	32.99	32.90	33.28	32.14	32.12	31.01	30.87	30.69	28.97	28.21	27.81	27.61	27.66	27.46	27.32	26.85	26.43	25.56	25.40	25.23	25.29	25.06	24.73	24.17	24.01	23.95
Uganda	46.51	46.03	45.31	45.08	44.44	43.97	43.22	41.75	42.15	41.18	40.19	39.32	38.74	37.94	38.98	35.64	34.69	34.33	34.65	34.30	33.80	33.06	32.53	32.39	31.46	31.85
Ukraine	46.59	46.01	45.96	45.85	45.89	45.87	45.98	46.10	46.24	46.23	46.25	46.16	46.15	46.20	46.12	46.17	46.22	46.09	46.10	46.12	46.32	46.05	46.04	46.01	45.99	
United Kingdom	11.24	11.34	11.28	11.16	11.14	11.29	11.31	11.33	11.44	11.39	11.30	11.22	11.20	11.32	11.56	11.58	11.69	11.80	11.73	11.88	11.76	11.74	11.80	11.69	11.69	11.78
Viet Nam	15.58	14.50	16.55	16.66	15.94	16.46	15.90	14.69	14.28	13.63	13.16	11.00	14.57	14.32	13.20	13.52	13.44	13.98	12.64	11.94	11.51	11.21	10.75	10.62	10.07	11.59
Yemen, Rep.	19.81	20.08	20.11	20.15	20.12	20.16	20.19	20.24	20.27	20.37	20.51	20.63	20.84	21.03	21.64	21.79	21.94	22.20	22.56	23.19	23.65	24.04	24.34	24.87	24.75	24.85
Zambia	36.39	36.77	36.83	37.83	37.25	37.59	37.76	38.45	36.58	38.29	38.42	38.73	38.58	38.39	38.45	38.50	38.37	38.52	38.74	38.42	39.15	38.97	38.87	39.64	39.78	39.04
Zimbabwe	59.08	59.10	59.18	59.27	59.34	59.42	59.51	59.56	59.59	59.61	59.72	59.88	59.90	59.93	59.95	60.03	60.08	60.15	60.19	60.23	60.27	60.30	60.39	60.43	60.44	60.32

Note: * indicates a country not included in the Elgin et al. (2021) sample. Consequently, without exogenous estimates of the informal economy (IE), it is not possible to calibrate the estimates.

Table C.3: Estimates of the IE using Elgin et al. (2021) - MIMIC for calibration (see Excel file: Meth_f_g_Elg_MIMIC)

countryname	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Angola	48.30	48.13	47.64	47.48	47.45	47.24	47.21	47.15	47.25	47.34	47.48	47.67	47.94	48.17	48.47	47.90	47.39	46.96	46.74	46.65	46.64	46.44	46.30	46.52	46.44	46.98
Argentina	26.80	25.26	26.47	26.04	26.58	26.42	26.42	25.96	26.23	25.47	25.33	25.41	25.12	24.51	24.62	24.46	24.62	24.73	24.93	25.13	24.59	25.12	25.37	25.29	26.21	25.55
Austria	10.02	10.07	10.06	10.03	10.00	9.99	9.98	10.00	10.04	10.05	10.10	10.08	10.08	10.11	10.05	10.15	10.15	10.16	10.14	10.12	10.10	10.09	10.11	10.12	10.10	10.09
Bangladesh	35.96	35.81	35.56	35.59	35.55	35.46	35.53	35.36	35.24	35.19	35.21	35.10	35.06	34.83	35.17	34.85	34.57	34.49	34.36	33.63	34.22	34.15	34.06	34.01	33.90	33.95
Belarus	36.13	36.34	36.88	37.51	37.60	38.01	38.17	38.36	37.96	37.38	40.02	39.40	39.98	40.84	40.88	40.67	40.76	40.92	41.01	41.44	41.54	42.60	42.84	43.10	43.33	44.87
Belgium	22.97	22.77	22.98	22.28	21.73	22.02	21.86	21.76	21.98	21.91	21.85	21.42	21.96	21.66	21.68	21.74	22.16	22.04	22.18	22.07	21.78	21.64	21.80	22.07	21.78	22.19
Benin	49.41	49.27	49.27	48.11	49.86	47.97	48.32	48.90	48.07	48.22	48.22	49.68	49.35	50.97	48.00	45.61	47.23	47.17	45.91	46.36	46.11	45.67	45.22	45.55	45.14	44.85
Bolivia	61.70	61.75	61.83	61.66	61.68	62.18	61.64	61.32	61.66	61.87	61.49	61.37	60.75	61.19	61.65	61.40	61.94	62.74	62.33	64.15	64.15	64.21	63.05	64.16	64.48	64.70
Bosnia and Herzeg.	31.17	30.99	30.70	29.52	29.38	29.56	29.72	29.93	30.00	30.18	30.42	31.03	31.23	30.99	30.84	31.73	31.26	30.80	31.42	31.89	32.46	31.70	33.06	31.03	31.41	32.61
Botswana	35.13	35.08	34.90	34.76	34.58	34.45	34.24	34.17	33.92	33.96	34.07	33.59	33.31	33.19	32.99	32.80	32.58	32.35	32.16	31.92	31.72	31.52	31.29	31.01	30.76	30.74
Brazil	39.43	39.40	39.55	39.41	39.45	39.25	39.77	39.92	39.96	40.15	40.06	39.94	39.87	39.70	39.52	39.26	39.16	39.17	39.05	39.69	39.80	39.94	39.98	40.02	40.29	40.03
Bulgaria	34.69	35.80	34.60	34.42	33.99	34.50	32.88	32.17	33.43	33.04	33.37	32.16	31.49	34.19	32.72	32.00	33.57	32.68	32.68	32.65	33.02	32.98	32.72	32.73	32.34	32.65
Burkina Faso	40.80	40.66	40.32	40.18	40.11	39.94	39.83	39.69	39.99	39.73	39.11	39.18	38.79	38.08	38.49	38.04	37.40	38.51	38.22	37.57	37.49	37.43	37.27	37.39	37.27	36.84
Burundi	40.46	40.46	40.51	40.34	40.29	40.44	40.57	40.89	41.05	40.69	40.72	40.72	40.86	40.87	40.92	40.73	40.50	40.88	40.94	40.97	41.03	41.09	41.12	41.18	41.20	41.24
Cambodia	50.69	50.54	50.36	50.14	49.89	49.65	49.41	49.17	48.89	48.63	48.27	47.99	47.73	47.39	47.24	46.53	45.87	45.45	44.86	44.65	44.59	44.48	44.31	44.20	44.09	44.15
Cameroon	32.47	32.31	32.04	31.86	31.54	31.66	31.69	31.87	31.54	32.04	32.04	32.14	31.98	31.62	30.19	31.55	30.64	30.44	30.39	30.26	30.16	30.07	29.88	30.13	29.99	30.02
Canada	15.56	15.57	15.59	15.40	15.17	15.19	15.28	15.30	15.40	15.39	15.66	15.48	15.78	15.65	15.58	15.66	15.73	15.73	15.76	15.83	15.80	15.85	15.88	15.95	15.69	15.73
Chad	47.55	46.38	46.92	46.65	46.51	46.36	46.21	45.81	45.59	45.59	45.45	45.34	46.23	45.29	45.64	44.07	43.99	44.55	44.41	44.40	44.36	44.25	44.14	44.14	44.04	43.64
China	13.00	12.90	12.81	12.71	12.61	12.51	12.40	12.30	12.19	12.08	11.97	11.85	11.83	11.82	11.79	11.77	11.75	11.73	11.72	11.70	11.69	11.67	11.66	11.64	11.63	11.64
Colombia	36.76	36.74	36.74	36.74	36.75	36.76	36.76	36.81	36.80	36.74	36.72	36.74	36.79	36.77	36.78	36.77	36.80	36.77	36.76	36.74	36.75	36.75	36.73	36.74	36.74	36.74
Comoros	41.44	41.94	41.42	40.82	40.70	40.50	40.54	40.49	40.17	39.81	39.47	38.10	38.88	38.61	38.41	38.33	37.55	37.69	37.28	37.24	37.21	37.10	37.10	37.15	37.00	36.60
Congo, Dem. Rep.	47.76	47.78	47.92	47.96	47.89	47.85	47.92	47.73	47.62	47.42	47.04	46.59	46.36	45.75	45.36	44.89	45.01	44.36	44.03	44.20	44.22	43.89	44.07	44.34	44.26	43.90
Congo, Rep.	50.68	50.77	50.88	50.95	51.07	51.28	51.25	51.34	51.22	51.49	51.61	51.71	51.76	51.92	51.94	52.00	52.07	52.11	52.22	52.31	52.37	52.39	52.38	52.47	52.45	52.34
Costa Rica	26.72	26.61	26.70	26.45	26.76	26.88	26.70	26.83	26.51	26.38	26.12	26.10	26.23	26.04	25.60	25.76	26.02	25.82	25.71	25.48	25.56	25.78	25.99	25.86	25.83	25.46
Cote d'Ivoire	42.18	40.91	41.75	41.31	42.05	42.52	42.28	41.94	41.96	41.39	40.76	40.69	41.06	40.90	40.00	39.96	39.62	40.26	40.20	39.93	38.30	41.24	38.90	39.33	39.03	38.91
Croatia	32.66	32.43	32.43	32.27	32.35	32.38	32.49	32.45	32.64	32.21	31.83	31.98	31.86	32.03	32.25	31.79	31.54	31.11	31.14	30.82	30.59	30.53	30.59	30.64	30.75	30.71
Cyprus	28.71	28.70	28.69	28.69	28.67	28.68	28.70	28.70	28.70	28.69	28.68	28.68	28.68	28.65	28.65	28.64	28.65	28.66	28.63	28.62	28.62	28.62	28.62	28.63	28.61	28.61
Czechia	16.55	16.66	16.83	16.91	17.02	17.18	17.55	17.50	17.26	17.68	17.60	17.49	17.60	17.79	18.09	18.01	17.82	17.75	17.19	17.11	17.63	17.58	17.56	17.57	17.39	17.51
Denmark	17.52	16.99	17.32	17.52	17.80	17.72	17.58	17.43	17.26	17.36	17.47	17.35	17.51	17.11	17.22	17.76	17.17	17.70	17.27	17.18	16.92	16.80	16.96	17.09	17.20	17.20

Russian Federation	43.93	43.69	46.59	47.00	45.67	45.81	45.01	45.10	44.41	44.07	44.71	43.73	44.58	43.87	43.83	43.77	43.87	43.71	44.01	43.95	43.36	43.31	43.57	43.07	42.87	42.55
Rwanda	40.78	40.82	40.81	40.14	40.66	40.49	40.43	40.25	40.31	39.95	39.63	39.11	39.23	38.33	38.76	39.38	38.89	37.27	36.27	37.14	37.11	35.86	36.92	37.68	37.63	37.89
Senegal	44.17	43.88	43.93	43.80	43.69	43.56	43.49	43.35	43.39	43.25	43.07	43.06	42.90	42.80	42.63	42.60	42.13	42.32	42.05	42.78	42.50	42.15	42.00	42.07	41.98	41.74
Serbia*																										
Sierra Leone	48.80	48.77	48.82	48.77	48.83	48.74	48.72	48.68	48.41	48.10	47.17	46.97	47.04	46.95	47.06	46.51	46.23	45.81	45.08	44.02	43.47	44.44	43.76	43.54	43.23	42.84
Slovak Republic	14.91	15.04	15.13	15.17	15.41	15.35	15.54	16.28	16.22	16.39	16.30	16.46	16.67	16.66	16.92	16.85	16.92	16.78	17.23	16.66	16.87	16.80	16.92	16.95	16.96	17.48
Slovenia	27.48	27.63	27.14	26.47	26.72	26.46	25.97	26.54	26.33	26.64	26.74	26.24	26.84	27.03	26.93	26.55	26.64	27.13	26.48	25.76	25.99	26.14	25.68	25.39	25.61	25.56
South Africa	29.03	29.03	28.94	29.00	29.04	29.05	29.11	29.14	28.99	29.32	29.06	28.84	28.80	28.73	28.89	28.81	28.66	28.57	28.55	28.65	28.51	28.36	28.78	28.84	28.78	28.74
Spain	24.41	24.15	23.98	23.83	23.85	23.67	23.58	23.59	23.58	23.50	23.48	23.49	23.37	23.41	23.39	23.48	23.56	23.50	23.45	23.38	23.42	23.37	23.34	23.40	23.41	23.32
Sri Lanka	41.63	42.40	42.09	42.23	41.85	41.97	41.96	41.76	41.81	42.31	42.19	42.29	42.12	42.66	42.60	42.17	41.89	41.90	42.14	42.94	42.85	41.49	42.05	41.93	41.83	42.12
Sudan																										
Sweden	20.10	19.60	19.80	19.68	19.61	19.67	19.64	19.58	19.55	19.48	19.42	19.41	19.66	19.94	19.69	19.18	19.32	19.15	19.13	18.86	19.06	19.00	19.07	19.11	19.46	19.44
Switzerland	9.04	8.67	8.88	8.73	8.75	8.77	9.21	8.92	8.65	8.72	8.74	8.58	8.45	8.66	8.70	8.73	8.74	8.77	8.57	8.55	8.61	8.62	8.49	8.52	8.72	8.58
Tajikistan	43.01	43.00	43.00	42.81	42.53	41.31	41.97	42.28	41.51	41.40	40.89	39.08	39.55	39.93	40.11	39.26	39.26	39.14	39.09	38.72	38.50	38.19	37.93	37.67	37.42	36.85
Tanzania	57.87	57.75	57.54	57.41	57.20	56.99	56.69	57.66	56.73	55.77	55.33	54.18	53.13	54.19	54.29	54.18	53.92	55.42	53.47	53.11	52.80	52.49	52.09	52.20	51.93	51.89
Thailand	50.50	49.92	49.63	50.15	49.17	49.44	49.29	48.34	48.14	47.52	48.92	48.35	48.29	49.12	50.38	50.74	49.31	48.49	48.19	48.05	48.02	48.51	48.16	48.38	48.84	48.87
Timor-Leste*																										
Togo	34.97	34.80	34.80	35.29	35.06	35.02	35.00	35.03	35.08	35.06	34.77	34.80	35.32	34.91	34.81	34.41	33.82	33.73	34.06	33.76	33.62	33.55	33.48	33.67	33.59	33.63
Tunisia	39.13	38.95	38.86	38.90	38.83	38.75	38.64	38.47	38.75	38.83	38.66	38.60	38.45	38.45	38.30	38.12	38.17	38.04	38.28	38.01	37.83	37.77	37.68	37.48	37.43	37.59
Turkiye	32.92	32.90	32.99	32.74	32.73	32.49	32.46	32.42	32.05	31.88	31.80	31.75	31.76	31.72	31.69	31.59	31.50	31.31	31.27	31.24	31.25	31.20	31.13	31.01	30.97	30.96
Uganda	43.79	43.66	43.47	43.40	43.23	43.10	42.89	42.49	42.60	42.34	42.07	41.83	41.67	41.45	41.74	40.83	40.57	40.47	40.56	40.46	40.32	40.12	39.98	39.94	39.68	39.79
Ukraine	48.36	46.90	46.80	46.50	46.61	46.55	46.85	47.14	47.49	47.47	47.51	47.29	47.27	47.40	47.19	47.32	47.43	47.11	47.13	47.20	47.69	47.01	47.00	46.92	46.87	
United Kingdom	12.49	12.57	12.52	12.44	12.41	12.53	12.54	12.56	12.64	12.60	12.54	12.48	12.46	12.55	12.73	12.75	12.83	12.91	12.86	12.97	12.88	12.87	12.91	12.83	12.82	12.90
Viet Nam	15.53	15.29	15.75	15.77	15.61	15.73	15.60	15.34	15.24	15.10	15.00	14.51	15.31	15.25	15.00	15.07	15.06	15.18	14.88	14.72	14.63	14.56	14.46	14.43	14.31	14.65
Yemen, Rep.	26.76	26.97	27.00	27.02	27.00	27.03	27.05	27.09	27.12	27.19	27.30	27.40	27.56	27.70	28.17	28.29	28.40	28.61	28.88	29.36	29.72	30.02	30.25	30.66	30.57	30.65
Zambia	43.40	43.83	43.90	45.06	44.39	44.78	44.97	45.77	43.61	45.58	45.74	46.10	45.93	45.70	45.77	45.83	45.68	45.85	46.11	45.73	46.58	46.37	46.26	47.15	47.30	46.45
Zimbabwe	59.58	59.62	59.78	59.95	60.09	60.24	60.42	60.53	60.57	60.62	60.84	61.15	61.20	61.25	61.30	61.45	61.54	61.69	61.76	61.84	61.91	61.97	62.15	62.23	62.26	62.01

Note: * indicates a country not included in the Elgin et al. (2021) sample. Consequently, without exogenous estimates of the informal economy (IE), it is not possible to calibrate the estimates.

Table C.4: Estimates of the IE using Medina and Schneider (2021) – MIMIC for calibration (see Excel file: Meth_f_g_MS)

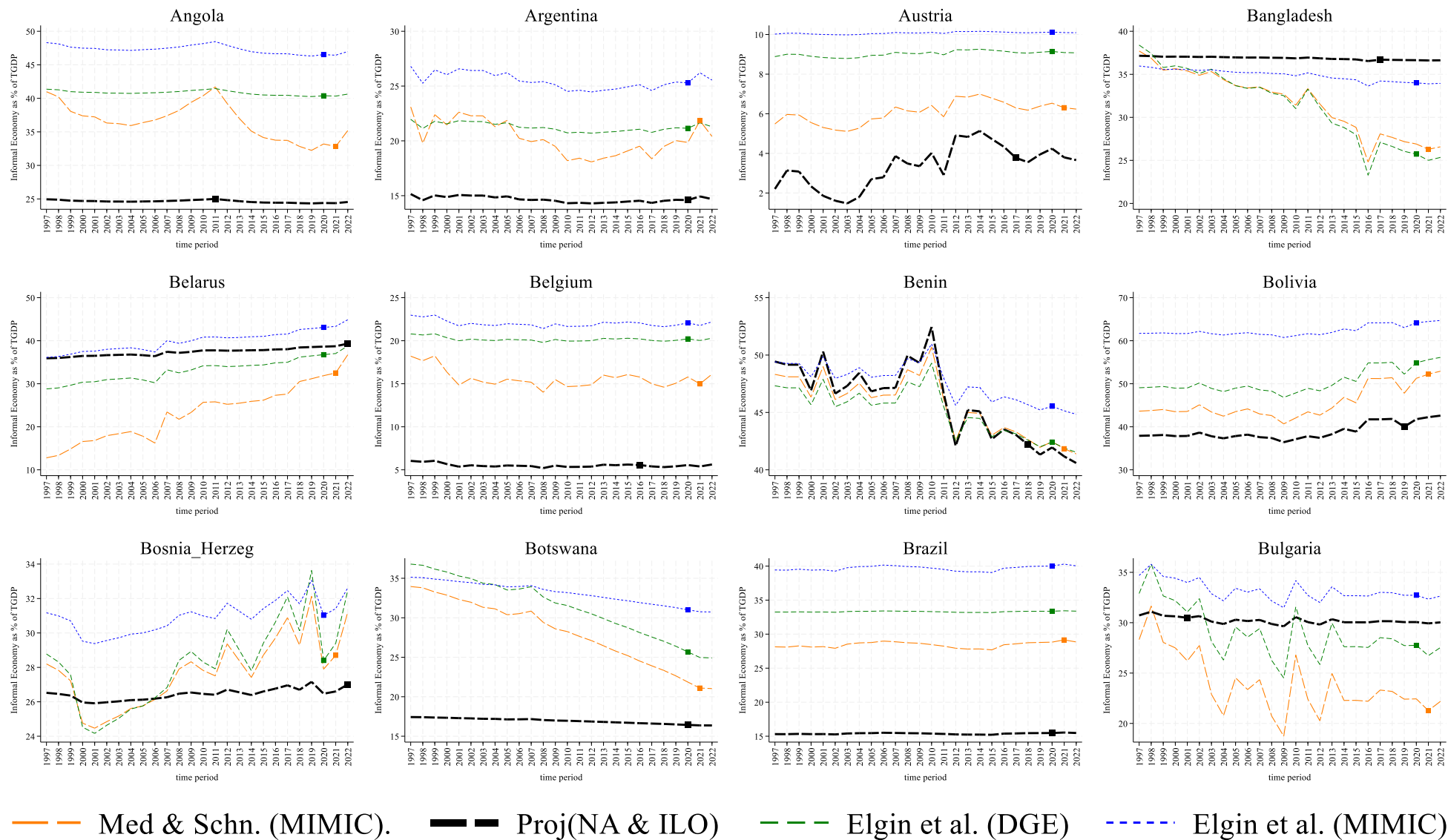
countryname	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Angola	40.99	40.21	38.07	37.39	37.24	36.33	36.23	35.93	36.39	36.77	37.41	38.20	39.41	40.39	41.71	39.22	37.01	35.11	34.15	33.77	33.73	32.83	32.25	33.20	32.83	35.19
Argentina	23.10	19.79	22.39	21.46	22.62	22.29	22.28	21.29	21.87	20.23	19.94	20.12	19.50	18.19	18.42	18.08	18.42	18.65	19.08	19.52	18.36	19.49	20.02	19.85	21.84	20.41
Austria	5.49	5.97	5.94	5.56	5.31	5.18	5.11	5.28	5.74	5.79	6.34	6.15	6.08	6.42	5.85	6.88	6.84	7.00	6.79	6.58	6.29	6.18	6.38	6.53	6.31	6.24
Bangladesh	37.71	36.88	35.48	35.66	35.39	34.89	35.32	34.39	33.69	33.41	33.53	32.94	32.70	31.42	33.34	31.55	29.98	29.54	28.84	24.81	28.08	27.67	27.18	26.90	26.29	26.58
Belarus	12.80	13.37	14.85	16.58	16.81	17.94	18.40	18.89	17.81	16.22	23.44	21.75	23.34	25.69	25.80	25.23	25.48	25.92	26.17	27.33	27.62	30.53	31.17	31.89	32.51	36.73
Belgium	18.20	17.68	18.25	16.36	14.86	15.64	15.20	14.95	15.54	15.35	15.18	14.01	15.48	14.67	14.74	14.89	16.01	15.71	16.07	15.79	15.00	14.60	15.06	15.79	14.99	16.11
Benin	48.32	48.11	48.11	46.34	49.00	46.13	46.66	47.55	46.29	46.51	46.52	48.73	48.22	50.69	46.18	42.56	45.00	44.92	43.01	43.69	43.31	42.65	41.96	42.45	41.84	41.39
Bolivia	43.64	43.79	44.03	43.51	43.56	45.11	43.44	42.47	43.52	44.17	43.00	42.61	40.69	42.07	43.47	42.71	44.37	46.87	45.57	51.22	51.22	51.41	47.80	51.26	52.23	52.91
Bosnia and Herzeg.	28.20	27.83	27.22	24.76	24.47	24.85	25.18	25.61	25.76	26.14	26.63	27.90	28.33	27.82	27.51	29.37	28.39	27.42	28.71	29.70	30.89	29.29	32.14	27.90	28.70	31.21
Botswana	33.96	33.80	33.27	32.87	32.32	31.97	31.32	31.14	30.38	30.52	30.85	29.42	28.60	28.25	27.65	27.11	26.45	25.78	25.22	24.52	23.92	23.33	22.65	21.86	21.10	21.04
Brazil	28.14	28.10	28.28	28.11	28.16	27.93	28.53	28.71	28.77	28.98	28.88	28.73	28.66	28.46	28.24	27.93	27.82	27.83	27.69	28.45	28.57	28.74	28.79	28.83	29.15	28.85
Bulgaria	28.32	31.65	28.05	27.50	26.22	27.74	22.90	20.77	24.53	23.37	24.35	20.73	18.73	26.81	22.41	20.26	24.96	22.28	22.29	22.20	23.31	23.18	22.41	22.44	21.28	22.19
Burkina Faso	41.41	40.90	39.70	39.18	38.94	38.34	37.97	37.47	38.52	37.61	35.38	35.63	34.25	31.73	33.20	31.61	29.32	33.26	32.25	29.95	29.66	29.44	28.87	29.30	28.86	27.35
Burundi	29.62	29.59	29.90	28.90	28.55	29.49	30.30	32.27	33.25	31.07	31.24	31.22	32.07	32.19	32.45	31.32	29.87	32.23	32.61	32.79	33.15	33.54	33.69	34.11	34.22	34.48
Cambodia	50.37	50.20	49.99	49.74	49.45	49.18	48.91	48.63	48.32	48.02	47.62	47.30	47.00	46.61	46.44	45.64	44.90	44.41	43.74	43.51	43.44	43.31	43.12	42.99	42.87	42.94
Cameroon	30.33	30.02	29.50	29.15	28.53	28.77	28.83	29.17	28.53	29.50	29.51	29.69	29.37	28.69	25.93	28.56	26.81	26.42	26.32	26.07	25.88	25.71	25.34	25.81	25.55	25.61
Canada	9.65	9.68	9.75	9.04	8.21	8.28	8.61	8.68	9.04	9.01	10.03	9.37	10.46	9.97	9.72	10.03	10.28	10.30	10.39	10.65	10.56	10.72	10.84	11.11	10.14	10.27
Chad	45.64	41.48	43.41	42.45	41.95	41.41	40.89	39.47	38.69	38.68	38.21	37.81	40.95	37.62	38.88	33.31	33.04	34.99	34.51	34.48	34.35	33.95	33.56	33.54	33.19	31.79
China	16.09	15.67	15.27	14.85	14.43	14.01	13.56	13.12	12.65	12.19	11.72	11.25	11.15	11.09	10.99	10.91	10.81	10.74	10.67	10.61	10.55	10.48	10.42	10.36	10.31	10.35

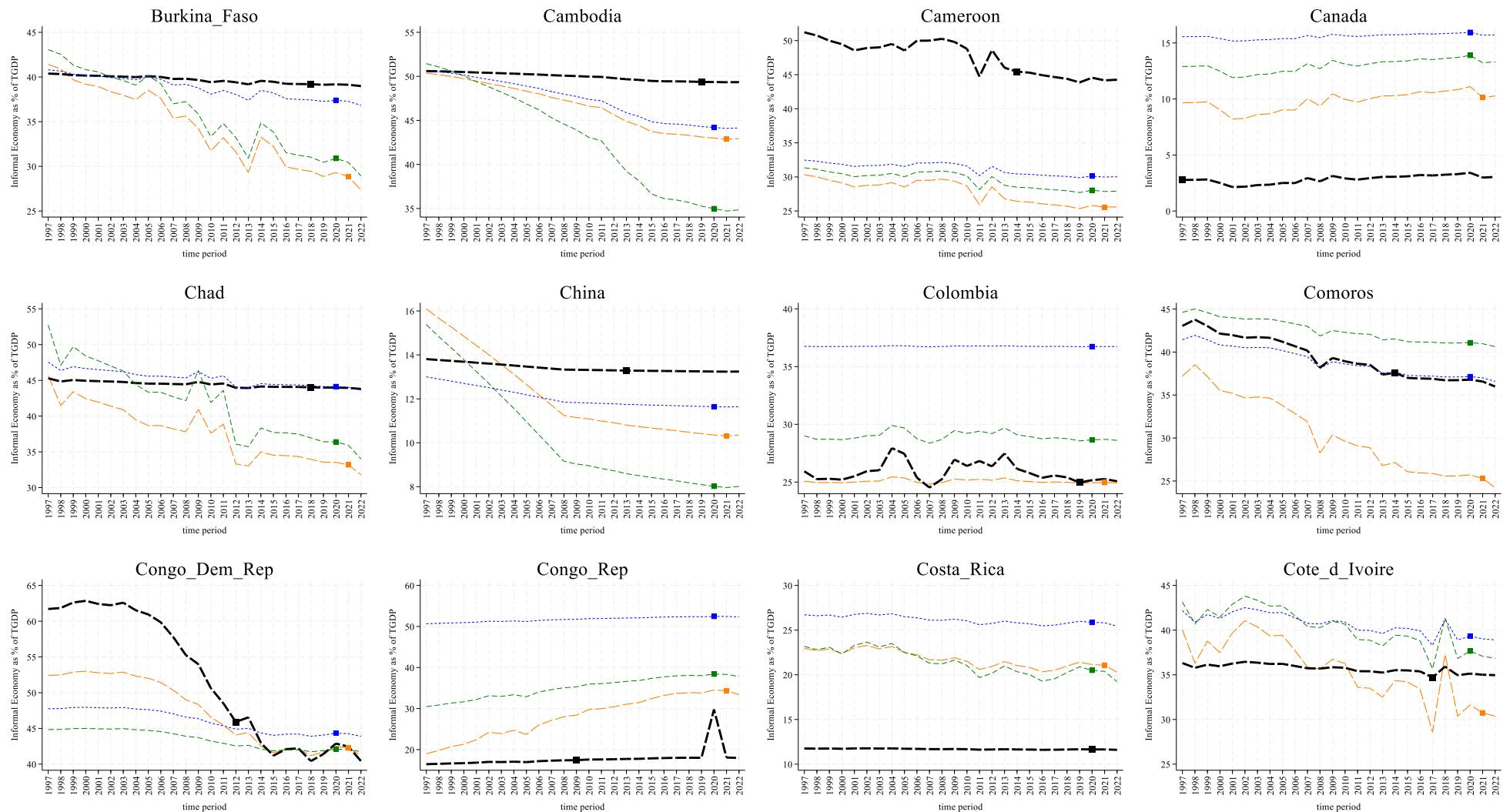
Colombia	25.08	24.95	24.96	24.94	25.00	25.08	25.09	25.45	25.35	24.97	24.82	24.95	25.26	25.16	25.24	25.15	25.36	25.12	25.05	24.97	25.01	24.98	24.90	24.93	24.95	24.92
Comoros	37.20	38.53	37.15	35.53	35.21	34.67	34.78	34.65	33.79	32.84	31.91	28.26	30.34	29.62	29.10	28.88	26.79	27.16	26.08	25.95	25.87	25.58	25.59	25.71	25.31	24.24
Congo, Dem. Rep.	52.42	52.49	52.89	53.01	52.79	52.69	52.88	52.32	52.01	51.43	50.34	49.01	48.35	46.58	45.46	44.08	44.42	42.54	41.60	42.08	42.13	41.20	41.72	42.49	42.26	41.20
Congo, Rep.	18.98	19.80	20.73	21.31	22.38	24.21	23.92	24.72	23.69	26.05	27.10	28.00	28.43	29.77	29.98	30.44	31.06	31.45	32.43	33.20	33.70	33.89	33.81	34.53	34.36	33.40
Costa Rica	22.95	22.71	22.89	22.38	23.03	23.28	22.90	23.17	22.50	22.24	21.69	21.64	21.92	21.51	20.60	20.93	21.48	21.05	20.83	20.34	20.51	20.98	21.41	21.15	21.07	20.30
Cote d'Ivoire	40.06	36.29	38.78	37.48	39.69	41.06	40.36	39.36	39.42	37.71	35.87	35.65	36.75	36.26	33.61	33.50	32.50	34.37	34.20	33.40	28.58	37.29	30.37	31.63	30.74	30.38
Croatia	28.08	27.20	27.22	26.59	26.88	26.99	27.42	27.27	28.02	26.38	24.92	25.47	25.00	25.68	26.51	24.76	23.80	22.17	22.26	21.03	20.17	19.92	20.16	20.37	20.77	20.63
Cyprus	27.22	26.92	26.40	26.69	25.91	25.99	27.12	27.09	27.05	26.54	26.16	26.28	26.22	25.07	24.93	24.62	25.00	25.17	23.98	23.68	23.54	23.53	23.82	23.92	23.41	23.10
Czechia	7.69	8.03	8.62	8.86	9.24	9.78	11.00	10.82	10.05	11.42	11.15	10.81	11.18	11.81	12.79	12.52	11.88	11.65	9.80	9.53	11.25	11.09	11.02	11.06	10.46	10.86
Denmark	11.31	10.12	10.87	11.31	11.94	11.75	11.44	11.10	10.72	10.94	11.20	10.93	11.29	10.38	10.63	11.85	10.52	11.70	10.76	10.54	9.96	9.69	10.05	10.34	10.58	10.60
Djibouti*																										
Dominican Republic	22.20	22.40	22.77	23.02	23.60	24.05	24.21	24.18	25.04	25.20	25.19	26.11	26.30	26.54	26.68	26.61	26.56	26.83	26.93	26.75	27.41	27.54	27.25	27.53	27.46	28.56
Ecuador	35.05	34.93	34.34	34.75	34.00	33.42	32.86	33.16	32.51	32.20	31.68	31.20	30.69	29.65	30.21	30.04	30.05	28.47	28.42	28.83	28.67	28.46	28.28	28.29	28.21	27.34
Egypt, Arab Rep.	25.36	25.77	25.74	26.63	26.27	26.97	28.72	30.02	28.91	28.70	30.73	30.55	30.47	30.47	31.32	30.95	32.18	32.65	31.82	29.14	30.19	30.03	29.38	29.21	29.26	32.74
El Salvador	37.37	37.76	37.55	38.57	37.70	38.93	37.39	36.44	37.04	36.07	36.63	37.36	37.17	36.27	37.65	38.46	38.36	37.24	37.97	37.92	37.39	36.84	37.14	36.70	36.58	36.39
Estonia	12.85	13.15	12.19	11.22	11.21	11.05	12.59	12.68	11.82	12.81	13.99	11.80	13.10	13.24	15.00	14.18	16.67	15.91	16.61	16.79	17.36	18.18	18.75	18.73	18.51	19.11
Eswatini	28.67	29.00	29.16	28.53	31.06	31.22	30.83	30.81	31.38	31.81	31.93	31.91	32.01	33.04	33.82	33.58	33.89	34.04	34.54	34.91	35.09	35.25	35.48	35.59	35.81	36.48
Finland	11.87	11.01	10.23	10.16	9.57	9.38	9.21	9.04	9.11	9.24	8.96	9.03	9.65	9.49	9.49	8.91	8.81	9.19	9.23	9.00	8.63	8.55	8.65	8.57	9.47	9.21
France	14.40	13.85	13.49	12.84	12.53	12.31	12.70	12.21	11.94	12.21	11.78	11.18	11.32	11.56	11.51	11.24	10.97	11.01	10.68	10.78	10.45	10.36	10.53	10.36	10.37	10.50
Gambia, The	45.07	45.09	45.12	45.14	45.05	45.01	45.05	45.37	45.42	45.44	45.40	45.58	45.59	45.55	45.62	45.62	45.53	45.41	45.49	45.67	45.72	45.75	45.76	45.86	45.86	45.85
Germany	8.63	8.61	8.78	8.86	9.27	9.35	9.72	10.49	11.05	10.65	10.60	10.63	10.45	10.66	11.14	10.72	10.32	10.26	9.99	9.73	9.83	9.93	9.72	9.46	8.67	9.67
Ghana	40.51	40.25	39.49	38.84	43.86	38.71	38.43	38.90	36.58	37.35	31.80	31.12	32.02	28.73	39.57	34.78	34.10	34.40	31.42	31.81	31.99	31.29	30.27	31.28	30.54	30.83
Greece	25.19	24.75	23.49	22.33	21.93	21.78	21.23	20.04	20.21	20.19	19.88	19.92	20.48	21.04	21.61	22.05	22.88	22.70	22.19	21.75	21.96	22.02	21.20	21.21	21.98	24.46
Guatemala	52.07	52.21	52.25	52.79	52.94	53.31	53.26	52.92	51.74	49.75	50.19	49.92	49.26	49.46	47.17	49.51	47.22	45.99	44.51	42.77	45.46	45.34	42.78	42.54	41.92	43.30
Guinea-Bissau	20.74	22.98	23.62	24.05	24.64	25.28	25.69	26.49	23.29	23.32	23.92	24.08	24.46	25.04	22.01	23.17	26.08	25.33	25.58	25.60	25.56	25.76	25.52	27.58	27.43	25.71
Haiti	30.52	30.75	31.39	31.79	32.31	32.87	33.23	33.61	34.03	34.48	34.69	35.28	35.62	36.99	36.34	37.72	38.21	38.46	39.18	39.94	40.41	40.92	41.53	44.63	45.10	44.44
Honduras	32.68	33.04	33.46	33.84	34.24	34.69	34.98	35.25	35.48	35.89	36.05	36.44	37.29	38.30	38.15	39.25	39.42	39.13	39.31	39.26	40.54	40.76	40.91	41.11	41.25	40.96
Hungary	23.08	20.64	20.45	20.18	19.60	18.74	17.91	18.53	17.82	17.03	16.93	16.66	17.93	16.89	18.15	16.32	16.57	14.42	13.74	14.29	14.65	14.74	15.02	16.28	16.49	15.71
Iceland	13.03	13.34	13.27	13.05	12.68	12.67	11.34	11.23	11.72	11.67	11.44	10.96	10.70	11.21	10.94	10.89	10.83	10.83	10.81	10.76	10.69	10.85	10.77	10.77	11.16	10.61
India	26.77	26.41	25.83	25.21	25.49	25.17	25.04	24.96	25.06	24.79	23.33	22.91	21.10	21.13	20.89	20.92	21.48	19.69	19.52	18.95	18.70	18.21	17.68	17.55	17.30	16.81
Indonesia	18.90	20.75	20.82	20.95	20.47	20.55	20.96	20.73	20.36	20.31	21.57	21.93	21.70	20.68	20.19	19.24	19.11	19.32	18.61	19.44	19.53	19.76	19.93	20.26	20.26	20.28
Ireland	14.69	13.73	13.44	13.76	13.00	12.66	11.95	11.80	11.36	11.13	11.05	11.29	11.80	11.45	11.13	11.09	11.30	11.10	11.37	10.57	10.20	9.92	9.46	9.53	9.14	9.03
Italy	22.14	22.01	22.24	22.29	21.36	21.92	21.27	21.34	20.62	20.46	20.28	19.81	19.14	19.65	19.41	19.20	19.32	19.25	18.84	18.74	18.33	18.18	18.26	18.31	17.89	18.08
Jamaica	29.58	29.84	29.98	29.88	29.55	29.69	30.71	29.71	28.70	29.53	28.84	30.51	29.54	29.08	29.49	30.26	30.20	30.15	30.21	29.95	29.73	29.68	30.13	30.22	30.24	30.09
Kyrgyz Republic	32.51	34.08	36.16	36.58	34.73	32.78	31.54	30.31	30.58	30.02	29.00	26.44	25.27	23.54	26.03	25.01	28.38	32.36	28.32	30.16	28.44	26.47	26.00	26.53	26.89	27.49
Lao PDR	33.02	31.29	31.17	31.00	29.26	30.60	29.99	29.82	29.56	29.24	28.81	28.36	25.45	27.82	26.04	27.37	27.63	27.30	25.38	24.93	24.52	24.22	23.81	24.07	23.73	23.86
Latvia	22.77	21.58	20.57	18.07	18.47	17.56	16.55	16.16	15.26	15.72	15.00	13.32	13.62	14.06	15.43	15.32	15.24	15.72	16.83	15.34	16.36	15.57	16.01	16.96	17.41	16.84
Lebanon	25.10	25.09	25.10	25.12	25.14	25.06	25.21	25.37	24.86	25.01	25.12	24.86	24.99	24.93	24.99	24.74	24.92	25.02	25.11	25.15	25.20	25.26	25.30	25.20	25.21	25.20
Lesotho	28.12	27.60	28.37	29.24	28.76	27.60	27.49	27.42	25.15	25.01	27.07	24.64	26.87	26.74	26.68	26.53	26.44	26.40	26.32	26.23	26.26	28.60	26.17	26.20	26.21	26.24
Lithuania	26.87	26.50	27.10	26.60	27.01	28.32	27.37	25.32	23.53	23.12	20.72	17.25	17.57	17.83	18.84	19.71	20.14	20.98	20.70	18.41	20.15	19.84	19.85	20.12	20.01	20.07
Luxembourg	5.91	5.98	5.91	5.98	5.80	5.86	5.86	5.85	5.83	5.84	5.80	5.74	5.94	5.87	5.94	5.98	6.20	6.45	6.55	6.82	6.98	7.03	7.20	7.44	7.70	7.97
Madagascar	34.87	35.20	34.79	34.87	34.89	34.98	35.04	35.22	35.65	35.50	35.56	35.37	35.47	35.91	35.58	35.40	36.09	36.21	36.68	36.65	36.66	36.48	36.51	36.64	36.63	36.37
Mali	40.89	40.65	40.16	39.70	38.52	37.98	37.18	36.76	36.18	35.02	35.31	36.85	36.77	33.00	31.39	34.16	35.62	32.53	33.16	30.76	34.20	31.34	30.23	30.82	30.45	31.61
Mauritania	37.23	35.37	33.72	35.16	35.22	34.88	34.56	34.49	34.22	33.13	32.43	30.32	31.65	28.60	32.00	32.12	32.62	30.07	29.68	28.67	28.81	28.45	28.27	28.79	28.10	28.92
Mauritius	15.24	15.39	15.55	15.71	16.33	15.69	16.93	16.02	16.61	16.84	16.93	17.08	16.49	17.39	17.64	18.09	18.18	18.31	18.72	18.85	18.93	18.52	19.10	18.71	18.43	19.00
Mexico	30.92	28.84	28.32	28.40	29.82	28.03	29.08	28.75	28.31	28.03	27.40	26.85	26.72	26.45	27.20	26.44	25.48	25.62	25.50	25.47	25.55	25.48	25.56	24.63	25.24	24.91
Moldova	30.64	31.24	32.42	35.03	36.46	37.4																				

Nicaragua	17.57	19.27	19.76	21.28	22.45	24.30	26.30	25.47	25.78	25.56	26.61	27.00	27.78	28.30	28.77	29.36	29.40	29.67	29.88	29.83	29.78	29.81	30.35	31.81	31.91	32.70
Niger	42.01	42.06	41.74	41.44	41.00	40.68	40.25	39.88	39.24	38.68	38.08	38.51	38.43	37.30	36.68	34.02	36.12	38.09	38.45	35.11	34.29	35.01	34.48	34.30	33.77	33.21
North Macedonia*																										
Norway	11.01	11.00	10.86	10.63	10.65	10.77	11.12	11.32	11.37	11.65	11.48	11.39	11.34	11.16	10.98	10.90	10.66	10.96	10.61	10.70	10.89	10.91	10.90	10.84	10.44	10.85
Pakistan	36.65	36.46	36.24	35.94	35.84	34.23	33.95	34.48	34.27	33.61	33.43	33.73	33.63	33.60	33.37	32.63	29.24	32.21	32.17	32.54	31.82	29.75	29.18	29.02	28.52	29.06
Paraguay	38.43	38.26	37.75	37.41	37.82	38.45	37.69	38.62	36.70	36.16	35.92	34.47	34.95	34.65	30.32	33.84	32.43	31.79	31.61	32.24	31.16	30.82	30.62	31.02	30.85	29.69
Peru	52.30	45.99	52.55	51.95	52.45	54.78	56.51	55.29	58.61	52.25	51.45	47.84	49.09	48.55	43.74	41.55	41.90	45.77	42.38	41.54	42.95	42.05	43.59	43.18	42.75	42.77
Poland	25.31	26.24	23.09	23.05	24.15	25.97	24.11	23.94	23.49	20.43	19.37	19.26	18.97	19.89	19.86	19.62	19.33	18.56	18.96	17.27	17.66	17.47	17.23	18.14	17.09	17.61
Portugal	21.06	21.21	20.61	20.20	21.00	20.67	20.76	20.07	20.16	19.89	20.40	19.81	19.61	19.46	18.70	18.85	18.49	17.62	17.12	16.86	16.53	16.38	16.41	16.34	15.72	15.72
Romania	33.20	34.02	35.29	36.28	36.31	32.45	32.38	30.03	30.57	29.53	30.06	29.71	29.96	31.19	30.11	30.07	29.74	28.92	27.34	26.41	26.49	26.09	25.59	25.36	22.10	24.58
Russian Federation	35.54	34.98	41.69	42.64	39.56	39.88	38.03	38.25	36.66	35.86	37.35	35.07	37.03	35.40	35.30	35.18	35.41	35.03	35.72	35.59	34.22	34.10	34.70	33.56	33.09	32.36
Rwanda	36.07	36.19	36.15	34.32	35.75	35.28	35.14	34.63	34.79	33.80	32.94	31.52	31.84	29.37	30.56	32.26	30.90	26.48	23.75	26.13	26.04	22.63	25.53	27.61	27.45	28.17
Senegal	44.58	43.62	43.79	43.38	43.03	42.60	42.37	41.92	42.04	41.59	41.02	40.99	40.48	40.14	39.59	39.47	37.98	38.58	37.70	40.07	39.16	38.04	37.55	37.77	37.49	36.71
Serbia*																										
Sierra Leone	45.28	45.21	45.32	45.20	45.34	45.12	45.08	44.97	44.32	43.58	41.36	40.88	41.03	40.83	41.08	39.77	39.09	38.08	36.32	33.79	32.47	34.79	33.16	32.62	31.88	30.96
Slovak Republic	4.87	5.26	5.50	5.63	6.32	6.15	6.71	8.84	8.67	9.14	8.89	9.34	9.97	9.93	10.70	10.48	10.70	10.27	11.58	9.94	10.55	10.35	10.70	10.77	10.81	12.31
Slovenia	22.28	22.63	21.50	19.97	20.55	19.94	18.82	20.13	19.65	20.36	20.58	19.43	20.83	21.25	21.03	20.15	20.37	21.48	19.98	18.33	18.87	19.22	18.16	17.49	17.99	17.87
South Africa	23.47	23.46	23.16	23.36	23.50	23.52	23.70	23.80	23.33	24.36	23.54	22.85	22.74	22.51	23.02	22.76	22.28	22.01	21.95	22.26	21.82	21.36	22.66	22.86	22.67	22.53
Spain	23.43	22.21	21.40	20.69	20.77	19.93	19.52	19.57	19.50	19.12	19.03	19.09	18.51	18.68	18.60	19.01	19.41	19.13	18.89	18.58	18.73	18.53	18.39	18.67	18.68	18.27
Sri Lanka	36.36	38.43	37.62	37.99	36.96	37.27	37.24	36.71	36.86	38.20	37.87	38.14	37.68	39.15	38.99	37.82	37.05	37.10	37.74	39.91	39.65	35.98	37.50	37.18	36.90	37.69
Sudan*																										
Sweden	10.48	9.11	9.65	9.34	9.14	9.29	9.21	9.06	8.97	8.77	8.62	8.59	9.27	10.03	9.35	7.95	8.35	7.89	7.81	7.07	7.64	7.46	7.65	7.76	8.73	8.67
Switzerland	5.58	4.45	5.09	4.64	4.70	4.74	6.08	5.20	4.38	4.60	4.66	4.18	3.78	4.44	4.54	4.62	4.67	4.76	4.14	4.08	4.27	4.31	3.90	4.00	4.60	4.19
Tajikistan	44.09	44.06	44.07	43.73	43.23	41.07	42.25	42.79	41.43	41.23	40.33	37.13	37.96	38.63	38.96	37.44	37.44	37.24	37.15	36.49	36.10	35.55	35.09	34.64	34.19	33.18
Tanzania	58.05	57.74	57.21	56.88	56.33	55.81	55.03	57.50	55.15	52.70	51.58	48.63	45.95	48.66	48.91	48.65	47.97	51.80	46.81	45.92	45.11	44.34	43.31	43.58	42.89	42.79
Thailand	44.51	43.46	42.95	43.88	42.13	42.61	42.34	40.63	40.26	39.16	41.67	40.64	40.54	42.03	44.31	44.95	42.38	40.89	40.36	40.11	40.05	40.94	40.31	40.70	41.53	41.57
Timor-Leste*																										
Togo	31.85	31.35	31.35	32.78	32.11	31.98	31.93	32.02	32.15	32.10	31.27	31.35	32.86	31.67	31.39	30.22	28.50	28.25	29.20	28.33	27.93	27.74	27.53	28.06	27.84	27.95
Tunisia	36.15	35.38	34.98	35.14	34.84	34.52	34.06	33.30	34.50	34.86	34.14	33.87	33.22	33.25	32.59	31.82	32.03	31.47	32.51	31.35	30.61	30.33	29.96	29.13	28.91	29.59
Türkiye	31.88	31.81	32.10	31.22	31.21	30.34	30.24	30.10	28.77	28.18	27.87	27.72	27.76	27.61	27.49	27.13	26.81	26.14	26.01	25.88	25.93	25.75	25.49	25.06	24.94	24.89
Uganda	44.82	44.22	43.34	43.05	42.26	41.70	40.76	38.96	39.44	38.26	37.04	35.97	35.25	34.26	35.55	31.43	30.26	29.81	30.21	29.78	29.17	28.25	27.60	27.43	26.28	26.77
Ukraine	37.72	35.59	35.43	35.00	35.15	35.07	35.51	35.93	36.44	36.41	36.47	36.15	36.12	36.31	36.00	36.20	36.35	35.89	35.92	36.02	36.73	35.74	35.73	35.61	35.53	
United Kingdom*	7.15	7.44	7.26	6.95	6.87	7.30	7.35	7.41	7.73	7.56	7.33	7.11	7.06	7.39	8.04	8.11	8.42	8.71	8.51	8.94	8.60	8.56	8.72	8.41	8.40	8.66
Viet Nam	18.78	17.52	19.92	20.05	19.20	19.81	19.16	17.74	17.26	16.49	15.95	13.41	17.60	17.31	15.99	16.37	16.28	16.90	15.34	14.52	14.01	13.66	13.13	12.97	12.33	14.11
Yemen, Rep.	15.33	15.62	15.66	15.70	15.67	15.71	15.74	15.80	15.84	15.94	16.10	16.24	16.47	16.68	17.35	17.52	17.69	17.98	18.38	19.08	19.59	20.02	20.35	20.94	20.81	20.92
Zambia	13.48	15.71	16.09	22.02	18.56	20.58	21.58	25.68	14.57	24.72	25.51	27.36	26.48	25.32	25.67	25.99	25.22	26.11	27.42	25.50	29.86	28.76	28.19	32.76	33.57	29.17
Zimbabwe	32.30	32.49	33.33	34.23	34.95	35.69	36.62	37.20	37.42	37.66	38.77	40.38	40.64	40.92	41.14	41.91	42.42	43.15	43.54	43.92	44.31	44.63	45.54	45.97	46.08	44.82

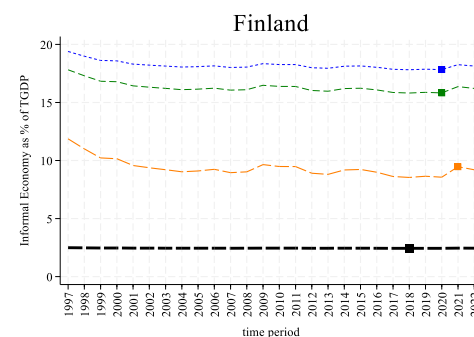
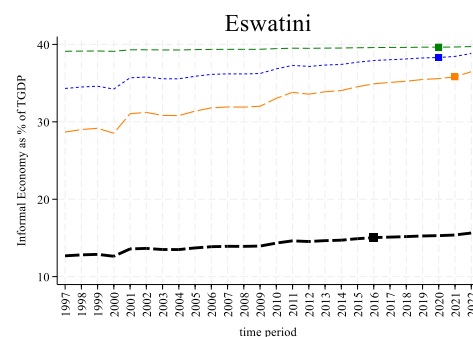
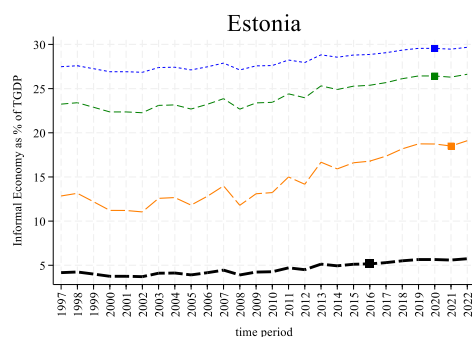
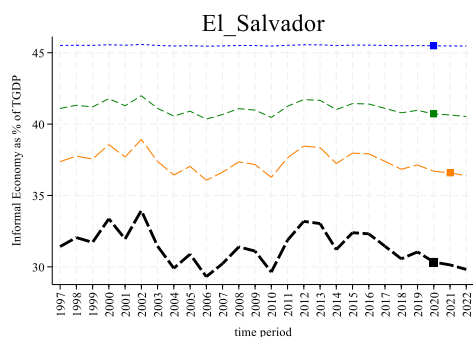
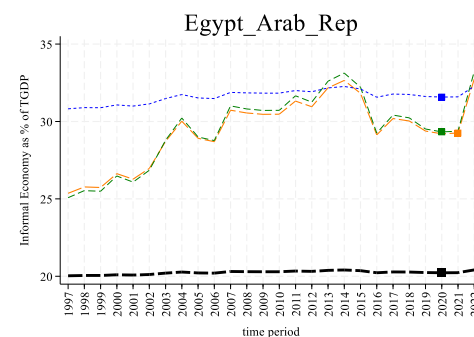
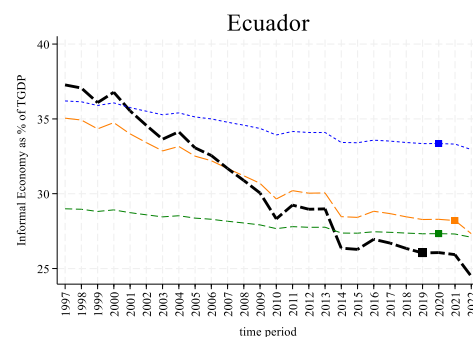
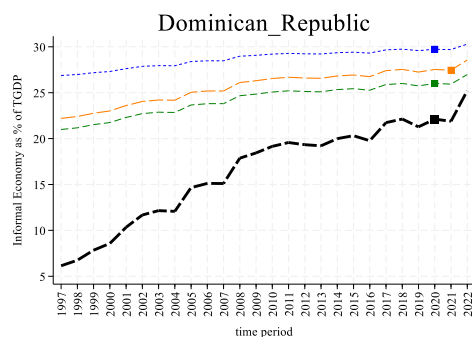
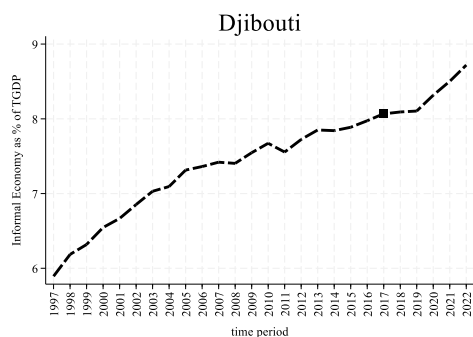
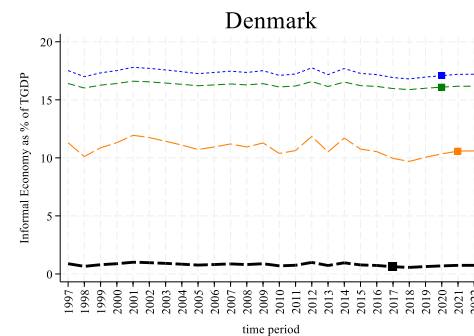
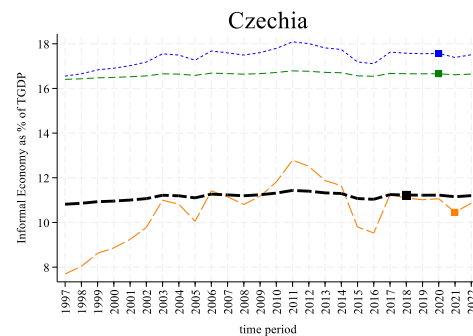
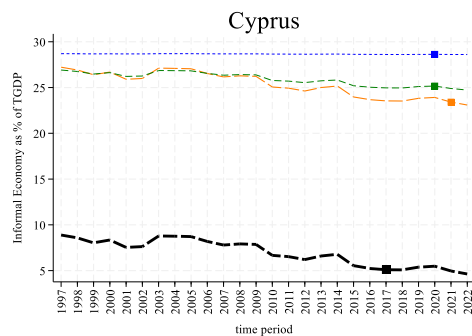
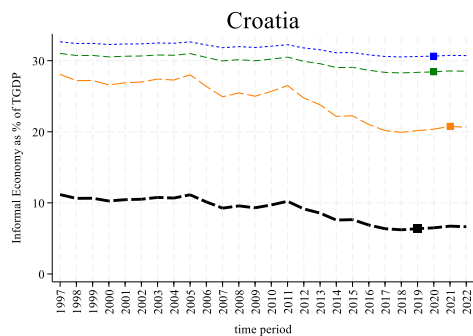
Note: * indicates a country not included in the Medina and Schneider (2021) sample. Consequently, without exogenous estimates of the informal economy (IE), it is not possible to calibrate the estimates.

APPENDIX D – GRAPHICAL COMPARISON AMONG ESTIMATES BASED ON DIFFERENT EXOGENOUS SOURCES FOR CALIBRATION

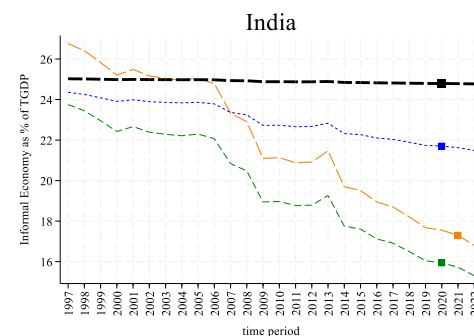
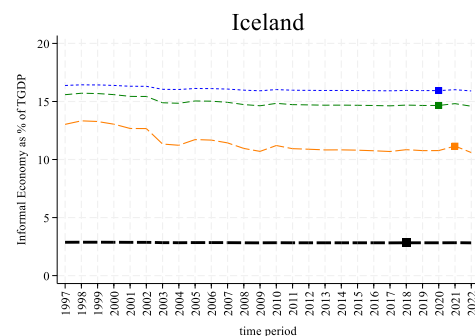
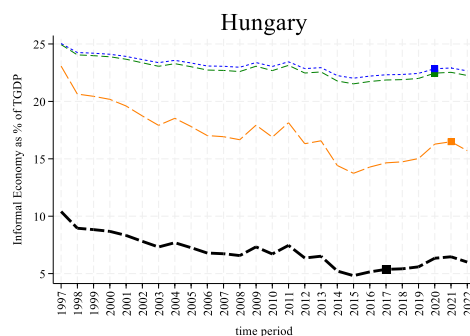
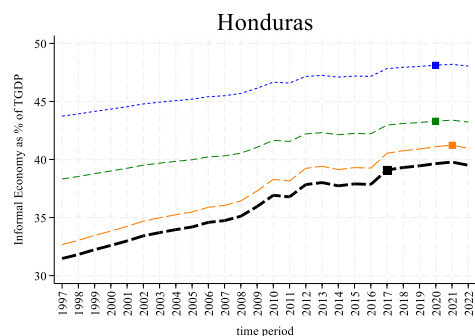
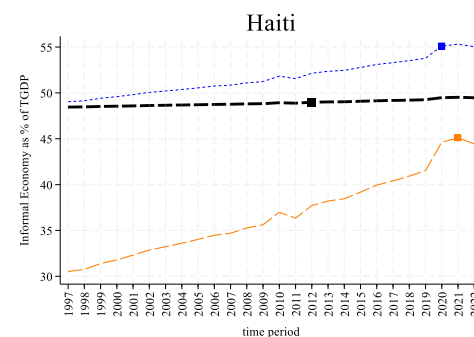
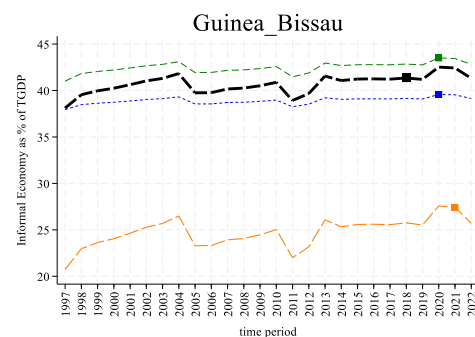
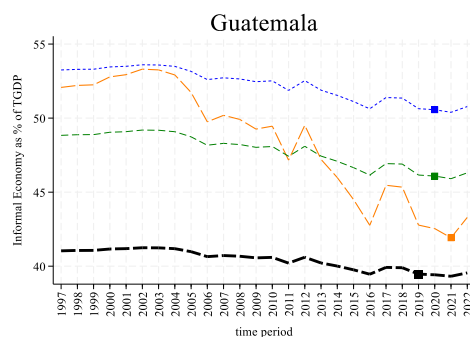
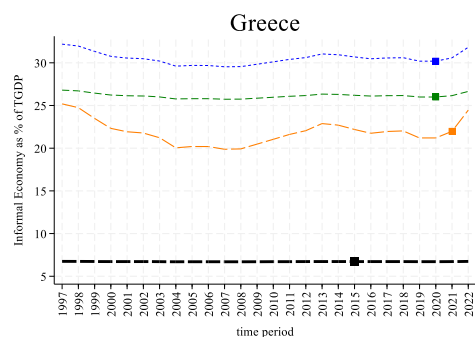
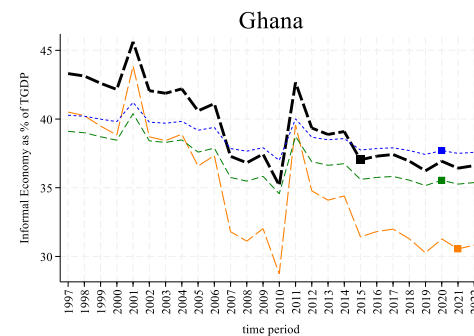
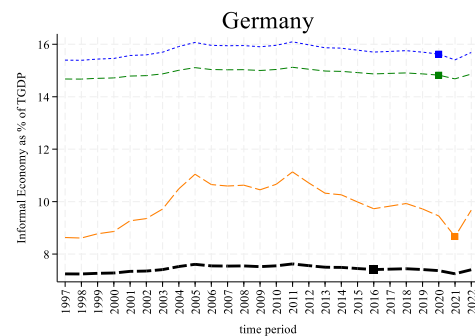
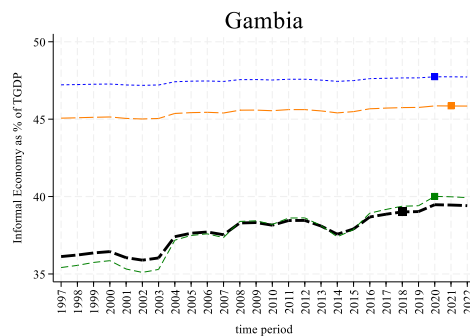
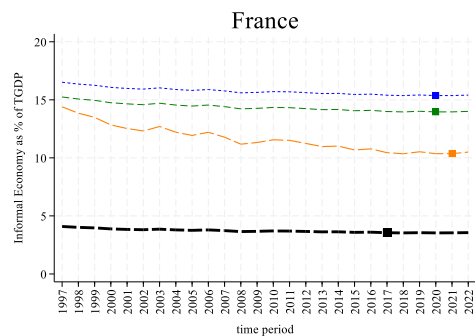




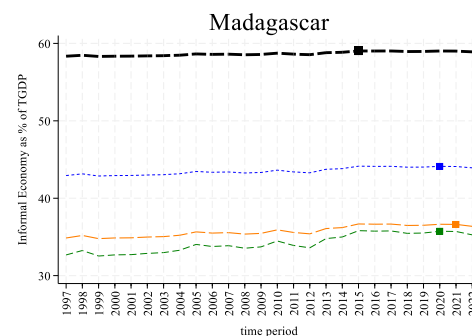
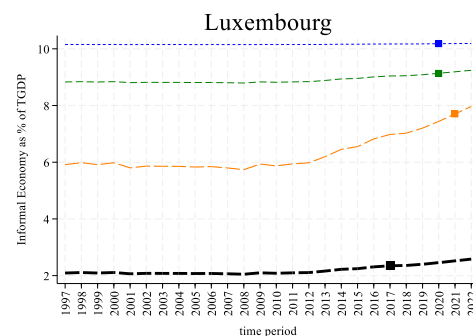
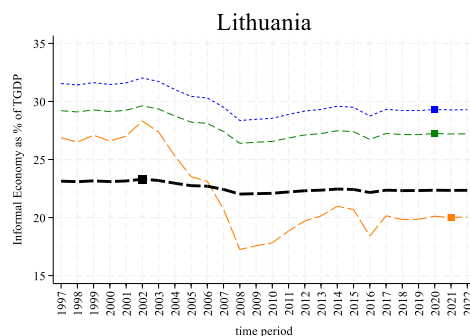
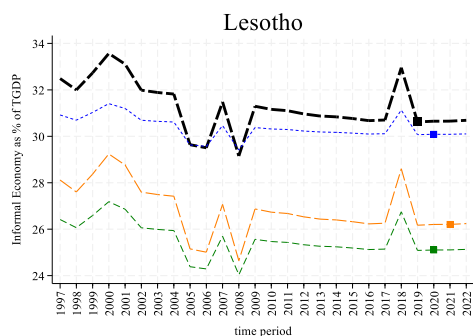
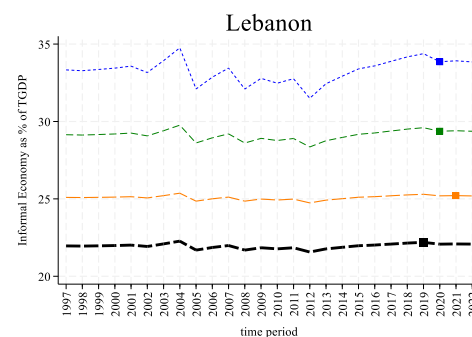
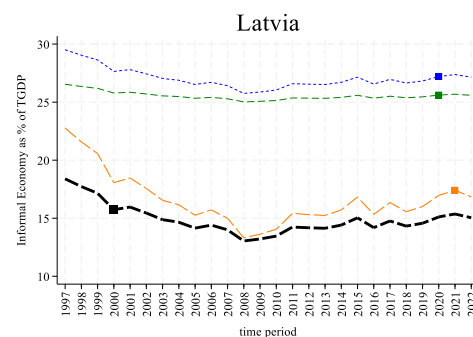
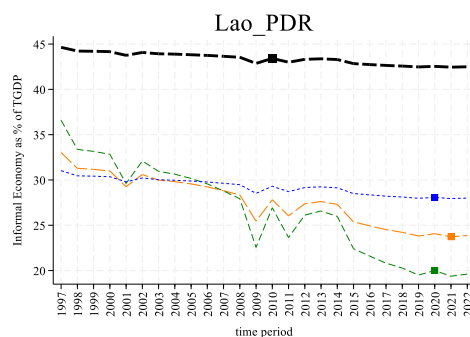
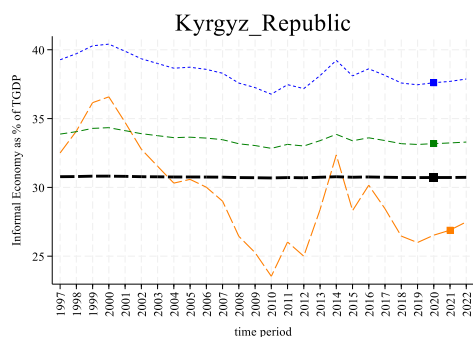
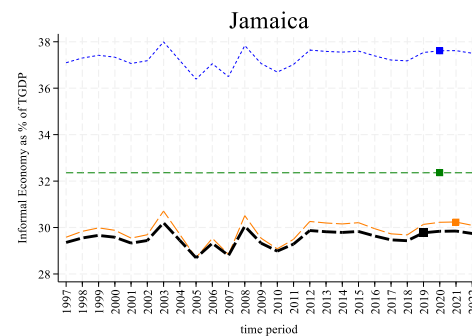
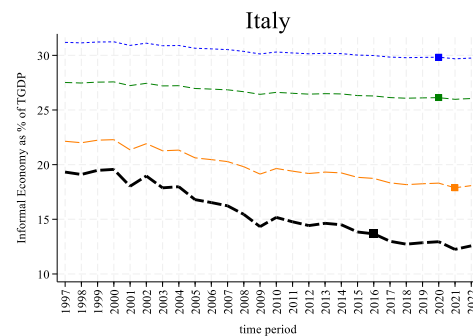
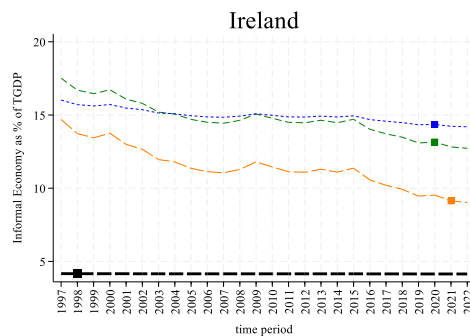
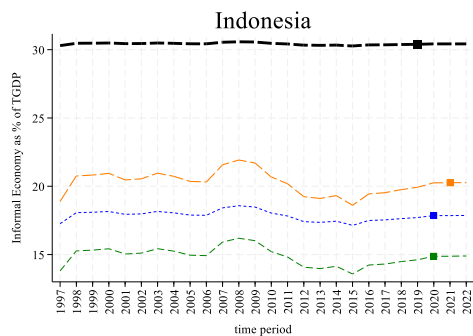
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 - - Proj(NA & ILO)
 - - Elgin et al. (DGE)
 - - - - Elgin et al. (MIMIC)



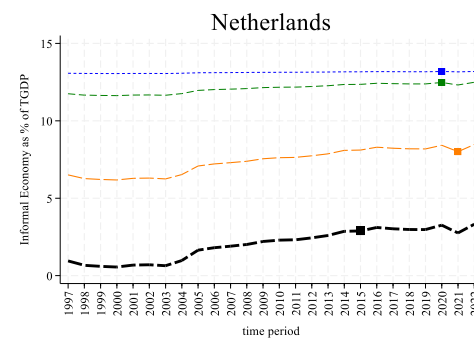
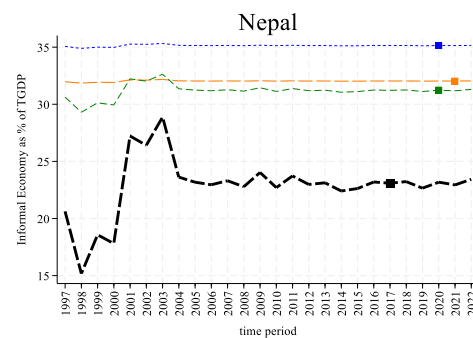
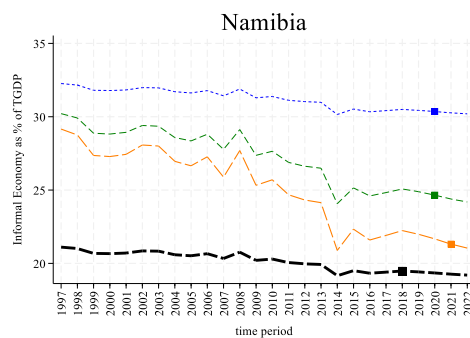
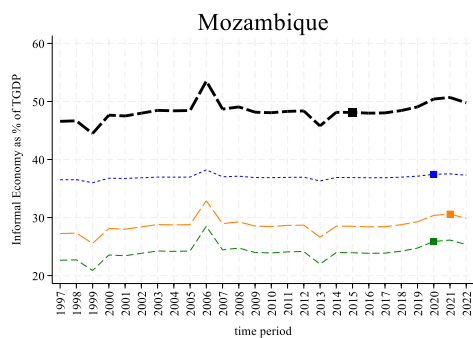
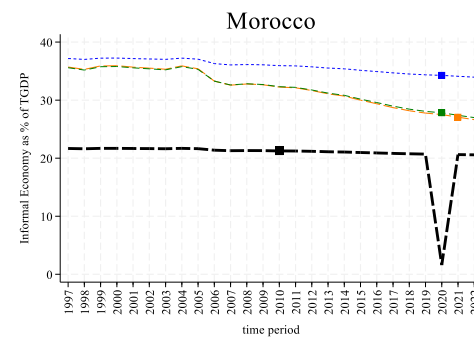
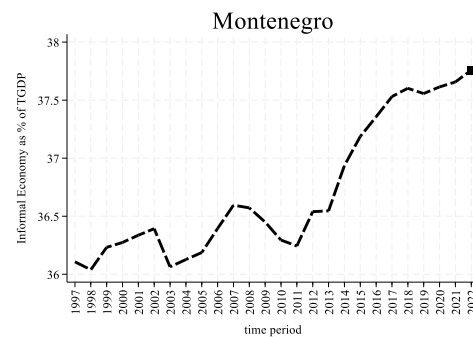
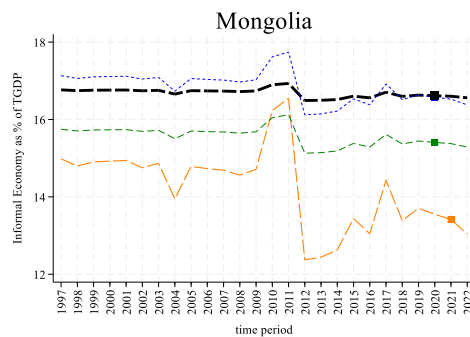
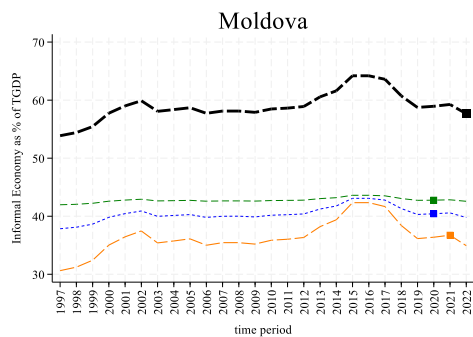
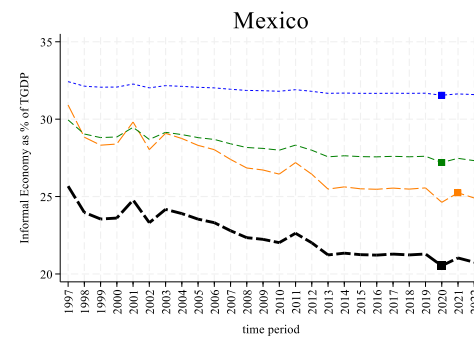
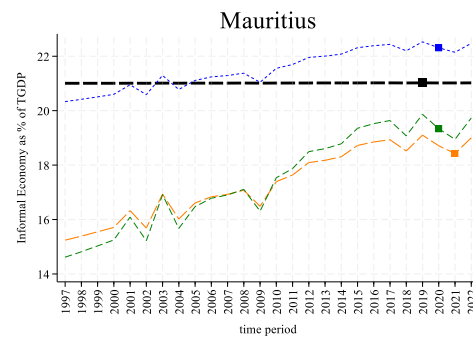
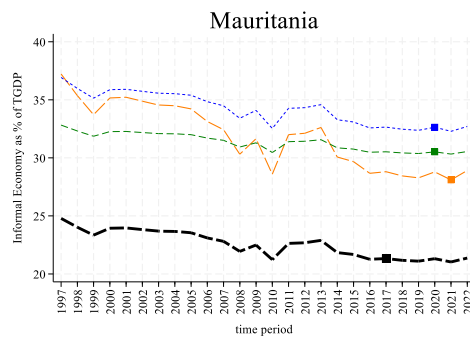
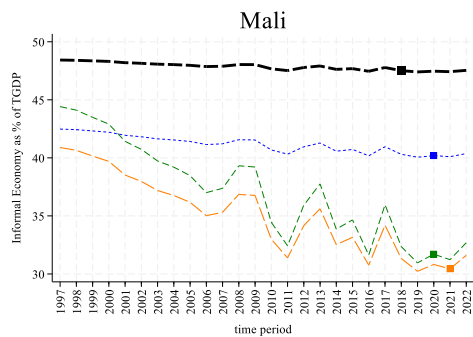
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 —■— Proj(NA & ILO)
 —■— Elgin et al. (DGE)
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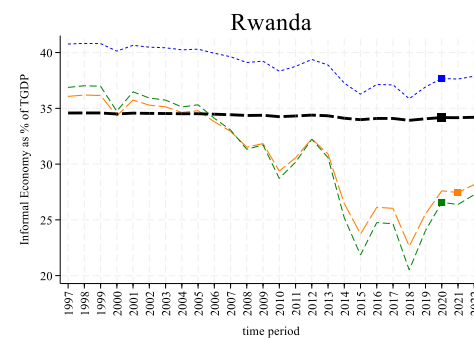
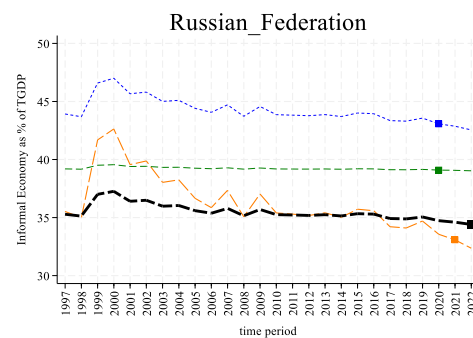
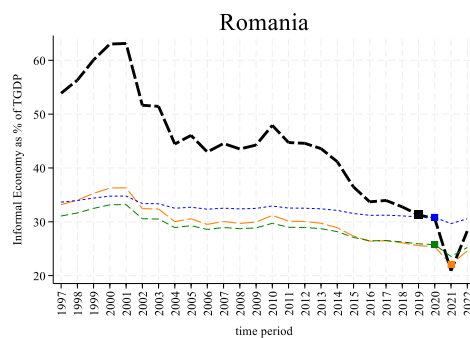
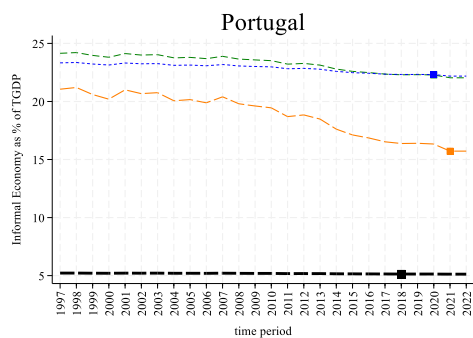
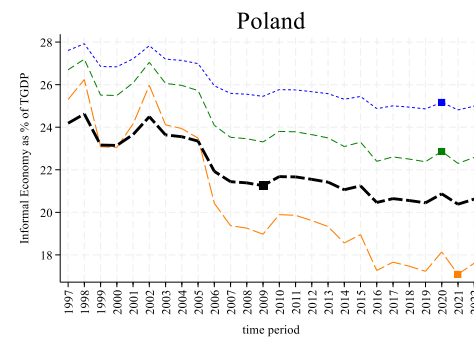
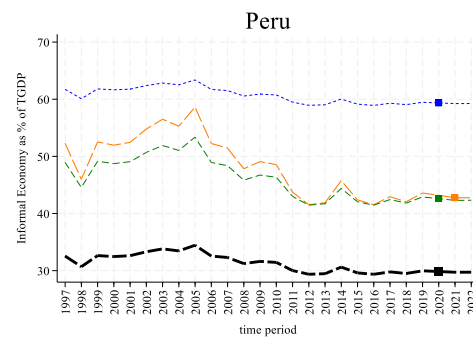
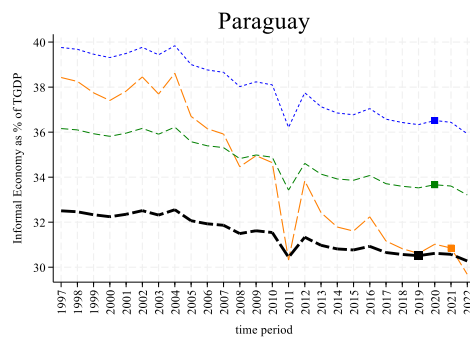
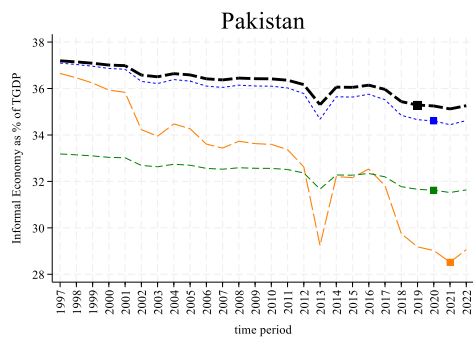
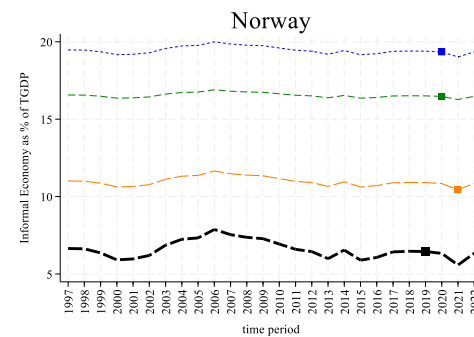
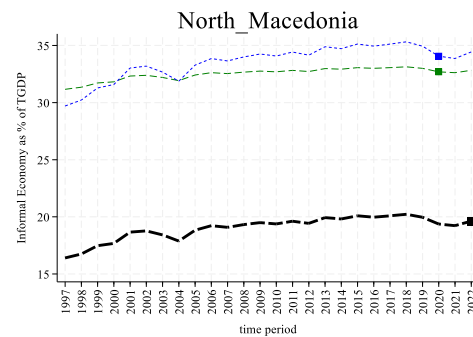
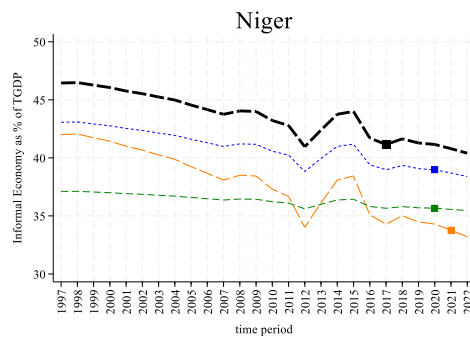
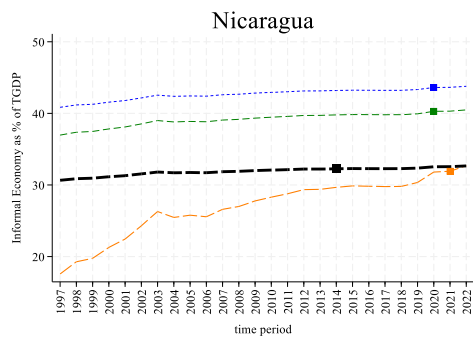
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 —■— Elgin et al. (MIMIC)



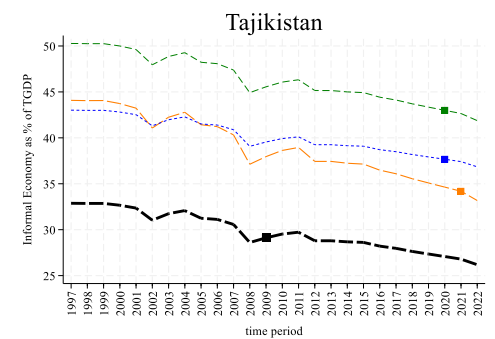
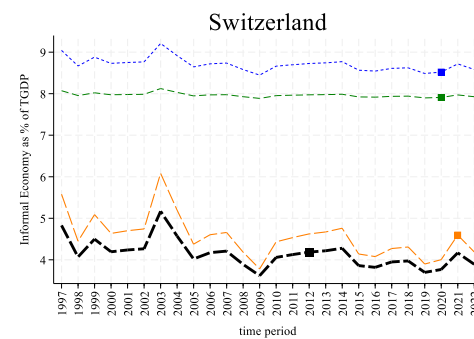
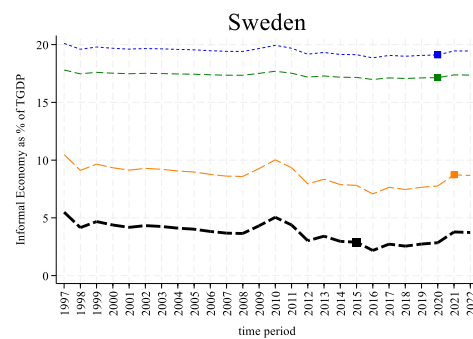
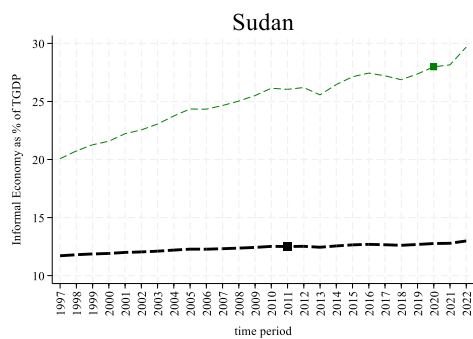
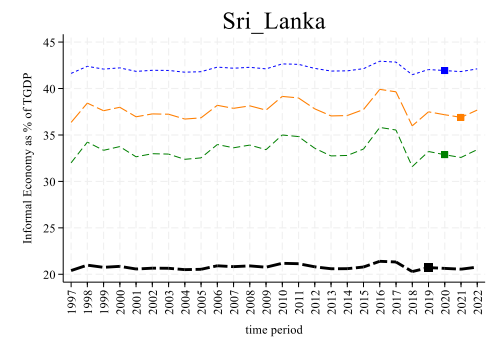
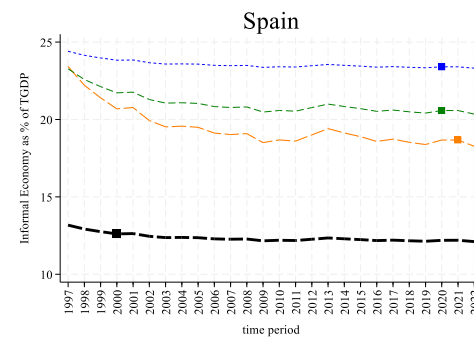
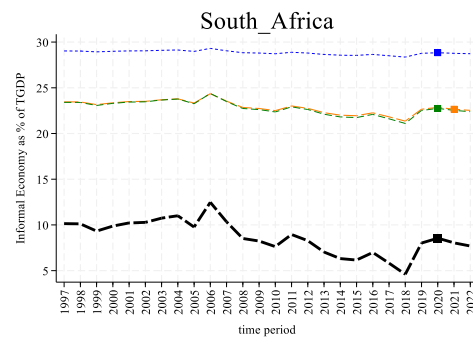
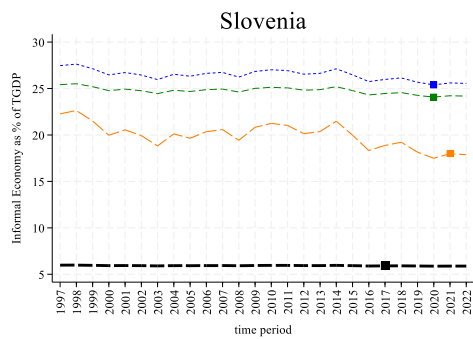
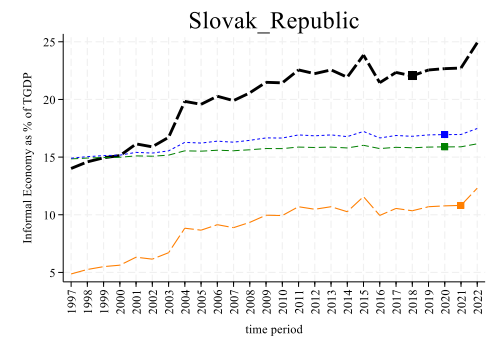
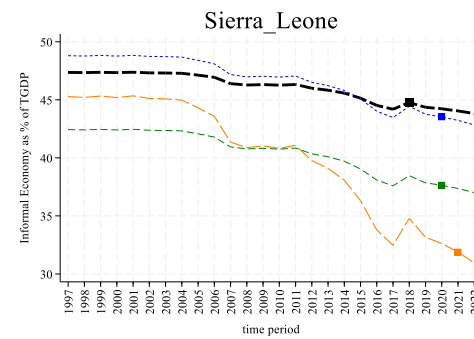
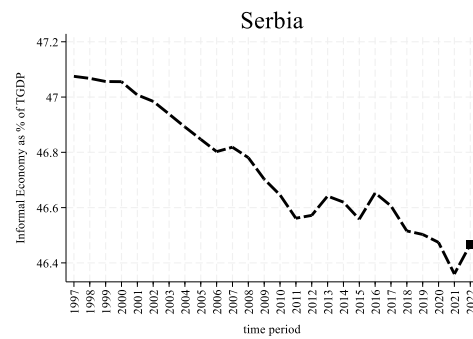
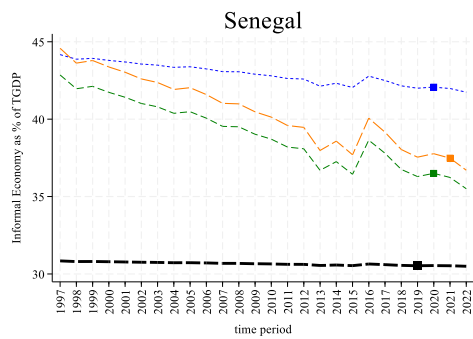
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 — Proj(NA & ILO)
 - - Elgin et al. (DGE)
 - - Elgin et al. (MIMIC)



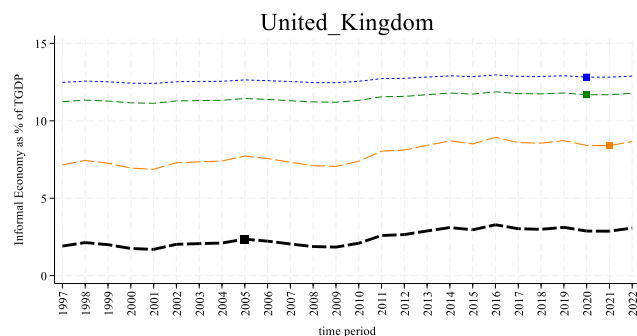
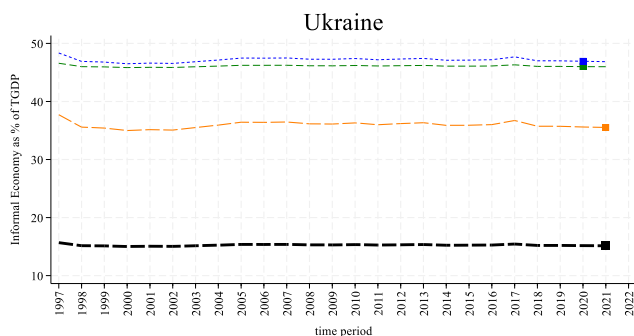
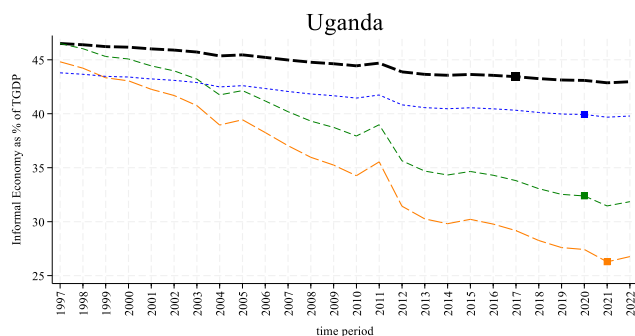
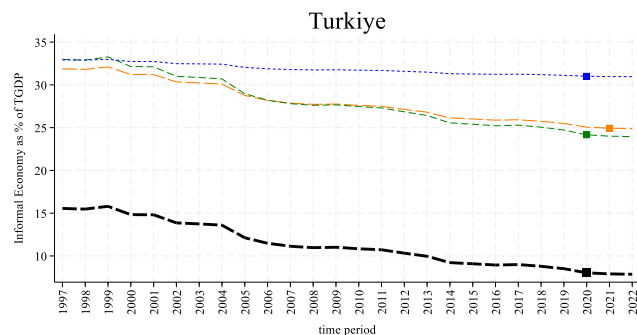
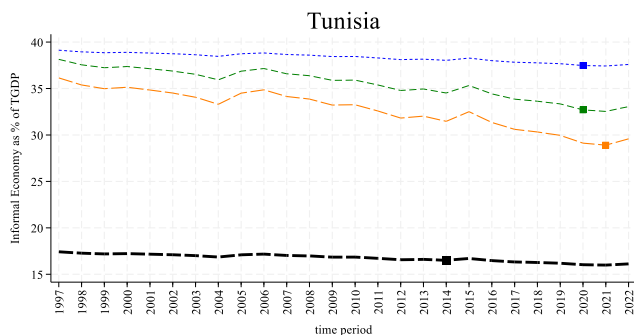
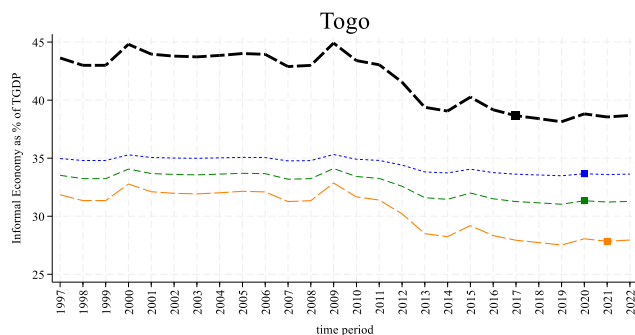
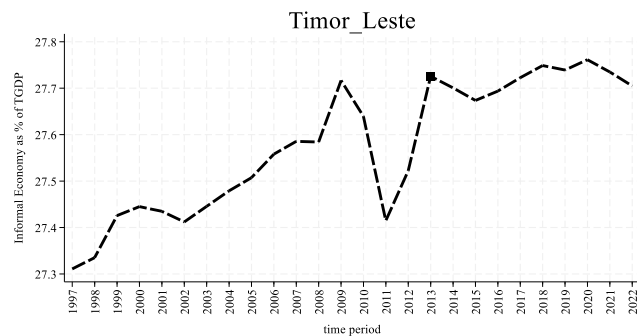
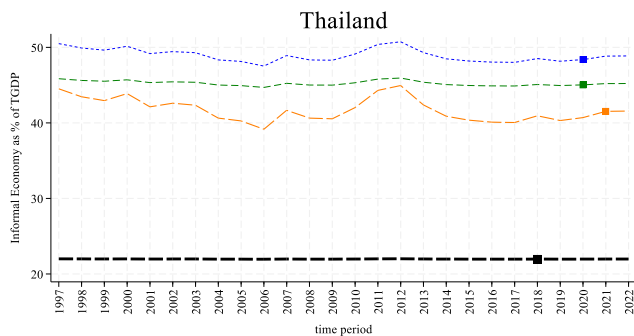
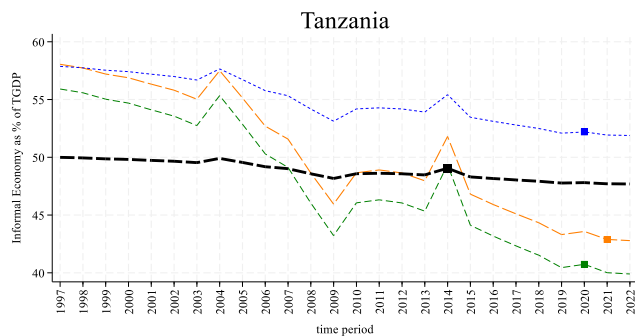
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 - - Elgin et al. (DGE)
 - - Elgin et al. (MIMIC)



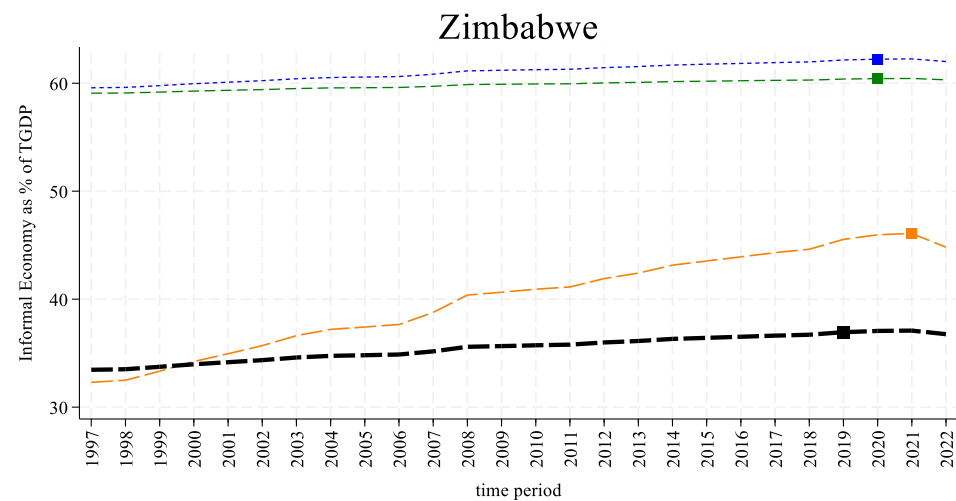
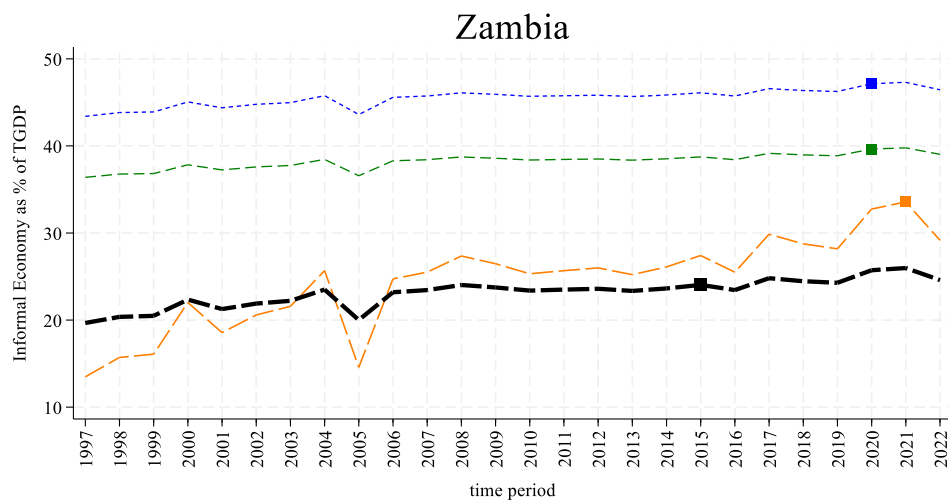
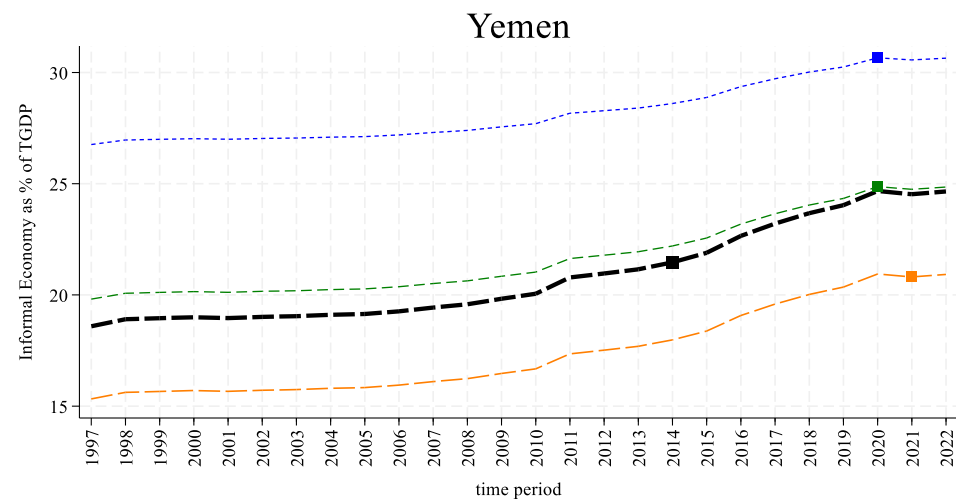
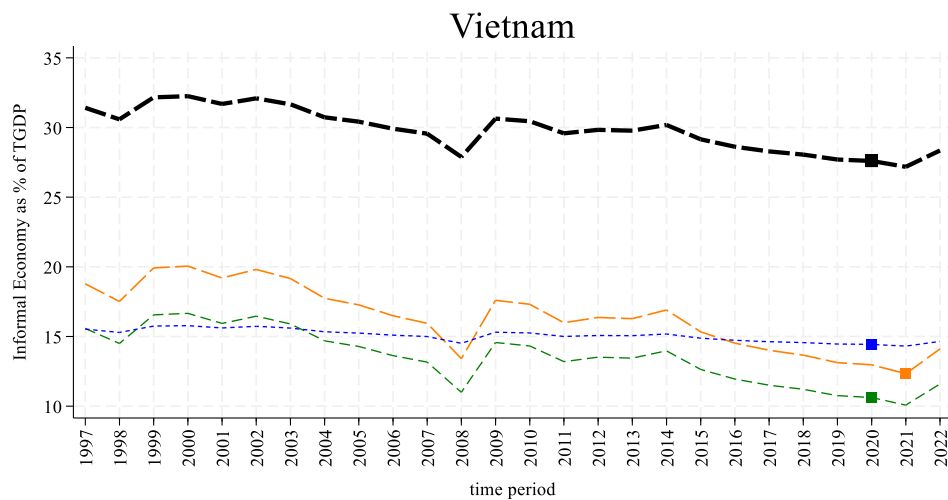
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 - - -■- Elgin et al. (DGE)
 - - -■- Elgin et al. (MIMIC)



— Med & Schn. (MIMIC).
 — Proj(NA & ILO)
 — Elgin et al. (DGE)
 — Elgin et al. (MIMIC)



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— — Med & Schn. (MIMIC).
 — — Proj(NA & ILO)
 — — Elgin et al. (DGE)
 - - - - Elgin et al. (MIMIC)

APPENDIX E – REFERENCE INDICATOR ESTIMATES BASED ON NA AND ILO PROJECTIONS

id	country	High	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
3	Angola	0	36.04	34.53	33.05	31.61	30.20	28.79	27.47	25.85	24.87	24.97	25.13	25.28	26.44	25.57	25.00	26.01	26.27	26.53	26.69	26.86	27.16	27.44	27.74	28.15	28.49	29.03
4	Argentina	0	20.57	20.23	19.93	19.64	19.28	18.96	18.75	18.74	18.28	18.28	17.98	17.19	17.06	16.82	17.29	17.61	17.58	16.85	17.04	17.10	17.47	17.67	17.47	14.59	16.50	16.44
7	Austria	1	7.10	7.03	6.97	7.61	7.27	3.01	6.86	5.99	6.03	7.20	4.09	7.30	3.17	3.06	3.82	2.89	3.93	3.28	2.52	3.47	3.77	4.06	3.83	5.24	3.16	2.71
11	Bangladesh	0	31.69	33.11	34.45	35.70	36.50	36.81	36.98	37.09	37.19	37.16	36.94	37.03	36.72	37.30	36.88	36.80	36.04	36.64	36.53	36.40	36.70	36.27	36.15	35.96	35.94	35.84
13	Belarus	0*	35.83	35.85	35.83	35.89	35.99	36.17	36.32	36.42	36.55	36.63	36.67	36.76	36.87	37.02	37.22	37.31	37.34	37.40	37.46	37.62	37.89	38.05	38.11	38.33	38.71	39.32
14	Belgium	1	6.88	6.95	6.94	9.95	8.26	3.46	6.71	7.95	6.88	7.54	4.42	7.54	6.25	6.55	6.31	5.71	7.03	6.40	6.15	5.56	6.14	6.38	6.63	8.07	6.09	5.28
16	Benin	0	71.98	71.26	70.41	69.52	68.62	67.51	66.00	64.49	62.92	61.64	59.72	58.24	56.66	55.09	53.51	51.94	50.37	48.77	47.19	45.55	43.90	42.20	40.47	38.69	36.89	35.10
18	Bolivia	0	43.88	43.29	44.89	35.72	37.63	38.85	41.07	40.83	45.84	47.46	40.44	41.46	40.74	39.14	40.51	37.95	37.08	40.63	37.40	33.65	35.67	38.15	40.01	38.31	38.14	38.20
19	Bosnia and Herzeg.	0*	26.13	24.89	25.63	25.03	25.39	24.50	24.14	22.57	24.28	23.93	22.83	22.92	22.88	23.06	23.27	23.05	24.66	24.71	24.66	24.73	24.98	25.25	25.10	25.27	25.53	27.01
20	Botswana	0	11.42	11.61	11.85	12.11	12.38	13.84	15.40	17.09	18.87	20.69	18.69	16.69	14.75	12.87	11.08	11.12	11.60	12.15	12.70	13.36	14.03	14.69	15.03	16.44	16.79	17.72
21	Brazil	0	24.53	22.81	21.11	19.50	19.09	18.78	18.47	18.22	18.02	17.84	17.64	17.51	18.27	17.23	16.52	16.64	16.36	16.91	16.80	16.38	16.73	17.07	17.54	15.47	16.28	16.34
23	Bulgaria	0*	28.94	28.98	28.94	28.95	30.49	30.72	29.60	29.65	29.87	30.00	30.07	30.01	29.93	29.93	29.91	29.86	29.81	29.79	29.90	30.02	30.12	30.20	30.29	30.26	30.52	35.12
24	Burkina Faso	0	58.50	57.60	56.81	55.78	54.69	53.50	52.27	50.94	49.58	48.12	47.15	46.54	45.94	45.35	44.72	44.08	43.41	42.59	41.83	40.95	40.10	39.19	38.25	37.28	36.36	35.37
25	Burundi	0	9.71	13.68	17.58	19.89	22.51	25.85	28.33	31.59	34.46	36.90	39.50	42.08	44.97	48.40	49.65	51.75	54.37	56.53	58.99	59.74	62.60	64.88	67.83	69.69	71.66	73.71
26	Cambodia	0	43.78	43.65	44.43	45.10	45.87	46.67	47.48	48.26	49.06	49.83	50.65	51.30	51.11	50.99	50.95	50.99	50.98	50.83	50.73	50.48	50.21	49.82	49.38	48.87	48.56	48.07
27	Cameroon	0	56.65	55.99	55.39	54.75	54.10	53.45	52.86	52.19	51.53	50.83	50.14	49.56	48.91	48.25	47.56	46.85	46.18	45.45	45.11	44.34	43.65	42.82	42.21	41.47	40.75	40.08
28	Canada	1	2.77	2.99	3.17	3.31	3.68	3.81	3.46	3.39	3.39	3.50	3.73	4.15	4.85	4.81	4.36	4.57	4.45	4.37	3.26	4.13	4.11	4.52	4.77	4.66	2.26	5.86
30	Chad	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.31	4.77	7.50	10.85	13.93	17.51	20.62	23.80	27.03	29.94	33.12	35.92	38.36	41.39	44.03	46.83	49.14	51.64	54.06
32	China	0	29.97	29.84	29.63	29.39	28.44	27.09	25.69	24.26	22.82	21.46	20.14	18.84	17.51	16.16	15.13	14.29	13.29	12.26	11.23	10.27	9.40	8.45	7.64	6.91	6.32	5.90
33	Colombia	0	31.67	31.20	30.75	30.30	29.88	29.48	29.11	28.71	28.43	28.01	25.66	25.84	27.67	27.80	27.49	28.12	27.16	26.40	26.48	25.72	25.48	25.48	24.96	26.02	25.66	25.82
34	Comoros	0	28.67	29.34	30.04	30.53	31.29	32.01	32.69	33.34	34.01	34.66	35.20	35.71	36.17	36.59	36.95	37.23	37.43	37.59	37.65	37.65	37.63	37.35	37.14	36.84	36.55	36.14
35	Congo, Dem. Rep.	0	75.52	73.72	72.38	70.44	68.47	66.56	64.52	62.39	60.49	58.50	56.49	54.40	52.29	50.13	48.04	45.90	43.53	41.34	38.91	36.52	34.24	31.71	29.17	26.63	24.20	21.65
36	Congo, Rep.	0	0.00	0.00	0.00	0.56	4.15	4.47	5.89	8.54	10.35	12.45	14.28	16.19	17.44	20.72	21.49	23.20	24.49	26.21	27.94	29.68	31.44	33.22	34.93	36.67	38.46	40.20
37	Costa Rica	0	27.54	27.61	27.66	27.67	25.98	24.33	22.86	21.38	20.15	18.89	17.83	16.79	15.82	12.72	11.89	13.75	14.40	14.66	14.83	13.45	13.82	13.93	14.38	11.65	15.73	16.72
38	Cote d'Ivoire	0	42.30	42.17	41.84	41.30	40.92	40.55	40.19	39.83	39.49	39.15	38.82	38.50	38.21	37.93	37.65	37.00	37.02	36.74	36.78	38.20	34.71	35.66	35.19	34.69	34.16	33.59
39	Croatia	1	17.86	17.19	16.75	16.48	19.64	15.98	15.39	14.84	14.05	13.66	13.24	15.15	11.00	10.78	11.11	7.82	8.08	6.72	7.37	7.56	6.91	6.47	6.36	6.07	7.33	4.08
41	Cyprus	1	14.41	14.09	13.80	14.90	13.50	8.34	13.50	14.62	15.32	13.44	9.41	13.07	7.67	5.75	3.70	0.98	2.86	3.92	5.24	5.84	5.10	5.12	5.19	7.39	2.70	2.82
42	Czechia	1	11.63	11.48	11.38	11.11	11.52	6.74	12.45	12.79	13.25	13.55	9.48	14.01	10.28	11.46	11.74	9.83	11.54	11.09	11.64	10.64	11.63	11.23	10.77	10.96	13.55	12.35
43	Denmark	1	5.10	4.89	4.67	6.15	4.51	0.00	4.27	5.22	5.30	5.15	0.63	4.10	1.17	2.19	1.61	0.95	1.96	1.63	0.97	1.21	0.62	0.30	1.27	4.30	0.53	0.00
44	Djibouti	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	5.08	8.07	11.02	13.93	16.75	19.52	22.32
45	Dominican Republic	0	31.92	32.12	32.37	35.29	33.19	34.26	32.78	33.03	26.61	25.21	21.99	22.83	21.65	21.45	22.99	23.19	22.23	21.44	22.87	22.98	23.61	23.68	22.82	22.12	24.61	25.63
46	Ecuador	0	39.83	38.05	36.25	34.45	31.62	31.68	32.81	31.78	31.59	32.09	29.11	27.99	26.16	25.35	23.33	22.38	21.96	21.18	23.17	23.62	25.64	25.40	26.04	21.34	20.47	20.03
47	Egypt, Arab Rep.	0	20.15	20.03	19.91	19.71	19.63	19.38	19.19	18.91	18.78	18.61	18.52	18.26	18.35	19.54	19.72	19.28	19.94	20.02	20.14	20.89	20.89	19.61	19.16	20.23	19.27	18.79
48	El Salvador	0	38.26	36.12	36.45	36.75	36.99	37.24	37.57	37.87	38.14	38.56	38.71	38.16	37.33	36.56	35.82	35.13	34.49	33.36	33.10	33.28	33.26	32.08	32.71	30.34	31.81	31.90
51	Estonia	1	4.63	4.65	4.32	6.87	4.22	0.00	4.15	4.05	4.34	4.89	2.34	4.96	1.77	6.28	8.74	5.70	5.88	5.02	5.10	5.16	5.80	4.54	5.46	6.41	6.34	5.10
52	Eswatini	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	3.41	6.35	9.28	12.18	15.04	17.88	20.68	23.46	26.07	28.84	31.34
54	Finland	1	5.53	5.34	5.31	8.36	6.16	1.49	5.24	5.66	4.69	5.54	2.51	4.80	0.39	3.35	2.62	0.39	1.74	2.07	1.88	2.93	3.01	2.44	2.88	3.84	1.09	0.76
55	France	1	4.09	4.12	4.04	5.97	4.68	0.00	4.05	5.12	4.81	5.54	2.14	5.96	2.84	3.47	3.79	2.64	3.97	3.32	2.82	3.10	3.55	3.81	4.32	3.76	3.48	3.56
57	Gambia, The	0	23.55	23.85	24.12	24.35	24.60	24.83	25.20	26.13	27.04	27.99	28.94	29.85	30.76	31.67	32.56	33.47	34.35	35.22	36.11	37.04	38.01	39.01	40.08	41.15	42.32	43.53
59	Germany	1	4.62	4.56	4.39	4.20	4.11	4.07	4.13	4.15	4.17	4.30	4.39	4.50	4.60	4.56	5.99	4.24	4.14	3.97	3.56	3.58	3.83	3.70	3.61	3.59	3.52	2.20
60	Ghana	0	50.91	50.31	49.61	49.01	48.62	48.29	47.85	47.32	46.91	44.90	45.93	45.46	45.01	44.57	44.11	43.72	50.11	42.80	37.03	41.84	41.37	40.91	40.54	40.14	39.80	39.44
61	Greece	1	8.04	7.96	8.03	7.79	7.68	7.69	7.68	7.87	7.77	7.70	7.76	7.80	7.77	7.83	8.00	8.18	8.27	8.34	8.53	8.53	8.46	8.56	8.68	8.90	9.27	9.23
62	Guatemala	0	41.98	41.85	41.74	41.75	41.51	41.20	41.22	41.51	40.87	40.52	40.74	40.69	40.64	39.50	40.19	43.67	39.21	38.52	39.45	40.02	40.77	40.86	39.46	38.70	38.11	37.65
64	Guinea-Bissau	0	0.00	0.65	2.72	4.89	7.07	9.21	11.35	13.																		

73	Ireland	1	4.94	4.92	5.27	5.53	5.80	5.43	5.38	6.03	6.50	7.56	6.39	4.20	3.15	3.11	3.22	3.38	3.70	4.09	4.46	4.55	5.04	5.11	4.82	4.46	4.52	4.23
75	Italy	1	21.35	20.87	20.44	21.01	20.23	14.27	20.11	20.56	19.89	21.03	16.05	20.16	15.48	16.04	15.33	13.22	14.38	13.43	13.52	13.67	13.16	13.20	13.87	13.20	12.29	12.00
76	Jamaica	0	13.42	14.08	14.70	15.24	15.85	16.77	17.69	18.60	19.56	20.43	21.37	22.12	22.95	23.82	24.80	25.68	26.46	27.13	27.78	28.29	29.00	29.22	29.77	30.09	30.65	30.78
83	Kyrgyz Republic	0	15.00	16.81	18.31	18.89	19.38	20.11	20.89	21.90	22.73	23.50	24.44	25.10	26.14	27.21	27.73	28.73	29.69	29.56	29.94	30.07	30.06	28.73	30.09	30.72	29.04	28.56
84	Lao PDR	0	38.59	38.46	38.41	38.20	37.93	37.53	37.04	36.44	36.41	38.01	39.44	40.79	42.12	43.42	44.71	45.95	47.17	48.38	49.55	50.87	52.08	53.24	54.38	55.48	56.55	57.62
85	Latvia	1	5.34	5.26	5.03	5.22	5.32	5.10	4.86	4.89	5.05	4.77	4.62	4.79	5.10	5.41	5.13	4.58	4.37	4.18	3.95	3.96	3.99	3.95	3.84	3.75	3.83	2.86
86	Lebanon	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	4.35	7.97	17.72	16.47	14.13	16.83	19.52	22.19	24.48	28.38	31.07
87	Lesotho	0	0.00	0.00	0.00	0.00	0.00	0.00	1.23	2.53	3.79	5.23	7.36	9.11	10.97	12.61	14.33	16.47	18.60	20.69	22.74	24.80	26.80	28.75	30.62	32.44	34.18	35.86
90	Lithuania	1	5.02	4.66	4.13	3.87	3.69	3.35	3.10	3.29	3.71	3.62	3.45	3.57	3.60	4.42	4.57	3.78	3.48	3.38	3.48	3.79	3.96	3.67	3.14	2.88	2.71	1.59
91	Luxembourg	1	3.93	3.67	3.98	5.78	3.72	0.00	4.42	5.63	5.59	6.29	5.23	4.37	2.06	3.06	0.30	1.48	2.27	1.40	2.49	3.66	2.35	2.62	2.65	5.31	0.73	0.00
92	Madagascar	0	53.54	54.76	55.95	57.12	58.30	59.15	60.01	61.10	61.03	60.94	60.83	60.67	60.50	60.27	60.07	59.84	59.57	59.30	59.03	58.80	58.55	58.25	57.95	57.61	57.26	56.94
96	Mali	0	53.67	54.43	54.65	54.72	54.70	54.66	54.56	54.39	54.21	53.90	53.58	53.21	52.83	52.43	52.05	51.68	48.25	51.90	52.42	51.28	49.69	47.51	48.80	48.29	48.02	47.72
98	Mauritania	0	16.77	20.46	23.61	26.93	27.88	27.14	26.84	26.51	26.21	25.92	25.56	25.18	24.91	24.55	24.19	23.77	23.32	22.49	22.06	21.68	21.32	21.03	20.78	20.56	20.43	20.38
99	Mauritius	0	19.71	19.65	20.13	19.99	19.94	19.96	20.07	20.22	20.31	20.31	20.41	20.45	20.49	20.59	20.68	20.51	20.84	21.94	21.37	20.90	20.58	20.78	21.02	20.35	20.19	19.37
100	Mexico	0	27.13	27.11	27.06	26.98	26.64	26.33	26.69	26.38	25.54	25.27	25.02	23.80	23.70	23.72	24.03	24.09	24.13	23.42	23.63	23.44	23.35	23.27	23.74	20.53	21.75	21.72
101	Moldova	0*	24.35	23.23	22.41	21.88	21.21	20.67	19.95	20.26	19.10	17.41	16.91	16.65	16.24	14.53	14.19	13.69	13.51	14.96	15.82	16.46	17.43	18.01	18.40	18.98	18.66	57.67
102	Mongolia	0	56.25	56.39	56.58	54.84	50.90	47.06	43.25	39.48	35.78	32.20	28.74	25.33	22.02	16.73	18.58	19.45	19.08	16.70	17.61	17.14	17.53	17.45	16.82	16.61	15.97	15.42
103	Montenegro	0*	34.09	34.43	34.77	34.60	34.99	35.44	35.77	36.58	36.60	36.49	36.40	36.32	36.30	36.77	37.52	37.36	37.27	36.80	36.63	36.59	36.65	36.68	36.94	37.07	37.71	37.76
104	Morocco	0	0.00	0.00	1.33	3.53	5.75	8.00	10.24	12.36	13.99	15.62	17.02	18.39	19.81	21.26	22.68	24.15	25.58	26.99	28.43	29.84	31.35	32.81	34.26	35.64	37.20	38.71
105	Mozambique	0	7.05	9.34	12.19	15.01	17.86	20.68	23.52	26.30	29.10	31.84	34.65	36.51	38.24	39.94	41.68	43.35	44.99	46.56	48.11	49.66	51.35	52.76	54.20	55.64	57.07	58.38
107	Namibia	0	0.00	0.00	1.36	3.90	6.36	7.58	8.50	9.44	10.50	11.56	12.61	13.68	14.70	15.67	16.56	16.04	19.00	17.64	19.74	24.66	21.24	19.48	22.79	23.66	24.59	25.46
108	Nepal	0	45.79	44.18	42.49	40.74	38.90	38.00	37.11	36.20	35.21	34.20	33.15	32.15	31.15	30.15	29.20	28.09	27.02	25.95	24.95	23.98	23.10	21.92	20.69	19.29	18.74	17.51
109	Netherlands	1	4.39	4.28	4.13	6.33	5.31	0.00	3.87	4.75	5.10	6.41	3.24	7.50	3.91	4.12	4.58	2.75	3.40	3.41	2.89	3.48	3.87	3.74	3.21	4.50	2.39	1.44
111	Nicaragua	0	59.49	57.86	56.28	54.75	53.16	51.55	49.96	48.40	46.82	45.30	43.66	42.02	40.39	38.79	37.17	35.55	33.91	32.26	30.62	28.97	27.26	25.50	23.69	21.71	19.85	17.92
112	Niger	0	82.70	80.39	78.14	75.81	73.57	71.59	69.62	67.66	65.71	63.74	61.76	59.80	57.82	55.85	53.86	51.90	49.84	47.59	45.48	43.37	41.15	38.80	36.46	33.96	31.47	28.94
114	North Macedonia	0*	21.99	21.38	21.66	21.39	21.16	20.92	20.09	20.01	19.54	19.41	19.32	19.05	18.92	18.77	18.68	18.62	18.37	18.37	18.39	18.59	18.63	18.66	18.85	19.37	19.62	19.62
115	Norway	1	4.06	4.38	4.86	5.35	5.18	0.00	4.13	6.12	7.24	7.73	4.45	8.98	6.87	6.39	7.99	8.06	8.80	7.61	6.11	5.90	6.99	6.97	6.45	7.00	7.52	8.05
117	Pakistan	0	30.83	30.82	31.03	31.20	31.75	31.96	31.67	31.87	32.17	32.40	32.95	32.74	32.37	32.95	33.71	33.57	32.94	34.23	33.59	34.54	34.43	33.96	35.29	34.57	34.69	34.59
120	Paraguay	0	43.49	41.90	40.31	38.66	36.99	35.14	34.46	33.91	33.58	33.14	32.78	32.64	32.78	31.29	30.36	33.49	30.47	29.12	29.23	30.34	29.77	30.36	30.51	28.95	28.55	28.13
121	Peru	0	47.52	46.34	45.16	43.95	42.73	41.52	40.27	39.55	35.85	36.40	36.24	36.00	36.05	36.70	36.10	34.22	33.38	33.17	33.18	32.16	32.96	33.26	33.65	29.85	31.16	30.80
123	Poland	1	19.71	20.12	20.50	23.70	20.76	15.47	22.28	24.54	23.36	24.78	21.17	25.46	21.25	21.92	24.19	20.56	20.87	24.61	23.67	23.81	24.21	25.01	25.42	24.71	25.41	44.67
124	Portugal	1	13.53	13.10	12.80	12.16	12.43	6.99	10.97	11.63	11.68	11.48	8.08	12.48	7.68	7.49	4.27	2.46	4.99	3.88	3.83	3.69	4.51	5.14	5.31	4.52	2.49	1.51
127	Romania	1	68.13	66.17	64.22	56.39	68.72	55.19	57.70	60.12	52.55	52.44	46.67	62.25	42.53	49.65	54.08	44.00	49.93	47.43	38.60	34.85	37.21	33.39	31.28	31.95	31.81	40.72
128	Russian Federation	0*	36.57	36.44	36.48	36.26	35.95	35.83	35.62	35.46	35.33	35.22	35.09	34.88	34.63	34.30	34.19	34.03	33.86	33.73	33.84	33.73	33.72	33.77	33.75	33.85	33.95	34.40
129	Rwanda	0	80.24	66.85	60.61	56.71	52.71	48.55	47.60	47.05	46.25	45.37	44.49	43.58	42.62	41.65	40.70	39.76	38.79	39.53	36.84	35.75	32.39	33.09	29.58	34.17	29.30	27.77
131	Senegal	0	12.93	14.41	15.94	17.50	19.05	20.62	21.69	22.34	23.00	23.67	24.29	24.89	25.52	26.13	26.71	27.29	27.86	28.39	28.77	29.95	28.37	30.80	30.53	30.89	31.18	31.44
132	Serbia	0*	46.08	46.15	46.15	46.09	45.91	45.89	45.95	46.05	46.14	46.27	46.34	46.42	46.46	46.41	46.95	46.73	46.54	46.52	46.62	46.36	46.42	46.50	46.39	46.48	46.65	46.47
133	Sierra Leone	0	11.98	13.94	15.38	16.90	20.97	24.89	24.98	26.64	27.72	28.91	29.93	31.62	33.06	34.60	35.85	37.18	38.44	39.72	40.94	42.23	43.55	44.77	45.94	47.04	48.14	49.19
135	Slovak Republic	1	25.81	25.31	24.99	24.16	26.10	21.43	28.35	29.46	24.64	26.12	20.19	27.68	15.30	17.67	14.66	14.17	16.68	16.56	17.02	19.32	20.25	22.04	21.72	25.21	18.41	34.74
136	Slovenia	1	9.80	9.53	9.04	10.31	9.31	5.33	8.90	10.35	9.09	10.38	7.32	10.05	3.80	5.56	5.63	3.32	4.64	7.03	5.31	4.89	5.91	6.19	5.84	6.62	4.76	4.50
137	South Africa	0	16.14	15.76	15.41	15.70	15.25	13.71	13.42	13.49	14.17	14.87	14.95	10.61	9.57	8.96	9.22	8.93	9.00	8.80	9.75	9.51	9.81	10.00	9.90	8.55	7.37	6.94
138	Spain	1	9.99	10.00	10.12	10.11	9.85	12.12	11.40	11.40	11.20	11.30	11.66	10.24	9.48	9.51	9.54	8.76	8.50	9.20	9.45	9.73	9.99	10.63	10.92	9.91	10.55	9.28
139	Sri Lanka	0	30.38	29.73	29.40	28.95	28.60	28.53	28.14	27.70	27.42	26.91	26.59	26.14	25.67	25.24	24.82	24.56	23.84	23.31	22.81	22.46	20.66	20.17	20.72	18.91	18.64	16.35
140	Sudan	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	3.71	6.84	9.99	12.51	15.35	18.40	21.21	24.41	26.96	29.52	32.11	34.29	36.35	40.56
142	Sweden	1	7.60	7.31	6.98	7.75	6.29																					

153	Uganda	0	56.63	55.83	55.94	55.44	55.01	54.43	54.11	53.47	52.86	52.26	51.63	50.95	50.23	49.49	48.71	47.89	47.02	46.02	45.18	44.17	43.44	42.36	41.23	40.17	38.93	37.79
154	Ukraine	0	17.31	17.21	17.38	17.20	16.91	16.94	16.94	16.39	16.19	16.11	16.02	16.01	15.85	15.64	15.51	15.63	15.33	15.33	15.25	15.09	15.01	15.00	15.04	15.03	15.15	
156	United Kingdom	1	4.93	4.91	4.86	4.87	4.85	4.89	4.87	4.83	4.78	4.75	4.71	4.71	4.70	4.60	4.55	4.55	4.54	4.40	4.33	4.28	4.30	4.31	4.28	4.38	4.71	4.58
161	Viet Nam	0	36.27	36.74	36.92	36.78	36.70	36.56	36.47	36.42	36.29	36.10	35.37	33.92	35.63	35.07	34.65	34.19	35.30	34.13	33.94	32.96	32.50	31.50	29.45	27.60	29.23	28.55
162	Yemen, Rep.	0	0.00	0.00	0.25	1.84	3.35	4.84	6.37	7.88	9.35	10.95	12.45	13.81	15.14	16.47	17.74	19.00	20.25	21.47	22.54	23.60	24.69	25.74	26.83	27.95	28.93	29.93
163	Zambia	0	0.00	0.00	0.00	0.00	0.12	2.08	3.73	5.65	7.36	9.29	10.97	12.77	14.47	16.25	17.80	19.35	20.92	22.51	24.05	25.57	27.08	28.56	29.94	31.32	32.76	34.13
164	Zimbabwe	0*	57.90	55.43	52.96	50.31	47.37	44.88	44.19	43.95	43.39	42.92	43.09	42.44	42.26	42.16	41.54	41.74	41.75	42.05	40.66	39.93	39.14	38.24	36.95	36.12	35.00	33.59

Notes: High income countries (High = 1) and Not High-income countries with “0*” are based on Dell'Anno's (2024) projections of NA estimates of NOE; Not high income (High=0) are based on ILO estimates of informal employment.