Informality in Indonesia

Levels, Trends, and Features

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Abstract

Informality is a multidimensional development challenge with features that potentially differ across workers, firms, and countries. This paper first briefly summarizes the literature, discusses the multiple existing definitions of informality, and adapts the cross-country analytical framework on informality to the context of Indonesia. It then uses several novel datasets and a range of modeling approaches to capture the levels and trends of both output and employment informality in Indonesia. It further contributes to the existing literature by estimating informality in Indonesia at the regional, provincial, and sectoral levels. Those estimates were then benchmarked to the levels, trends, and features of the informal sector in emerging markets and developing economies to examine whether the major features of the informal sector in Indonesia deviate from those observed in other emerging markets and developing economies. The paper finds that despite the declining trend, both output and employment informality remain elevated and broadly above the comparator countries in the region. Informality in Indonesia is mostly concentrated in agriculture and low-skilled services and is associated with higher poverty at the provincial level. There also appear to be productivity, education, and salary gaps between formal and informal workers. Moreover, markets are not segregated as informal firms compete strongly with formal ones. Finally, informality seems to pose macroeconomic challenges as tax efforts and financial sector depth remain below the averages for emerging markets and developing economies.

Informality in Indonesia: Levels, Trends, and Features

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Contents

1. Introduction

1. **Informality is a broad development challenge with multiple features and different layers of analysis.** Informality is associated with many development challenges, such as lower productivity firms, less protected workers, and tax leakages (Loayza 2018; Ohnsorge and Yu 2021; Ulyssea 2020). At the same time, the informal sector provides livelihoods, creativity, and buffers against shocks. The latter was exemplified by the recent shock induced by the COVID-19 pandemic. Despite the significance of informality in emerging markets and developing economies (EMDEs), it remains difficult to measure and study, mainly due to the presence of multiple definitions for informality and the lack of estimates (Elgin et al. 2021a). This is particularly the case in Indonesia where a limited number of studies have focused on the informal sector.[1]

2. **Against this backdrop, this paper uses several novel datasets and various modeling approaches to measure the extent and nature of informality in Indonesia.** It first briefly summarizes the literature, discusses the multiple existing definitions of informality, and adapts the cross-country analytical framework on informality to the context of Indonesia. It then uses several novel datasets, including an updated cross-country database on informality provided by Elgin et al. (2021a), and a range of modeling approaches to capture the levels and trends of both output and employment informality. It further contributes to the existing literature by estimating output and employment informality in Indonesia at the regional, provincial, and sectoral levels, using a series of labor force surveys (SAKERNAS surveys) provided by Badan Pusat Statistik (BPS). Those estimates were then benchmarked to the levels, trends, and features in EMDEs to examine whether the major features of the informal sector in Indonesia deviate from those in EMDEs.

3. **Despite the recent development, informality remains pervasive in Indonesia.** While being slightly lower than the average of other EMDEs, output informality in Indonesia averaged around 35 percent of GDP in the decade before 2020, slightly above the average level in East Asia and the Pacific region (EAP). Informal employment in Indonesia, amounting to more than half of total employment, is higher than the average levels in other EMDEs and the EAP region. Like in other EMDEs, Indonesia witnessed a general declining trend in both output and employment informality during the past few decades. Nevertheless, both informality indicators remain elevated and broadly above comparator countries, creating both development and policy challenges.

4. **The informal sector in Indonesia exhibits several features, some of which are commonly documented in the literature and seen in the informal sectors in other EMDEs.** First, informality in Indonesia is mostly concentrated in the agriculture and low-skilled service sectors, similar to what has been observed in other EMDEs. Second, it is associated with a higher level of poverty at the provincial level, in line with the existing literature. Combinig evidence at the macro and micro levels, there appear to be productivity, education, and salary gaps between formal and informal workers. Moreover, markets are not segregated as informal firms compete

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[1] Some of the existing literarture on Indonesia includes ADB (2010), Baddiet, Brown and Mazaheri (2015), OECD (2010), and Comola and de Mello (2011).

strongly with formal ones. Finally, informality seems to pose macroeconomic challenges as tax efforts and financial sector depth in Indonesia remain below the EMDE averages.

5.   **The paper makes several contributions to the existing literature.** It is the first study on informality in Indonesia that uses a multidimensional approach adapted to the country's specific conditions. Following Elgin et al. (2021a), the paper looks at output, employment, and firm informality, and utilizes all existing data series that can be used to capture the extent of informality in Indonesia. Second, it is the first to estimate informality for Indonesia at the regional, provincial, and sectoral levels. No existing study has attempted to understand the informal sector in Indonesia at the sub-national level. Third, it is also the first paper that utilizes the various labor force surveys (SAKERNAS surveys) to estimate both output and employment informality. Lastly, it provides a systematic examination of the features of the informal sector in Indonesia, highlighting what is also commonly seen in other EMDEs (or documented in the literature) and what is not.

6.   **The paper has limitations as many questions about the informal sector in Indonesia remain unanswered**. Limited studies have looked at the informal sector systematically in Indonesia. The existing ones tend to focus on one or two dimensions of informality. While this paper helps deepen the understanding of the informal sector in Indonesia via a multidimensional approach, it does not provide additional information on the drivers of informality, nor does it try to establish any causality relationships, nor provide policy recommendations.

7.   **The paper is divided into five sections**. Section 2 highlights the literature behind the multiple informality analytical frameworks and discusses definitions and data used in this study. Section 3 depicts the levels and trends of informality in EMDEs (as well as the EAP region) and Indonesia. Section 4 summarizes the correlates of informality documented in the literature and other EMDEs and examines whether those correlates of informality also exist in Indonesia. In particular, it highlights the policy challenges associated with informality and examines the role of informality in Indonesia during an external shock like COVID-19. Section 5 concludes.

2.   Adapting the multidimensional approach of informality analysis to Indonesia

2.1   Definitions of informality: Global versus Indonesia

8.   **The nature of informality differs across workers, firms, and countries.** Some workers and firms are "excluded" from the modern economy due to burdensome entry regulations and lack of human capital (de Soto 1989; Loayza, Oviedo, and Servén 2006). This type of informality is frequently associated with underdevelopment, low productivity, and poorly paid employment (La Porta and Shleifer 2014; Loayza 2018).[2] Other informal workers and firms voluntarily "exit" the formal sector and choose the informal sector for its flexibility, independence, and lower compliance burdens (Blanchflower, Oswald, and Stutzer 2001; Maloney 2004; Günther and Launov 2012; Falco and Haywood 2016). Both "excluded" and "exiting" types of informality could coexist in an economy (Bosh and Maloney 2008, 2010; Lehmann and Pignatti 2007;

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[2] This typically occurs in lower-income countries where the informal sector is a major source of income for low-skilled workers whose income would otherwise fall below subsistence (Docquier, Müller, and Naval 2017).

Nordman, Rakotomanana, and Roubaud 2016). As a result, the informal sector consists of both high-productive and low-productive workers and firms. While the latter stay in the informal sector out of necessity, the former join the informal sector to avoid various costs associated with "being formal". As a result, the definition of informal workers as well as informal firms is largely context and country-specific (see Annex 1 for more details).

9.   **Multiple definitions of informal workers exist for cross-country comparison.** According to the International Labour Organization (ILO), informal employment covers all workers of the informal sector and informal workers outside the informal sector (Perry et al. 2007; ILO 2018). The former comprises all persons who were employed in at least one informal firm. The latter group includes self-employed and workers not employed in formal contractual arrangements or not subject to social protection or employment benefits. In practice, the most frequently used informal employment measure is the share of self-employment in total employment (La Porta and Shleifer 2014; ILO 1993).

10.   **In the context of Indonesia, labor force surveys also provide several definitions of informal employment.** For instance, the labor force surveys (SAKERNAS surveys) carried out by Badan Pusat Statistik (BPS) report data on self-employment twice a year. BPS provides three definitions of informal employment: simplified, old, and new.[3] The simplified definition mainly reflects job-based informal employment, covering casual workers, (i.e. those without formal labor contracts), part-time workers, and unpaid household workers. Both new and old definitions use information on sectors and types of employment to classify workers, making sectoral estimates hard to interpret. While the simplified definition overlaps with self-employment, it is less linked with sectoral distribution and is preferred for the analyses in this paper (See Annex 2 for details).

11.   **From a firm's perspective, past informality studies tend to use the following three criteria to identify informal firms (ILO 2018).** First, it is not a legal entity separate from its owners, has its own complete set of accounts, and is not owned or controlled by one or a few household members. Second, it is a market enterprise that sells its goods or services. Third, it falls into one of the following categories: it keeps the number of workers employed below a threshold determined by business regulations; it is not registered; or it hired workers informally. Other studies provide an alternative definition of informal firms as a continuum depending on size, registration, accounting standards, tax payments, mobility of workplace, and access to bank credit (Benjamin and Mbaye 2012; Mbaye, Benjamin, and Gueye (2017). In firm surveys such as World Bank Informal Sector Enterprises Surveys, informal firms are typically defined as a business without the possession of a firm registration (or tax) number.

12.   **Indonesia follows the global standard in defining formal and informal businesses.** Specifically, a formal enterprise is defined as a business in possession of a firm registration number (*TDP-Tanda Daftar Perusahaan*) or firm unique ID (*NIB-Nomor Induk Berusaha*), whereas an informal enterprise is a business that does not possess either of these.

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[3] The BPS moved from the old to the new definition of informality in 2016.

13.   **A multidimensional approach to informality should be taken to have a deeper understanding of informality in Indonesia.** As summarized by Elgin et al. (2021a), there are three dimensions of informality, with most of the available data capturing the following three dimensions: output informality, employment informality, and firm/perceived level of informality.

2.2   Informality data and estimation methods description: Cross-country and Indonesia-specific databases

14.   **The paper carries out two sets of analyses.** The first set of analyses (section 3) compares the levels and trends of informality in EMDEs with those in Indonesia. The EMDE estimates are taken from a comprehensive informality database provided by Elgin et al. (2021a) and updated to 2021. The estimates for Indonesia mainly use data from the labor force surveys, referred to as SAKERNAS, which is provided by the official statistics agency BPS over the period 2000-22. In particular, estimates on output and employment informality at the regional and sectoral levels are also estimated using SAKERNAS surveys. The second set of analyses (section 4) explores policy and development challenges associated with informality across EMDEs. The findings from cross-country analyses will be compared with specific features of informality in Indonesia.

15.   **The cross-country analyses rely on one of the most comprehensive cross-country databases of informal economic activity.** The updated database (from Elgin et al 2021a) covers more than 160 economies for the period 1990-2021. The database includes model-based and survey-based measures of informality, which capture the three dimensions of informality: output informality, employment informality, and perceived level of informality. The model-based measures cover output informality (often expressed in percent of official GDP), while survey-based estimates capture employment informality (in percent of total employment) and the perceived level of informality (especially by firms and by households). Annex 3 provides a detailed description of the three dimensions of informality and their construction. In this paper, when conducting cross-country analyses, preference is given to measures that are constructed using the same statistical standard (and definition) and have better country-and-year coverage.[4]

16.   **The paper considered two model-based estimates to compute output informality and three survey-based estimates for employment informality.** First, two model-based estimates are considered for the cross-country comparisons. One is the multiple indicators multiple causes model (MIMIC), which is a type of structural equation model that takes into account both the multiple possible causes of informal activity and the outcome indicators of it. The other one is a dynamic general equilibrium model (DGE) created by Elgin and Oztunali (2012) where production in the informal sector is determined by how households optimize their labor allocation between formal and informal economies in each period and how the allocation changes over time. Both models provide estimates of informal output in percent of official GDP. Second, three survey-based informal employment measures are considered here to capture employment informality:

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[4] For instance, self-employment shares are often used as a proxy for informal employment here, given its wide country-and-year coverage and consistency across countries.

self-employment, informal employment, and employment outside the formal sector. All informal employment measures are expressed as a share of total employment.

17.   **For output informality estimates in Indonesia, the paper prefers the MIMIC-based estimates.** In the case of output informality in Indonesia, the model-based MIMIC estimates are used mainly in cross-country comparisons, while the SAKERNAS estimates are used in the within-country comparison (see below for details). The MIMIC model, detailed in Schneider et al. (2010), is estimated in the paper (see Annex 4). According to Feige (2016), one of the limitations of Schneider et al. (2010) is that the base year value used for benchmarking is taken from an unspecified currency demand model. To overcome this limitation, the paper uses SAKERNAS estimates on output informality in 2000 to re-benchmark MIMIC estimates on output informality in Indonesia. It is also worth noting that MIMIC estimates are preferred here as they seem to capture the variation of informality better than DGE estimates in the case of Indonesia, while they are highly correlated with the DGE estimates in cross-country comparisons.

18.   **SAKERNAS surveys are used to construct output and employment informality in Indonesia for national, regional, and sectoral level analyses.** These estimates are mainly used for within-country analyses. In addition to national-level estimates, output informality and employment informality are estimated for 34 provinces, 3 major sectors, and 9 subsectors over the period 2000-2022. The estimations use data on informal employment status and monthly income from Sakernas. The following equations are used to compute the share of output informality at the national (excl. i), regional (region =i), or sectoral (sector=i) level in year t:

1.   Informal output (% total GDP, simple)$_{it}$ =

$$\frac{\sum_{j=0}^{j=n_{it}} \text{informal employment status dummy}_{jit} * \text{monthly income}_{jit}}{\sum_{j=0}^{j=n_{it}} \text{employment status dummy}_{jit} * \text{monthly income}_{jit}}.$$

2.   Informal output (% total GDP, weighted)$_{it}$ =

$$\frac{\sum_{j=0}^{j=n_{it}} \text{informal employment status dummy}_{jit} * \text{monthly income}_{jit} * \text{weight}_{jit}}{\sum_{j=0}^{j=n_{it}} \text{employment status dummy}_{jit} * \text{monthly income}_{jit} * \text{weight}_{jit}}.$$

The share of informal employment at the regional (region =i) or sectoral (sector =i) level in year t is computed as follows:

3.   Informal employment (% total employment, simple)$_{it}$ =

$$\frac{\sum_{j=0}^{j=n_{it}} \text{informal employment status dummy}_{jit}}{\sum_{j=0}^{j=n_{it}} \text{employment status dummy}_{jit}}.$$

4.   Informal employment (% total employment, weighted)$_{it}$ =

$$\frac{\sum_{j=0}^{j=n_{it}} \text{informal employment status dummy}_{jit} * \textbf{weight}_{jit}}{\sum_{j=0}^{j=n_{it}} \text{employment status dummy}_{jit} * \textbf{weight}_{jit}}.$$

Here the (informal) employment status dummy equals 1 when worker j in region i (or sector i) and year t is employed (informally employed), and 0 otherwise. Weights capture the extent of representativeness of worker j in the whole sample. Both simple and weighted measures are constructed with the latter giving more weight to more representative observations in the sample. As shown above, while BPS provides three definitions of informal employment, the simplified definition is preferred for the analyses as it is less linked with Indonesia's sectoral composition. These data series are then used to show the levels, trends, and features of informality in Indonesia.

3. Levels and trends of informality: EMDEs versus Indonesia

3.1 Informality in EMDEs[5]

19. **Informal economic activity is more pervasive in EMDEs than in advanced economies (AEs).** In AEs, it accounted for less than one-fifth of official GDP and total employment in 2019, whereas about one-third of economic activities and employment in EMDEs happens in the informal sector (Elgin et al. 2021). Informality is common in all EMDE regions but takes different forms. On average, the informal economy's share of output is highest in Sub-Saharan Africa (SSA), Europe and Central Asia (ECA), and Latin America and the Caribbean (LAC). The share of self-employment, however, is highest in SSA, South Asia (SAR), and East Asia and the Pacific (EAP).

20. **The share of informal output and employment has contracted in EMDEs since the 1990s.** The downward trend is observed both in AEs and EMDEs (Ohnsorge and Yu 2022). In the case of EMDEs, the downward trend is more prominent in output informality, whereas employment informality fell more noticeably during the recent two decades than during the 1990s.

Figure 1. Informality in EMDEs

| A. Informality across EMDE regions | B. Trend of informality in EMDEs |
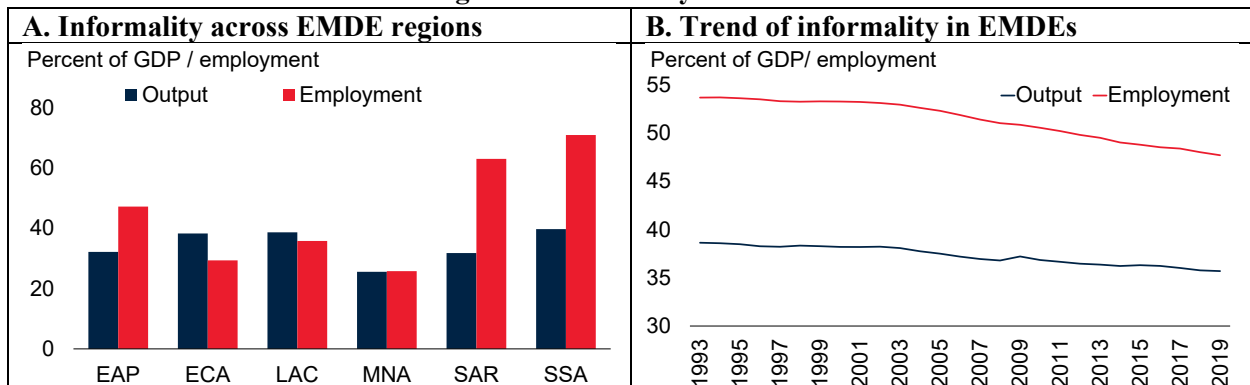
Sources: Elgin et al. (2021, updated), International Labor Organization (2023), World Bank.

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[5] In this section, output informality for EMDEs is captured by MIMIC-based estimates. The DGE-based estimates are highly positively correlated with the MIMIC-based estimates and give similar results. The discussion here is restricted to the period before 2020 to avoid the impact of COVID-19.

Notes: Informal output is based on the MIMIC model, in percent of official GDP. Informal employment is based on the share of self-employment in total employment.

A. Bars show the average share of informal output during 2011-19 (in blue; average self-employment rate in red).

B. Lines show unweighted group averages.

3.2 Informality in Indonesia

Output informality

21. **Indonesia generally exhibits lower output informality compared to the average of other EMDEs.** Output informality in Indonesia averaged around 38 percent of GDP in 2000-2007 before sliding down slightly to a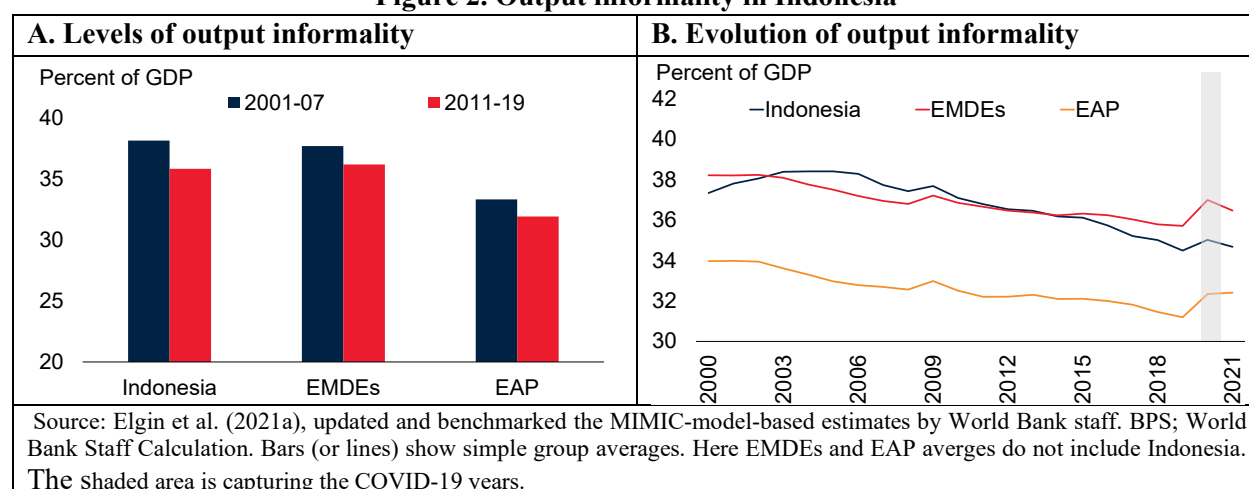n average of 36 percent of GDP in the decade before 2020.[6] This is smaller than the average level in EMDEs by about 0.5 percentage point of GDP, while being slightly above the average level in EAP (figure 2). The declining trend in output informality in Indonesia was also accompanied by rising GDP per capita, which rose almost by six times from USD 770.9 in 2000 to USD 4,333 in 2021, a consistent trend observed across EMDEs.

Figure 2. Output informality in Indonesia

A. Levels of output informality

B. Evolution of output informality

Source: Elgin et al. (2021a), updated and benchmarked the MIMIC-model-based estimates by World Bank staff. BPS; World Bank Staff Calculation. Bars (or lines) show simple group averages. Here EMDEs and EAP averges do not include Indonesia. The shaded area is capturing the COVID-19 years.

Employment informality

22. **Informal employment in Indonesia has also declined but remained higher than the average levels in other EMDEs and the EAP region.** Using self-employment as a proxy for informal employment, Indonesia has experienced a steady decline in informal employment since the 1990s (figure 3). However, there seems to be a reversal starting in 2016. A reversal that has been accelerated by the COVID-19 shock. Indeed, self-employment as a share of total employment increased from 49.9 percent in 2019 to 53.4 percent during the pandemic in 2020. Despite the historical decline, the level of employment informality in Indonesia is consistently higher than the level in the EAP region and other EMDEs. Using data on informal employment provided by ILO - a broader measure than self-employment - four out of five workers are informally employed in Indonesia, notably higher than the average informal employment rate in EAP or EMDEs (i.e., about 56 percent of total employment).

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[6] As shown in section 2, Output informality is proxied by MIMIC-based estimates or LFS estimates as elaborated in the previous section. The model-based MIMIC estimates are used mainly in cross-country comparisons, while the LFS estimates are used in the within-country comparison.

Figure 3. Employment informality

A. Evolution of employment informality	B. Levels of employment informality

Source: Elgin et al. (2021, updated), ILO (2023), and SAKERNAS from Indonesia NSO.
A. Shaded areas are capturing recession years. The blue lines show values for Indonesia (solid from ILO, dashed from NSO). Other lines show the simple averages for East Asia and the Pacific excl. Indonesia (EAP, in orange) and EMDEs excl. Indonesia (in red). Here self-employment (% total employment; ILO 2022) is used as a proxy for informal employment.
B. The dark blue bars show values for Indonesia in 2019 (the light blue horizontal bar shows the value in 2020, and the diamond shows the value in 2021). The other bars s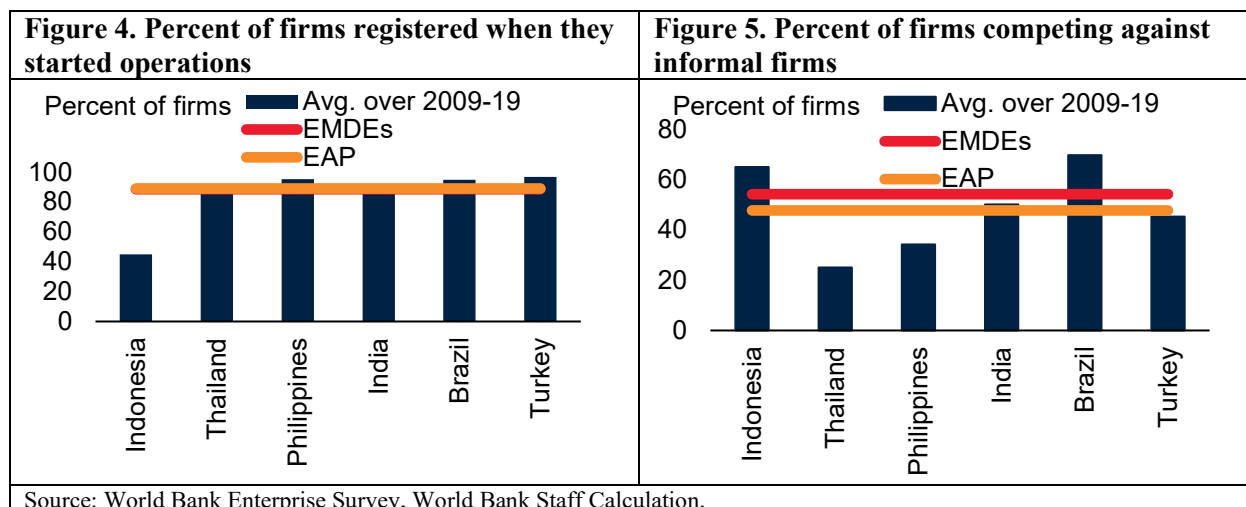how the simple averages for East Asia Pacific excl. Indonesia (EAP; in orange) and EMDEs excl. Indonesia (in red) in 2019.

Firm informality

23.   **Firms in Indonesia are dominated by Micro Small and Medium Enterprises (MSMEs).** The 2016 Economic Census, the last one available, classifies 99 percent of firms in the country as MSMEs. A large share of these MSMEs are micro firms, almost 60 percent, with fewer than 5 workers. This is in contrast to peer countries like Malaysia and Vietnam, which also have a large share of firms categorized as MSMEs. In those two countries, the informal sector is significantly smaller at around 9 percent (2016) and 27 percent (2019), respectively.

Figure 4. Percent of firms registered when they started operations	Figure 5. Percent of firms competing against informal firms

Source: World Bank Enterprise Survey, World Bank Staff Calculation.

24.   **Indonesia's firms are predominantly informal and seem to compete with the formal sector firms.** Only 45 percent of Indonesia's firms were legally registered when they started operations, a significantly lower share than EMDEs, EAP region, and peer-country averages

(figure 4). Moreover, economic activity in the formal and informal markets seems to be intertwined. According to the latest enterprise survey in 2015, around 65 percent of formal firms in Indonesia are competing with informal firms. This contrasts for example with Thailand where only 25 percent of formal firms compete with informal firms. It is also a larger share compared to EMDEs and EAP averages (respectively 54 and 47 percent) (figure 5).[7] Across the country, this practice is most prevalent in Bali, where almost all firms (98 percent) report competing with informal firms. Bali is a province particularly known for its dominant service sector, especially in tourism and hospitality as well as other low-value-added services.

3.3   Informality at the regional level in Indonesia

25.   **Across the region, most of the provinces in the eastern part of Indonesia show a relatively higher informal economy.** Papua province has the highest informal output, comprising almost 80 percent of its economy (figure 6). This is followed by three other provinces in the eastern region (East and West Nusa Tenggara, West Sulawesi) with around 70 percent of informal output. However, with unweighted computation,[8] Lampung province has the highest level of informal output with the informal output capturing almost 45 percent of total economic output. Different methods of measurement of informality also resulted in a significantly different informality level. For example, an Informal Sector Survey conducted by the Statistics Agency in 2010 in two pilot provinces (Yogyakarta and Banten) used questionnaires to determine output produced by production units in the informal sector. Output informality was estimated at 37 percent and 27 percent in Yogyakarta and Banten respectively, lower than the estimation produced by the model.[9]

Figure 6 Output informality by regions or by provinces
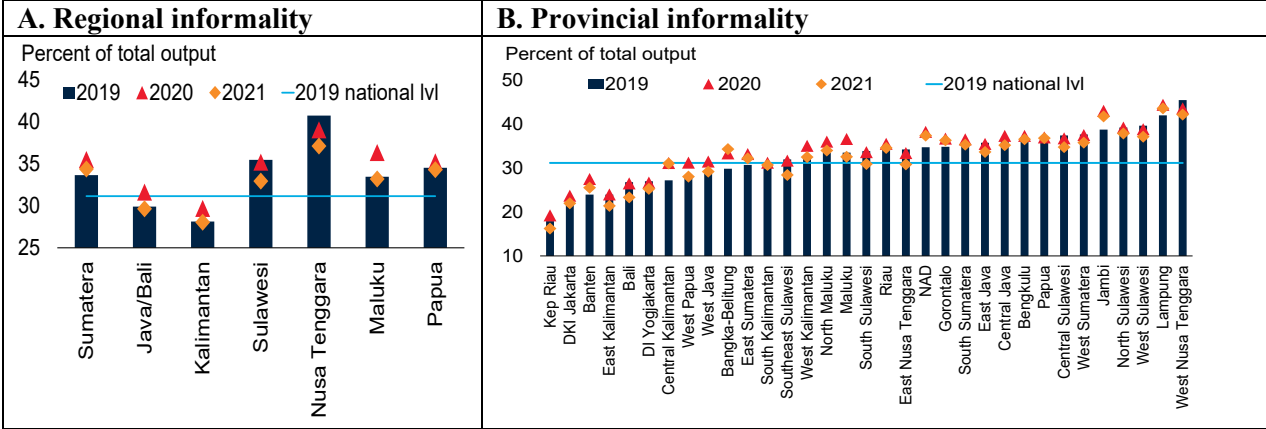
Source: BPS; World Bank Staff Calculation.

26.   **The regional pattern of informal employment seems to mimic the regional pattern of output informality** (figures 7)**.** Informal employment is most prevalent in Nusa Tenggara and Papua regions, which could be explained by the nature of jobs in that province (i.e., agriculture

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[7] World Bank Enterprise Survey, 2015.

[8] The weighted computation is accounting for the weight of the observation in the survey, while the unweighted computation is excluding the weight. See section 2 for the formula.

[9] While the model calculated data for 2020 which could potentially show different figures, the result is significantly different where Yogyakarta informal output reached more than 50 percent of the economy and Banten informal output comprised more than 40 percent of the economy using the model.

and artisanal mining). For example, both in Nusa Tenggara and Papua, agriculture jobs accounted for more than 43 and 60 percent of total jobs respectively. In Papua, despite being small as a share, jobs in mining and quarrying increased by almost 50 percent in the last decade. In these regions, employment informality is about 30 percent higher than at the national level.

Figure 7. Employment informality by regions or by provinces

| A. Employment informality by regions | B. Employment informality by provinces |

Source: BPS; World Bank Staff Calculation.
Note. See section 2.2 for details on how employment informality at the regional and provincial levels is constructed.
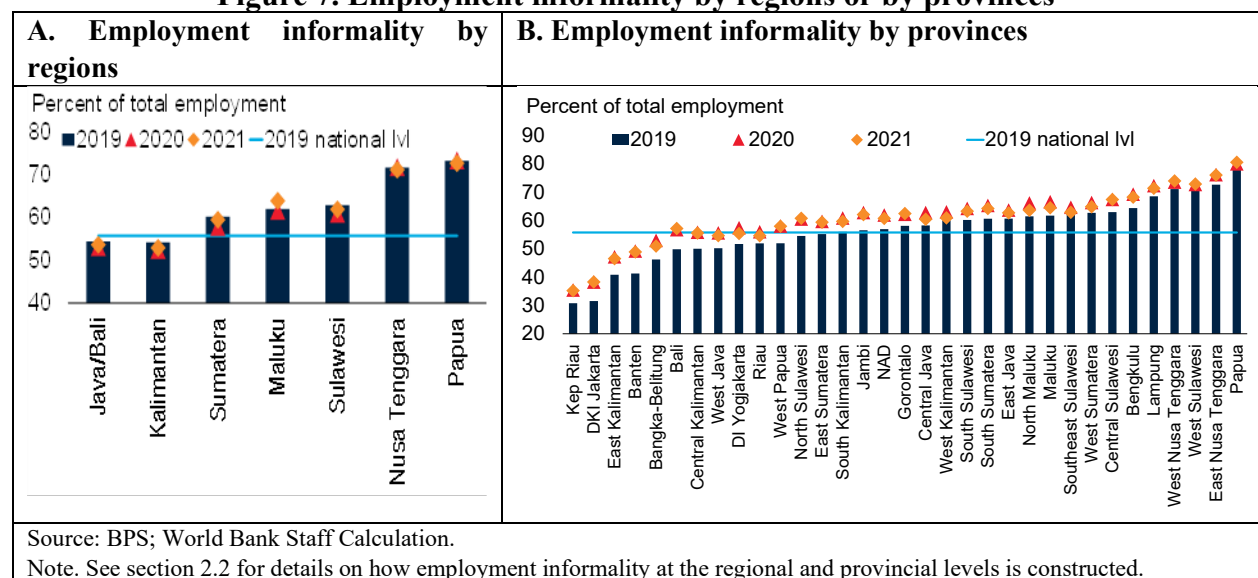
4. Policy and development challenges associated with informality: EMDEs versus Indonesia

27. **This section summarizes both development and macro policy challenges associated with informality.** It presents some of the correlates of informality identified in the literature (see, for instance, Loayza 2018; Ohnsorge and Yu 2021; Ulyssea 2020). Since the literature has not reached a consensus on what are the causes of informality nor on what are mere correlates of informality, the study here focuses on providing a comprehensive summary of correlates of informality in EMDEs and highlights areas where a causal link was established by past papers. Those correlates of informality are then reviewed for the case of Indonesia. In this section, empirical analyses for EMDEs are restricted to the period 1990-2019 to avoid being affected by the COVID-19 induced global recession in 2020.

4.1 Development challenges associated with informality

4.1.1 Underdevelopment, poverty and productivity gaps

28. **Theoretical models often consider the lack of economic development as one of the main causes (and features) of informality.** This type of model suggests that informality reflects the inability of an urban modern formal sector to absorb rural migrants during the urbanization process (Harris and Todaro 1970; Fields 1975; Loayza 2016). Development can further shrink the informal sector because households tend to shift away from agricultural and informal sectors as

their incomes grow (Saracoglu 2008). Moreover, limited access to credit, often associated with lower development, constrains firms' ability to overcome barriers to entry into the formal sector.[10]

29.   **Informality is more pervasive in countries with a lower level of per capita income, regardless of the measure of informality.** As a result, informality tends to be considerably more pervasive in EMDEs than in advanced economies (figure 8, La Porta and Shleifer 2014). In 2019, informal output and informal employment in advanced economies fell below the levels in EMDEs by 16 percentage points of GDP and 29 percentage points of total employment, respectively.

30.   **Informality is associated with a large rural population and a lack of urbanization.** As shown in Loayza (2016), a developing economy passes through three stages of development. In the first phase, modern informal employment expands as the falling relative cost of urban living encourages rural workers (in the rudimentary informal sector) to migrate to cities. In the second phase, rural-urban migration slows, and the relative shares of the modern informal and formal sectors stabilize, but the relative size of the rudimentary informal sector shrinks. In the third phase, modern informal employment declines as rural-urban migration stalls and a rising capital-labor ratio reduces the relative (and absolute) size of the modern informal sector.[11] In EMDEs with above-median informality, about half of the population still resided in rural areas during the past decade, while the ratio fell to two-fifths or one-third in EMDEs with below-median informality (Ohnsoge and Yu 2021).

31.   **Informality tends to be concentrated in the agriculture sector, especially in EMDEs.** About 90 percent of employment in the agriculture sector is informal in EMDEs (Ohnsorge and Yu 2020). Consequentially, in EMDEs with above-median informality, the agriculture sector accounted for about 20 percent of GDP and nearly 40 percent of total employment on average over the period 2011-2019. This is almost twice as much as in EMDEs with below-median informality. Meanwhile, informal firms in EMDEs tend to be small, less productive, and concentrated in labor-intensive sectors, such as low-value-added service sectors (Amin, Ohnsorge, and Okou 2019).

32.   **Informal workers tend to be less skilled and lower paid than their formal counterparts (Loayza 2018; Perry et al. 2007).** A meta-analysis of worker-level empirical studies shows that informal workers are, on average, paid 19 percent less than formal workers, which largely reflects the fact that informal workers tend to be less skilled and inexperienced (World Bank 2019). The negative link between informality and labor productivity is also supported by data, which could be driven by the significantly lower school attainment in EMDEs with above-median informality than in other EMDEs (figure 8).

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[10] See, for instance, Ferreira-Tiyaki (2008), D'Erasmo and Moscoso Boedo (2012), and Capasso and Jappelli (2013).
[11] As modeled in Loayza (2016), a developing economy consists of two co-existing economies: a modern economy that is organized in firms and uses high-productive technology and a rudimentary, informal economy that captured the self-employed who only use labor and low-productive technology. The former further consists of two sectors: a capital-intensive modern formal sector and a modern informal sector that is more labor-intensive.

Figure 8. Output informality and underdevelopment

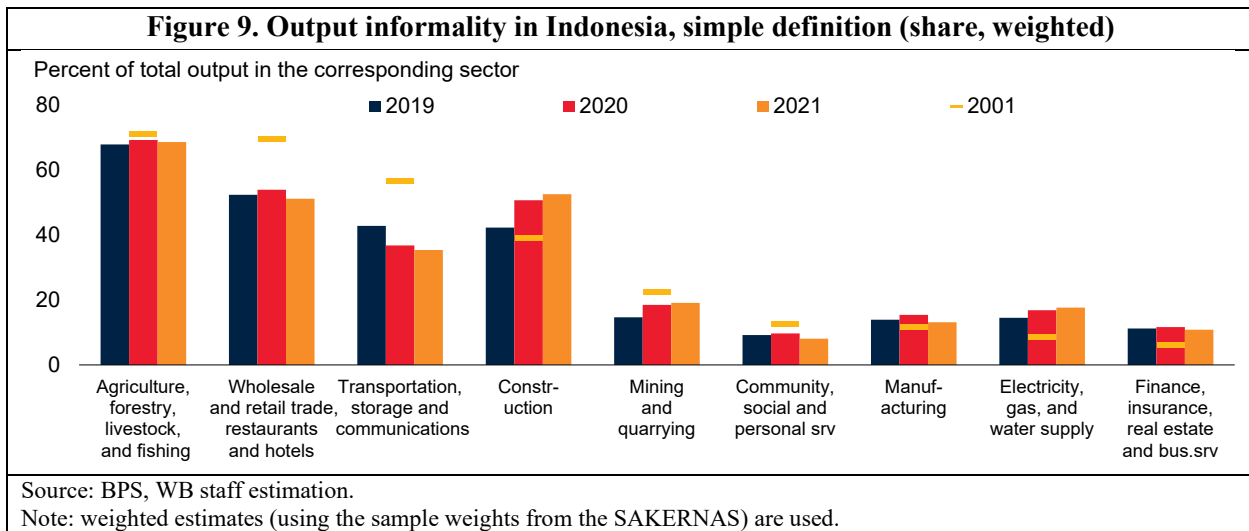| A. Informality and GDP per capita (2019)	B. Informality, labor productivity, and human capital
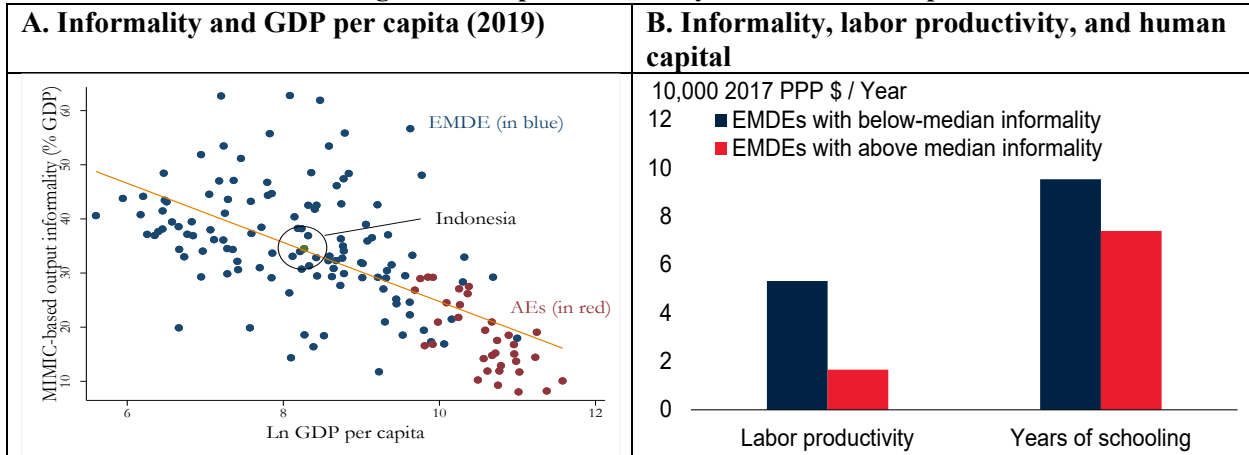
Sources: World Bank World Development Indicators, Elgin, et al. (2021 updated), and World Bank Staff estimates.
A. Informality is captured by MIMIC-based informal output as a share of GDP.
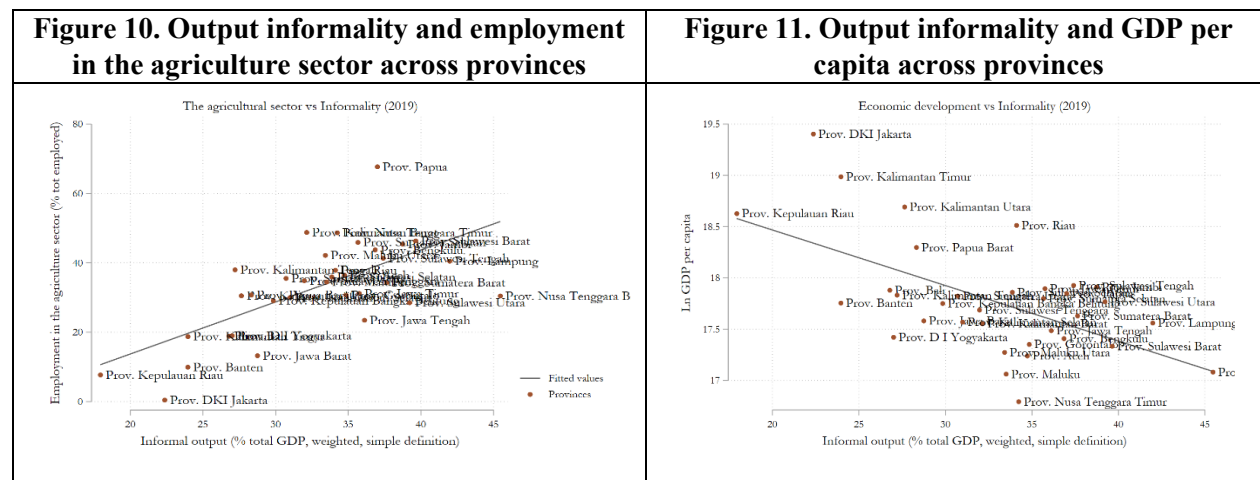B. The sample is constrained to EMDEs, and data are averaged over 2011-19 to avoid the impact of the global recession around 2020 and 2008/09. EMDEs are grouped into "above-median" and "below-median" self-employment as a share of total employment.

33.   **The link between informality and underdevelopment is supported by evidence in Indonesia.** First, output informality in Indonesia is most prevalent in the agriculture sector, followed by labor-intensive low-value-added service sectors (such as wholesale, retail, and hospitality sectors). Informal output in the agriculture sector is almost double the share of total informal output in the economy. It has declined slightly compared to its level in 2001 (figure 9). Wholesale, retail trade and hospitality sectors also pose a relatively larger share of informal output compared to other sectors though the share declined significantly compared to 2001. This is similar to a broad informality trend in other countries where informality tends to be higher in sectors that are labor-intensive, low-skilled, less productive, and with relatively low wages.

Figure 9. Output informality in Indonesia, simple definition (share, weighted)

Source: BPS, WB staff estimation.
Note: weighted estimates (using the sample weights from the SAKERNAS) are used.

34.   **The regions with the largest output informality are also regions with the largest rural population, weaker urbanization, prevalence of agriculture, and lower income.** For example, West Sulawesi and West Nusa Tenggara are two provinces in the top five largest output and employment informality. The share of the agriculture sector in those two provinces is the largest

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in the country (43 and 30 percent of total provincial GDP, respectively) (figures 10 and 11). West Sulawesi also has the highest rural population compared to other provinces (23.6 percent) and the weakest urbanization rate with only a 0.8 percent increase in urban population between 1996 and 2020. Output informality is also negatively correlated with regional income. Regions with the lowest per capita GDP tend to have more pervasive levels of informality (figure 11).

Figure 10. Output informality and employment in the agriculture sector across provinces	Figure 11. Output informality and GDP per capita across provinces

Source: BPS; World Bank Staff Calculation. All data points are taken from 2019. The same pattern is observed for 2010 and 2020.

35.   **At the same time, informality is also associated with the prevalence of services where the urbanization rate is high.** For example, West Nusa Tenggara has a relatively large share of the urban population with almost half of them in urban areas. It also has one of the highest urbanization rates, along with Lampung, among the provinces of Indonesia. In these two provinces, similar patterns are observed where there is a markedly declining share of agriculture-sector output (in percent of GDP) and an increasing share of services. This suggests that informality could potentially be closely associated with the service sector as well, particularly in low-productive service sectors (such as trade and hospitality).[12]

36.   **Informality is also strongly associated with higher poverty.** East Nusa Tenggara and Papua Province have the highest poverty rate and the highest share of informality in their economy (figure 12). The poverty rate in Papua has reached almost 30 percent, while in East Nusa Tenggara more than 40 percent of its population are poor. Interestingly, though East Nusa Tenggara is dominated by the agriculture sector, most of Papua's economy and employment is coming from mining and quarrying, indicating that they might be potentially working on artisanal and small-scale mining in the province. Many of these mining companies are not licensed, operate illegally, and evade government regulations (Meutia et al 22). Other links between poverty and informality exist. The informal sector often serves as an additional source of income for an economically insecure family. For example, a survey of poor families in Jakarta shows that sending children to work in the informal sector is an important way of increasing household income.[13]

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[12] However, other provinces with higher output informality such as Jambi have the same characteristics with a high rural population (70 percent) and weaker urbanization rate (17 percent rise in urban population during 1996-2020).
[13] Tulus Tambunan, Urban Poverty, Informal Sector and Poverty Alleviation Policies in Indonesia, EGDI and UNU-WIDER Conference Paper, September 2004.

Figure 12. Output Informality and Poverty

Poverty vs Informality (2019)
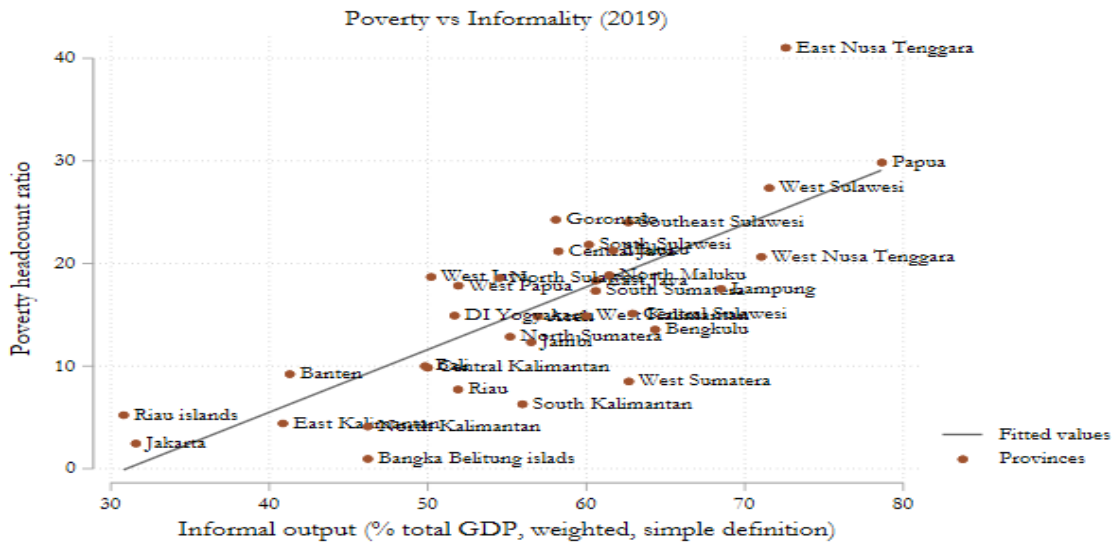
Source: BPS; World Bank Staff Calculation.

37. **Informal employment is also more prevalent in the agriculture sector and low-end services, rural areas, and for female workers than males** (figure 13)**.** In the agriculture sector, workers by nature are largely self-employed and/or work as unpaid family workers. Agriculture is also the dominant sector in most rural areas. Aside from agriculture, most commonly in urban areas are those in the low-value-added service sectors. Increasingly, with digital adoption, numerous online sellers are self-employed and are not covered by the social protection programs that are embedded in formal labor contracts.[14] These small online sellers are generally owned by women who are looking for flexible work in terms of location and time, due to constraints to enter the formal job market. Overall, people in informal employment also have limited opportunities to reach economic security. Among the poor,[15] 64 percent are informal workers.

Figure 13 Informal employment based on location, sector, and gender

Informal share in employment
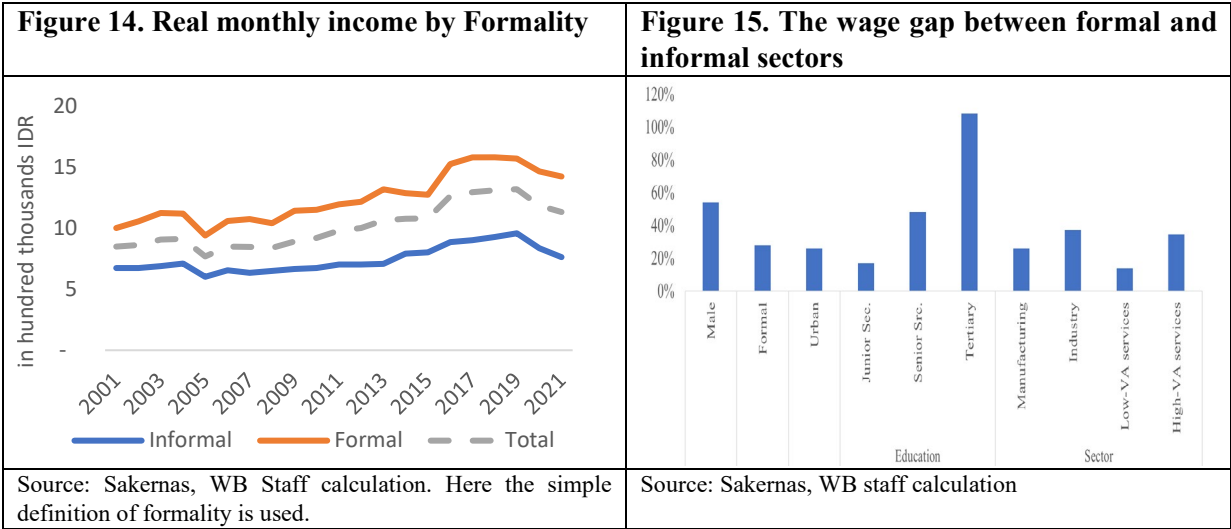
Source: Sakernas, WB Staff calculation

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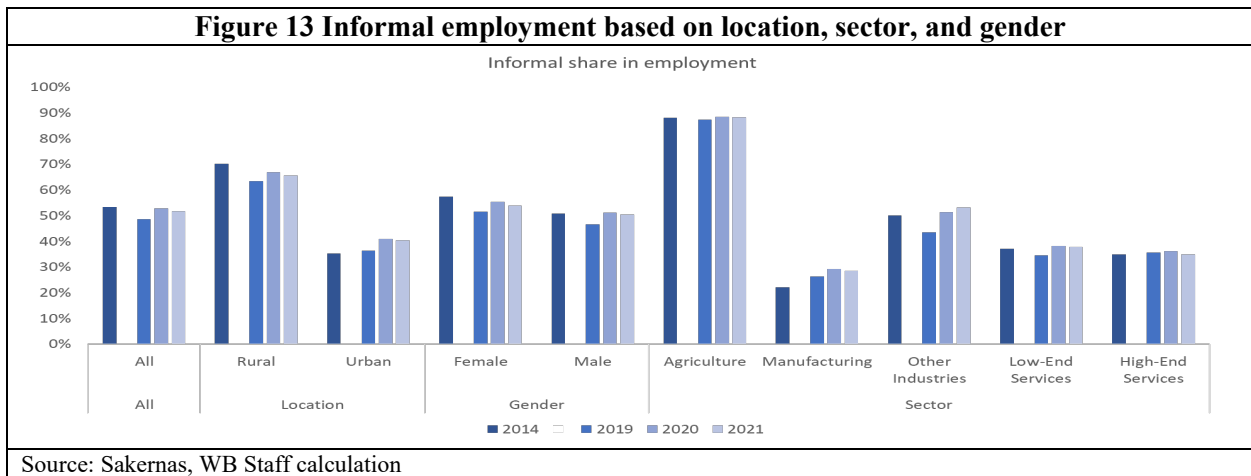
[14] https://www.newmandala.org/indonesian-gig-workers-the-quest-for-labour-protection/.
[15] Poor are defined as households living below US$3.20 2011 PPP. In 2019, the share of the poor population was computed at 20 percent (Source: World Bank Macro Poverty Outlook).

38.   **The share of informal employment was relatively higher than informal output, which suggests a large productivity gap between the informal and formal sectors.** Informal employment in Indonesia largely exceeds the level of EAP and EMDEs, while informal output tends to be lower. This disparity suggests a larger labor productivity gap between the formal and informal sectors in Indonesia, with the informal sector being less productive (Loayza 2018).

39.   **Such a productivity gap could be attributed to firms and job characteristics in Indonesia.** Most of the country's informal firms are micro or small firms, with fewer than five employees. They tend to pay low wages, are relatively unproductive when compared to large firms, predominantly supply products to local markets, make use of outdated technologies, and have no vision to expand their operations (Rothenberg et al., 2016). In terms of employment, most of them are self-employed and do not have a stable income. Typical examples in Indonesia are street vendors, small shop owners, farmers who own their farming land, and motorcycle taxi drivers. This is consistent with the fact that informality is most prevalent in the agriculture sector, with a large share of unpaid family workers or self-employed jobs. Those jobs often require a relatively low level of education background, suggesting low-skill workers with lower wages.

40.   **The low productivity in the informal sector has also been reflected through wage and income gaps between formal and informal (livelihood) sectors.** The income gap between the formal and informal sectors is also widening (figures 14 and 15). In 2001, income in the formal sector was 48 percent higher than the level in the informal sector. Over the past two decades, the income gap has widened to 63 percent in 2019. The gap can be attributed to the gap in productivity and the type of jobs in the informal sector, which are low-skilled and low-educated. More than 50 percent of workers in the informal sector only received primary schooling, compared to 28 percent in the formal sector. Sixty percent of the workers in the formal sector attained at least senior secondary education. Moreover, even after controlling for the level of education, the formal wage premium remains up to 28 percent.

Figure 14. Real monthly income by Formality	Figure 15. The wage gap between formal and informal sectors
Source: Sakernas, WB Staff calculation. Here the simple definition of formality is used.	Source: Sakernas, WB staff calculation

4.1.2 Poor governance, unfriendly business climates, and heavy-handed regulations leading to high-cost investment

41.　**There is ample evidence that poor governance, unfriendly business climate, and heavy-handed regulations can drive informality.** Literature shows that firms are incentivized to remain informal to avoid tax payments or regulatory compliance costs.[16] Excessive labor regulations also encourage informal employment by increasing the cost of formal employment (Rauch 1991; Loayza 2016). Conversely, access to productivity-enhancing public goods, such as access to electricity or a functioning court system, can lead to an increase in the share of formal production (Mendicino and Prado 2014). Corruption and rent-seeking bureaucracies increase firms' incentives to avoid interaction with the state by remaining informal.[17]

42.　**In EMDEs with more pervasive informality, formalizing is often not associated with a range of benefits.** For instance, access to social protection programs is largely limited in EMDEs with more pervasive informality, reducing the incentives for informal workers to move to the formal sector (Medina and Schneider 2018; WIEGO 2019). Access to *training and education resources* tends to be more limited in EMDEs with more pervasive informality, which can result in a group of low-skilled workers that cannot find suitable jobs in the formal sector. More widespread informality is associated with poorer access to infrastructure and lower overall quality of infrastructure, limiting the benefits of formalizing for informal workers and firms. Last but not least, access to finance is commonly seen as a benefit of operating in the formal sector. Lack of such access restricts firms' ability to invest in productivity-enhancing new technologies and constrains households' ability to absorb external shocks or start a business.

Figure 16. Business Environment Obstacle in Indonesia (percent of firms surveyed)

Source: World Bank Enterprise Survey 2015, World Bank Staff Calculation

43.　**Firms have identified competition with the informal sector and taxes as the largest obstacle to the business environment in Indonesia.** Around 37 percent of firms surveyed in 2015 identify competition with informal firms as the top obstacle to operations (figure 16). Such a finding is in contrast with the dual economy theory of informality where the two sectors' presence

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[16] See, Ihrig and Moe (2004), Amaral and Quintin (2006), D'Erasmo and Moscoso Boedo (2012), Auriol and Warlters (2005), Prado (2011), Kanbur (2017), Dabla-Norris et al. (2018), and Ulyssea (2018).
[17] For instance, Sarte (2000), Choi and Jum (2005) and Freidman et al. (2000).

are unrelated and serve different markets or consumers (Harris & Todaro, 1970). The second biggest challenge is tax, which suggests that many firms in Indonesia might choose to stay informal to avoid paying taxes or given regulatory issues linked to the perceived complexity of the taxation system. Firm-level features will be updated and analyzed more thoroughly though as soon as the new business enterprise survey is completed in late 2023.

4.2   Policy challenges associated with pervasive informality

44.   **Fiscal challenges are associated with more pervasive informality.** Over the period 2000-19, government revenues in EMDEs with above-median output informality were, on average, 4-5 percentage points of GDP below those with below-median output informality (figure 17; Ghossein, Yu, and Rana 2022). The composition of tax revenues is also tilted toward trade taxes in economies with more pronounced informality, making the tax system less progressive but facilitating tax collection when income underreporting is widespread. Similarly, in EMDEs with more pervasive output informality, government expenditures were 4-5 percentage points of GDP lower than in those with less output informality.

45.   **Constrained government spending in EMDEs with more pervasive informality is reflected in the limited provision of public services, contributing to poorer human development outcomes**. During 2000-19, EMDEs with above-median output informality spent 2.6 percent of GDP on health, which was about 1 percentage point of GDP lower than in EMDEs with below-median output informality (figure 17; Ghossein, Yu, and Rana 2022). Similarly, governments in EMDEs with below-median output informality spent 1 percentage point of GDP more on education than EMDEs with above-median output informality. The lack of spending on education and health led to limited public resources in these sectors.[18] Meanwhile, compensation of government employees amounts to about a third of government expenses in EMDEs with above-median output informality, which is above the level in other EMDEs by 6 percentage points.

Figure 17. Fiscal policies and informality
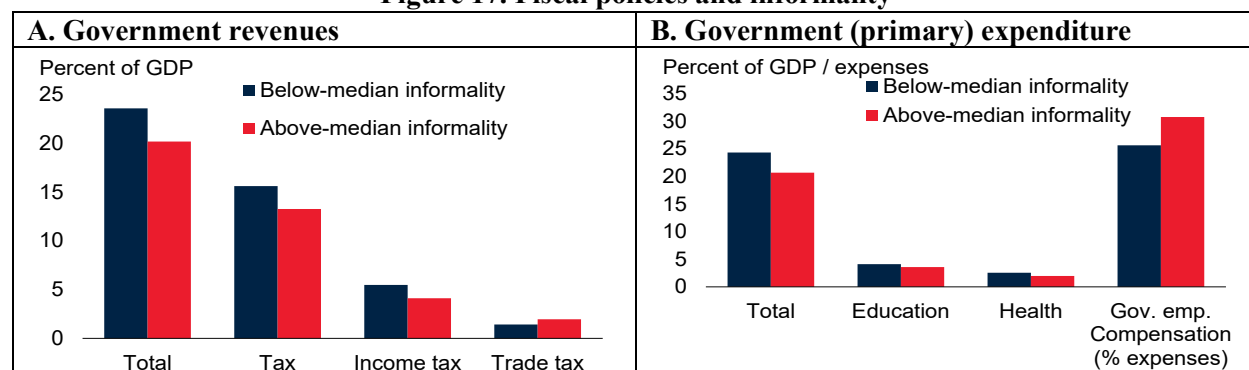
Sources: Elgin et al. (2021a) and Ghossein, Yu, and Rana (2022) .
Notes. Bars are simple averages over the period 2011-19 for EMDEs with above-median (high in blue; below-median, low in red) output informality. In all cases, blue bars are statistically different from red bars.

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[18] The average number of pupils per teacher in primary schools was about 35 in EMDEs with above-median informality—significantly higher, by eight students per teacher, than in EMDEs with below-median informality (Ohnsorge and Yu 2021). Access to medical resources, such as physicians and nurses, was also significantly more limited in EMDEs with a more pervasive informal sector (World Bank 2020).

46.   **The tax effort in Indonesia is significantly smaller than regional comparators or even EMDEs.** Over the decade preceding the pandemic, general government revenue averaged around 14 percent of GDP in Indonesia in the past 10 years before the pandemic. This is well below the median in EAP (and EMDEs) by 13.5 percentage points of GDP (9.4 percentage points of GDP) (figure 18). About half of this gap was due to weaker tax revenues. Indeed, revenues from income taxes, general services taxes, and trade taxes were all lower in Indonesia than EAP and EMDEs median. The weak tax effort can be attributed to multiple factors. This includes tax policy considerations, such as the prevalence of tax exemptions and high tax thresholds, or inefficiencies in tax administration that lead to low compliance rate. Nevertheless, pervasive informality also plays a role in such outcomes since informal employment and informal firms typically fall outside the taxation net (for income and general sales taxes). Formalizing firms outside of the tax net while lowering the threshold and improving compliance is likely to increase revenue in the medium term.

Figure 18. Fiscal indicators in Indonesia
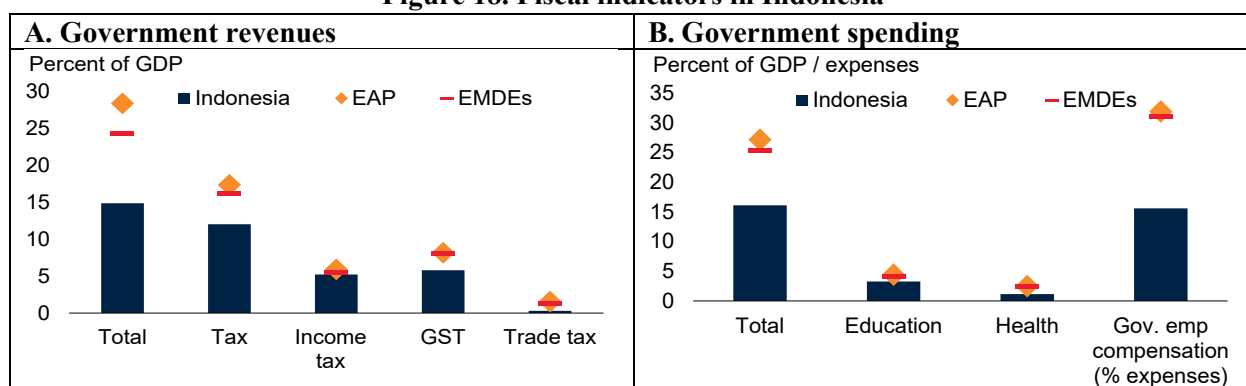
Sources: IMF GFS (2023), WEO (2022 Oct), World Bank WDI, and World Bank Staff calculation.
Notes: EAP=East Asia Pacific region; EMDEs=emerging market and developing economies. Medians over the period 2011-2019.

47.   **Low tax effort constrains Indonesia's growth-related public spending, a feature also observed in countries with high pervasive informality.** Primary expenditure in Indonesia averaged around 16 percent of GDP over the period 2011-2019, which was only three-fifths of the median in EAP and EMDEs. The limited fiscal resources led to lower public spending on education, health, social protection, and public investment relative to peers. Those programs all have implications for the country's future growth potential. Nevertheless, unlike other countries with high informality, Indonesia has had an adequate response to recent economic downturns. This was evident by the successful support package put in place during the COVID-19 pandemic. A package that was made possible given the country's prudent fiscal policy stance and adherence to the 3 percent fiscal deficit target, which enabled the gradual build-up of fiscal buffers.

48.   **The informal sector is excluded from financial markets, hence limiting the reach of banking credit in the economy** (Alberola and Urrutia 2020). About one-third of firms in EMDEs with above-median informality identified access to finance as a major constraint—8 percentage points higher than EMDEs with below-median informality (Ohnsorge and Yu 2021). By weakening the banking sector's performance (figure 19), the informal sector further dampens the transmission channel of monetary policy and makes it less effective in stabilizing inflation

(Capasso et al. 2018). The linkage between formal and informal economy business cycles further makes it difficult for central bankers to design optimal monetary policies.

Figure 19. Monetary policies and informality

A. Access to credit and informality	B. Banking sector performance and informality
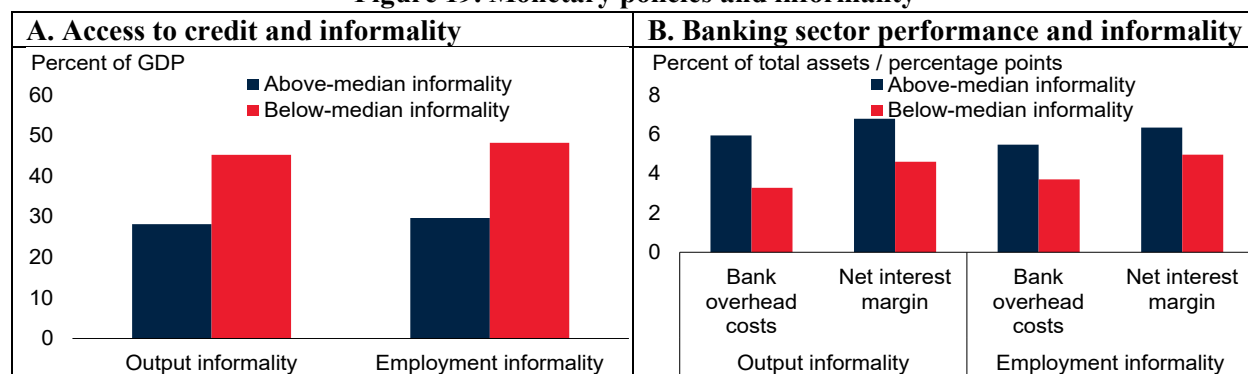
Source: WB staff estimation. Capasso, Ohnsorge and Yu (2022).
Note: Indicators in A and B are 2000-18 simple averages. "Above-median informality" and "Below-median informality" are the half of EMDEs with the highest and lowest informality by the share of informal output in percent of official GDP (by eal.mployment informality proxied by self-employment shares). In A, bars show domestic credit to the private sector in percent of GDP.

49.   **Indonesia is also lagging behind its peer comparators in terms of financial development.** Domestic credit to the private sector was around 38 percent of GDP in Indonesia before the 2020 recession. This was about half of the average level in EAP and one-third of the level in its regional comparators (figure 20). Moreover, the financial system still excludes almost half of the population. Account ownership at a financial institution or mobile money account is still relatively low, at about 51 percent in 2021, much lower than the average EAP countries (82 percent). In addition to issues linked with the financial sector deepening (supply-side constraints to private credit growth),[19] extensive informality among Indonesian firms as well as firm size contributes to this outcome (demand-side constraints). The cost of financial intermediation is also higher in Indonesia, making it more costly for firms to borrow from the banks. Low financial sector depth and breadth limits firms' ability to boost their productivity and expand during normal times. It also limits the effectiveness of monetary policies during economic downturns. While Indonesia's policy rate fell from around 6 percent in 2019 to around 4 percent in 2020 in response to the pandemic, access to credit in Indonesia largely remained the same. Meanwhile, credit-to-GDP ratios all hiked in its regional comparators to provide buffers to firms in the private sector.

Figure 20. Access to financial services in Indonesia

A. Access to credit	B. Cost of financial intermediation

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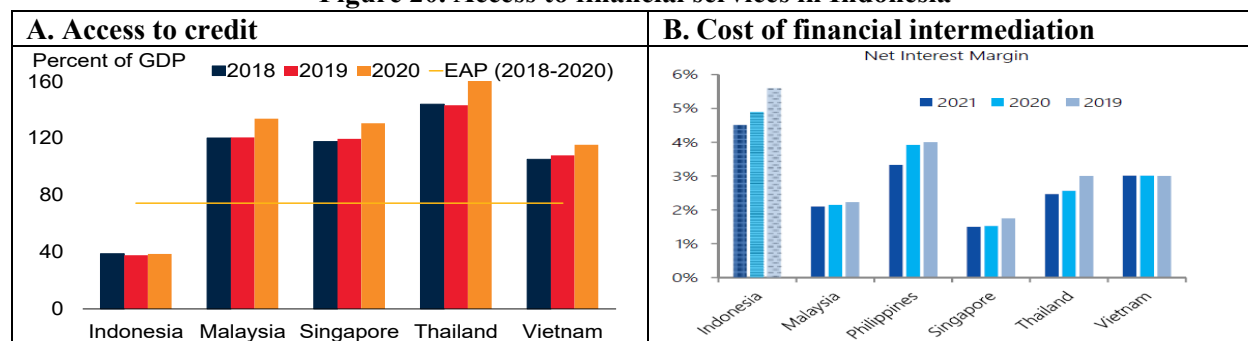
[19] World Bank, Indonesia Economic Prospects, June 2022.

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4.3   The COVID-19 shock and the informal sector in Indonesia

50.   **Additional policy challenges are posed by informal sector dynamics through business cycles.** The level of informal output tends to be mildly procyclical, responding positively, although less than proportionately, to formal-economy output swings (figure 21). On the other hand, while the level of informal employment remains broadly stable through business cycles in the formal economy (i.e., acyclical), total employment reacts more procyclically to formal-economy output swings. This results in an increase in the share of informal employment (i.e., countercyclical). The acyclical feature of informal employment and the mild procyclicality of informal output suggests that during economic downturns, the informal sector provides a buffer for workers in the informal sector, but to a limited extent. Moreover, the mild pro-cyclicality of informal output can moderate output recoveries during upturns, as well as the impact of macroeconomic stabilization policies. Several features of the informal sector also cause its participants to suffer more severe economic losses than their formal counterparts when the economy suffers from certain external shocks such as the COVID-19 pandemic (see Annex 5).

Figure 21. Informality and business cycles
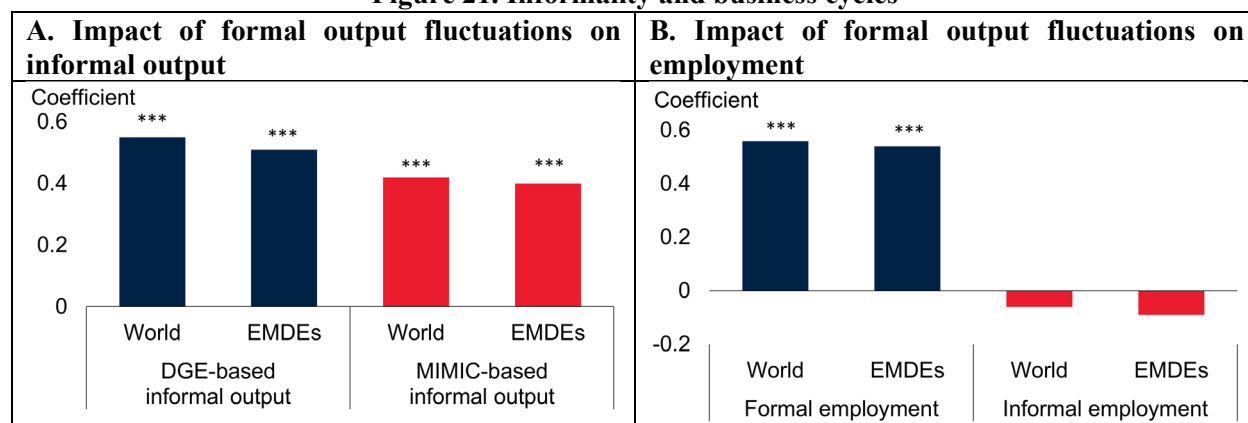
Source: Elgin et al. (2021b).
Note: Data are for 1990-2018. See Elgin et al. (2021b) for details. AEs = advanced economies; EMDEs = emerging market and developing economies. MIMIC = multiple indicators and multiple causes model estimates. Formal employment is proxied by total employment excluding self-employment. Informal employment is proxied by self-employment. *** denotes 10 percent significance. In A, bars show estimated coefficients when DGE- or MIMIC-based estimates are used as the dependent variable. In B., bars show estimated coefficients when formal employment or informal employment (defined as self-employment) is used as the dependent variable.

51.   **The COVID-19 pandemic was a large covariate shock that pushed the Indonesian economy into a recession for the first time since the Asian Financial Crisis.** COVID-19 forced governments around the world to restrict mobility. Indonesia introduced restrictions in March 2020, followed by several periods of gradual relaxations and reversals, especially with the arrival of the delta wave. The economy suffered through both domestic and external channels. Domestically, mobility restrictions and social distancing depressed economic activity. Externally,

both trade for goods and services as well as investment flows were affected.[20] Accordingly, Indonesia experienced its deepest contraction in two decades during the second quarter of 2020.

52.　**In the early days of the pandemic, workers – especially in urban areas – lost their jobs while others had to work fewer hours and earned less.** In the first six months of the pandemic, more than 5 million people (2.5 percent of the working-age population) lost their jobs and 24 million workers (11.8 percent of the working-age population) had to work reduced hours, with urban areas being the most affected. The unemployment rate rose by 1.8 percentage points to 7.1 percent in the third quarter of 2020 (yoy), mainly driven by urban unemployment increasing from 6.3 to 9 percent, while rural unemployment only increased from 4 to 4.7 percent. Underemployment increased by 7.3 percentage points to 28.9 percent. The intensity of under-employment was exacerbated by the pandemic, reducing average working hours by 0.5 hour, and earnings by about 5 percent.

53.　**For 3.4 million new labor market entrants, the economy added only 1.9 million jobs in 2020.** To compensate for losses in households' livelihoods and the loss of jobs for men, women's entry into the labor force increased by 2.8 million women in 2020. This was substantially more than the previous 5-year average when women's entry into the labor force grew by 1.1 million. At the same time, 330,000 men left the labor force, in stark contrast to the customary number of 1.3 million men entering the labor force yearly. Jobs became less secure, with 4.5 million formal jobs vanishing, while 6.4 million informal jobs being created (figure 22A). Some of them were in the digital economy as gig workers to buffer the impact of job loss (Word Bank 2023). However, 4 million of the new jobs were unpaid family work and often in agriculture, mostly filled by women. Net job losses among men were particularly prevalent in manufacturing while service jobs became informal.[21] Overall, COVID-19 increased women's employment in 2020, compensating for employment losses by men, while informality helped as a buffer.

54.　**Informality acted as a buffer for job losses, but only to a limited extent and at the aggregate level of the economy.** The large increase in informal jobs during the pandemic compensated for the loss of formal jobs. However, the compensation acted at the aggregate level of the economy rather than the individual level. While men lost their formal jobs, most informal jobs were taken up by women. This suggests that women sought informal work to compensate for income loss at the household level. These losses might have occurred for formal as well as informal jobs, at the intensive margin due to lower working hours and at the extensive margin by job losses.

55.　**COVID-19 also affected the youth by leading to school dropouts and part-time work, while diminishing work opportunities for older youth.**[22] The youngest (aged 15 to 18) were more likely due to COVID-19 to work while being in school, more often above 20 hours per week. In addition, the pandemic increased the number of younger youth neither in school nor employed. For the older cohort of youth aged 19 to 24, the pandemic similarly led to school dropouts but led
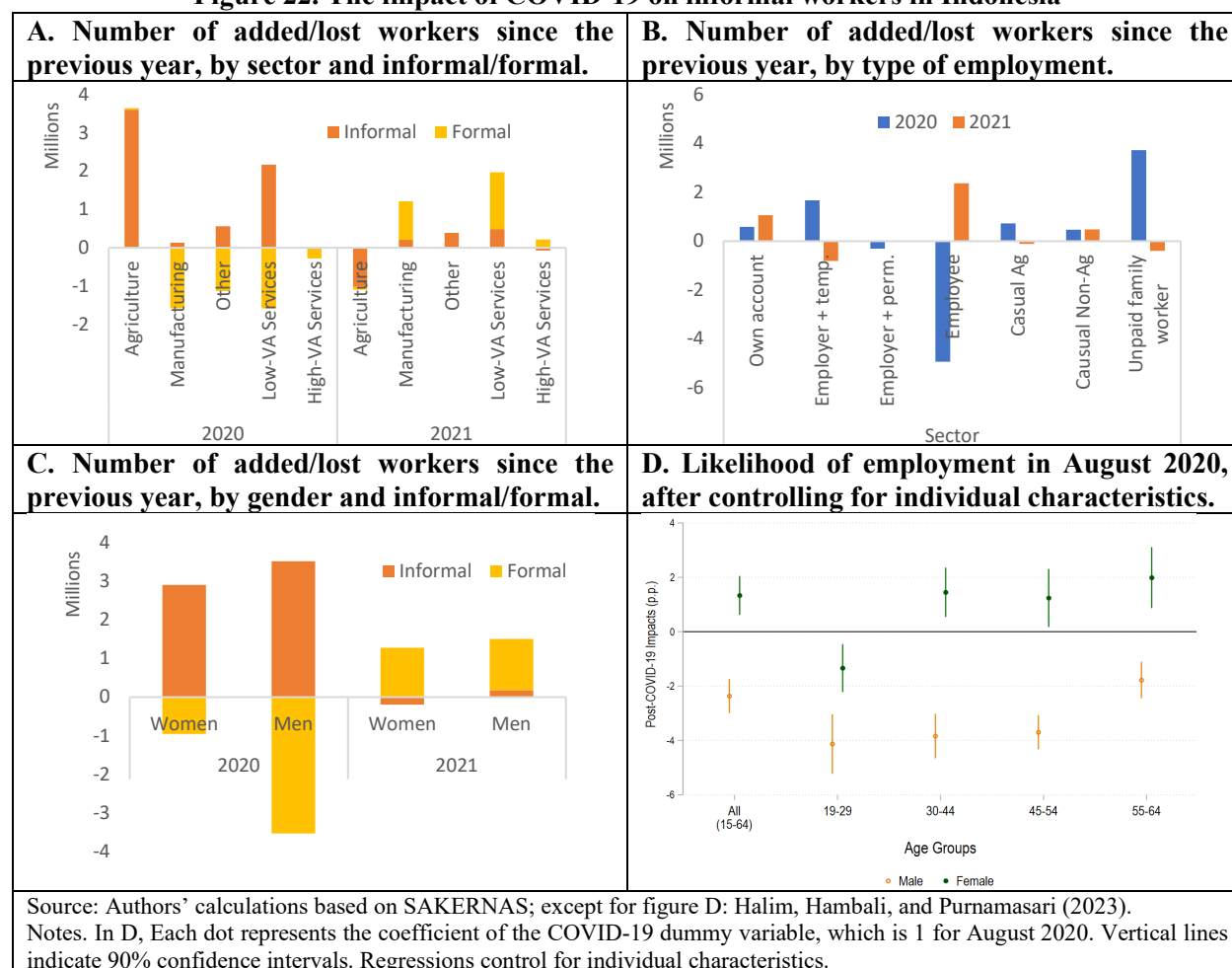
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[20] World Bank, Indonesia Economic Prospects, December 2020.
[21] Putra, Ovsiannikov, and Kotani, "COVID-19-Associated Income Loss and Job Loss."
[22] Halim, Hambali, and Purnamasari (2023).

to fewer work opportunities with a larger share being neither in school nor employed. Early dropouts and long hours in partial employment while in school can diminish learning, with life-long consequences. Fewer work opportunities for youth once out of school delay building up crucial work experience and can trap workers in low-productive – often informal – jobs.[23]

Figure 22. The impact of COVID-19 on informal workers in Indonesia

A. Number of added/lost workers since the previous year, by sector and informal/formal.	B. Number of added/lost workers since the previous year, by type of employment.
C. Number of added/lost workers since the previous year, by gender and informal/formal.	D. Likelihood of employment in August 2020, after controlling for individual characteristics.

Source: Authors' calculations based on SAKERNAS; except for figure D: Halim, Hambali, and Purnamasari (2023).
Notes. In D, Each dot represents the coefficient of the COVID-19 dummy variable, which is 1 for August 2020. Vertical lines indicate 90% confidence intervals. Regressions control for individual characteristics.

56.   **In 2021 both the economy and the labor market rebounded with better – formal – jobs returning.** With relaxed mobility restrictions and COVID-19 better under control, economies around the world rebounded and so did Indonesia. In the labor market, some of the informal jobs in agriculture disappeared (potentially as they were not necessary anymore), with additional, and most formal, jobs returning in manufacturing as well as low-value-added services (figure 22B). However, many unpaid jobs remained in the economy (figure 22C). The unemployment rate reversed from 7.1 percent in 2020 to 6.5 percent in 2021. Nevertheless, frictions remain in the labor market. Spells of unemployment last longer, while fresh labor market entrants face difficulties finding jobs.[24]

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[23] Duryea, Lam, and Levison (2007) and Naidoo, Packard, and Auwalin (2015).
[24] Halim, Hambali, and Purnamasari (2023).

57.   **Despite the rebound, lingering impacts are still felt on employment and incomes of poorer and urban households.** While employment and income impacts were widespread, those already economically insecure prior to the pandemic were hit harder. Among primary breadwinners, household heads with lower education were initially more likely to experience work stoppages (Purnamasari et al 2020). Those and households with young children more often reported an income shock. Two years into the pandemic, these households – as well as households in the bottom 40 percent – were recovering more slowly than other households. The lack of resilience of bottom 40 households exacerbates the impact, and, hence, pre-existing inequalities.

5. Conclusion

58.   **Informality trends observed in EMDEs were upheld in Indonesia to a large extent.** Like in other EMDEs, Indonesia witnessed a general decline in informality during the past few decades but it remains elevated and broadly above comparator countries. At 35 percent of its output and 54 percent of its employment, informality remains an important development challenge for Indonesia. First, informality in Indonesia is mostly concentrated in the agriculture and low-skilled service sectors. Second, it is associated with a higher level of poverty at the provincial level. Combing evidence at the macro and micro levels, there appear to be productivity, education, and salary gaps between formal and informal workers. Moreover, markets are not segregated as informal firms compete strongly with formal ones. Finally, informality seems to pose macroeconomic challenges as tax efforts and financial sector depth in Indonesia remain below the EMDE averages. Table 1 summarizes the main findings of the paper and compares the country's informality features to findings in the literature on informality in EMDEs.

Table 1: Summary of informality features in EMDEs and Indonesia

#	Feature of Informality in EMDES	Feature of Informality in Indonesia
1	Informality is more pervasive in countries with a lower level of per capita income.	Trend upheld. Informality declined in Indonesia overall with rising GDP per capita. Moreover, provinces with lower sub-regional GDP per capita had more pervasive output and employment informality.
2	Informality is associated with a large rural population and a lack of urbanization.	While this is the case, informality is also dominant in some urban areas like those with large mining sector activity.
3	Informal participants tend to be concentrated in the agriculture sector, especially in EMDEs.	Informality is higher in regions with a larger agriculture sector. However, informality is also strong in regions with a large low-skilled service sector such as trade, transport and construction.
4	Informal workers tend to be less skilled and lower paid than their formal counterparts.	Trend upheld. There appears to be a productivity gap, an education gap, and a salary gap between formal and informal. Moreover, informality seems to be associated with higher poverty at the sub-regional level.

5	Poor governance, unfriendly business climates, and heavy-handed regulations can drive informality.	N/A
6	Higher business registration and operational costs, ranging from heavy firm startup costs to fiscal burdens, increase firms' costs of being formal.	Firms identified competition from the informal sector and taxes as the major obstacles to the business environment. However, the large share of unregistered firms also points to a potentially burdensome registration process.
7	Greater corruption, rent-seeking bureaucracies, less effective government-to-business services, and weaker rule of law increase informality.	N/A
8	In EMDEs with more pervasive informality, formalizing is often not associated with a range of benefits.	Trend upheld. COVID pandemic areas suggest informality was a buffer on an aggregate level. However, it is not the case from an individual perspective. Informality is also a drag during recovery given potentially the lack of access to government support and credit.
9	Fiscal challenges are associated with more pervasive informality, especially with lower tax revenues and less progressive tax schemes.	Trend upheld. Limited government revenues in Indonesia are partially attributed to the pervasive informal sector where both informal firms and informal employment falls outside of the tax nets (namely for income and general sales taxes).
10	Constrained government spending in EMDEs with more pervasive informality is reflected in the limited provision of government services, contributing to poorer human development outcomes.	Trend upheld. Limited revenues in Indonesia constrain public spending on pro-growth programs and limit the government's ability to conduct countercyclical fiscal policies.
11	The informal sector is often excluded from financial markets, hence limiting the scope for a credit channel in the economy.	Trend upheld. Access to credit and financial sector depth is more limited in Indonesia than in its EAP comparators.
12	Additional policy challenges are posed by the interactions between formal and informal business cycles.	The dual economy theory does not seem to be upheld in Indonesia. Formal and informal firms' economic activities seem to intertwine. There is an uptick though in employment informality during economic recessions. COVID-19 period was a case in point.

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Annex 1: Examples of common definitions of informality in the literature

There are various definitions of informality in the literature.[25] While some define it from an "economic" perspective (Feige 2016), others define it from a "statistical" perspective and refer to concepts used by statisticians in national income accounting and in labor surveys. From an "economic" perspective, informality is typically defined as the market-based legal production of goods and services that are hidden from public authorities for monetary, regulatory, and institutional reasons (Schneider, Buehn, and Montenegro 2010).[26] This definition reflects activities that, if recorded, would contribute to official GDP figures, should be taxed, and does not cover illegal activities or household production (Schneider, Buehn, and Montenegro 2010; Medina and Schneider 2018).

The definition and classification of informality are highly context specific. The general definition referred to above encompasses many types of informal activities by workers and firms. Here we list a few definitions that have been used in this stream of literature:

- *Exit versus exclusion.* Workers and firms can be "excluded" from the modern economy or from state benefit systems due to burdensome entry regulations and a lack of human capital.[27] Other informal workers voluntarily "exit" the formal sector and choose the informal activity for its flexibility, independence, and lower regulatory compliance burdens.[28] Both "excluded" and "exiting" types of informality could coexist in an economy.[29]

- *Subsistence informality.* "Subsistence informality" captures workers whose income would fall below the subsistence line in the absence of such informal economic activity (Docquier, Müller, and Naval 2017). It is more pervasive in lower-income countries and characterized by low-skilled technology.

- *Evaders, avoiders, and outsiders.* Another group of studies classifies informal workers and firms into evaders, avoiders, and outsiders depending on their compliance with regulations and regulations' applicability (c; Kanbur and Keen 2015).[30]

- *Margins.* More recent studies distinguish different types of informality by the entities engaged in the informal activity, without focusing on their motivation: firms that do not register their business (the extensive margin) and or registered firms that hire workers "off the books" (the intensive margin; Ulysses 2018, 2020).

- *Noncompliant behavior.* Feige (2016) points out that while noncompliance and "unobservability" are common features of the informal sector, informal sectors differ from

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[25] See, for instance, Ohnsorge and Yu (2021), Dell'Anno (2022), and ILO (2021) for recent reviews.

[26] Monetary reasons include avoiding taxes and social security contributions, regulatory reasons include avoiding government bureaucracy or regulatory burdens, and institutional reasons include corruption, the quality of political institutions and weak rule of law.

[27] See, for instance, de Soto (1989), Loayza, Oviedo, and Servén (2006), and Perry et al. (2007). The former type of informality is frequently associated with low productivity and with poorly paid and low-skilled employment (La Porta and Shleifer 2014; Loayza 2018).

[28] See, for instance, Blanchflower, Oswald, and Stutzer (2001), Falco and Haywood (2016), Günther and Launov (2012), and Maloney (2004).

29 See Bosch and Maloney (2008 and 2010), Lehmann and Pignatti (2007), and Nordman, Rakotomanana, and Roubaud (2016).

[30] Evaders are firms that are covered by regulations but do not comply; avoiders are firms that adjust to being outside the remit of regulations; outsiders are firms that are simply not covered by regulations.

each other concerning the particular rule being violated. Specifically, he defines "unreported economy" as when the noncompliance consists in the circumvention of the fiscal code by tax evasion, "unrecorded economy" as when the added informal value added arises from violations of the rules of national income accounting, and "informal economy" as the circumventions of labor market regulations such as minimum wages and working conditions.

Annex 2: Definitions of informality from SAKERNAS

The old and new definitions of informality from SAKERNAS and used by BPS are jointly based on employment status and type of jobs as listed in table A1.1. Since 2016, the BPS moved from the old definition of informality to the new definition of informality. The new definition measures informal employment according to workers' employment status, type of establishment, and labor protection (as illustrated in the figures below).

Table A1.1: Old and New definitions of formal and informal Labor from SAKERNAS

| Status of Employment	Occupation							
	Professional, Technical & Related Workers	Administrative & Managerial Workers	Clerical & Related Workers	Sales Workers	Services Workers	Agriculture & Forestry Workers, Fishermen & Hunters	Production, Transport equipment operators & laborers	Others
Own account	Formal	Formal	Formal	Informal	Informal	Informal	Informal	Informal
Employer assisted by temporary worker	Formal	Formal	Formal	Formal	Formal	Informal	Formal	Informal
Employer assisted by permanent worker	Formal	Formal	Formal	Formal	Formal	Formal	Formal	Formal
Employee	Formal	Formal	Formal	Formal	Formal	Formal	Formal	Formal
Casual worker in agriculture	Formal	Formal	Formal	Informal	Informal	Informal	Informal	Informal
Casual worker not in agriculture	Formal	Formal	Formal	Informal	Informal	Informal	Informal	Informal
Unpaid family worker	Informal	Informal	Informal	Informal	Informal	Informal	Informal	Informal

Gambar 5.3 Penentuan Usaha Formal dan Informal
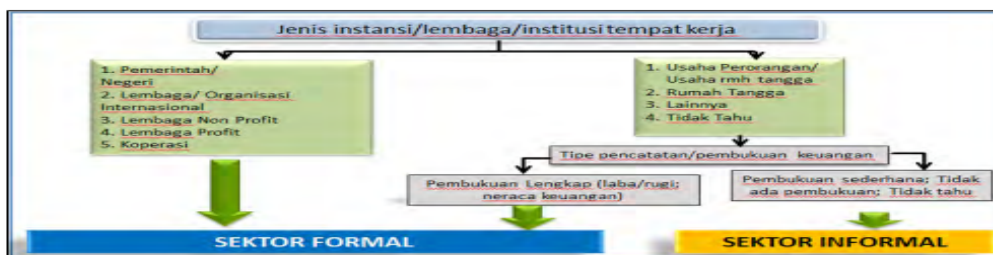
b. Tenaga Kerja Formal/Informal

Pengukuran ini didapatkan dari pertanyaan Subblok V.D Rincian 24.a (status berkode 4, 5 atau 6) dan Rincian 30 (penyediaan jaminan sosial dan pemberian cuti oleh perusahaan/usaha/tempat kerja).

Gambar 5.4 Penentuan Tenaga Kerja Kerja Formal dan Informal
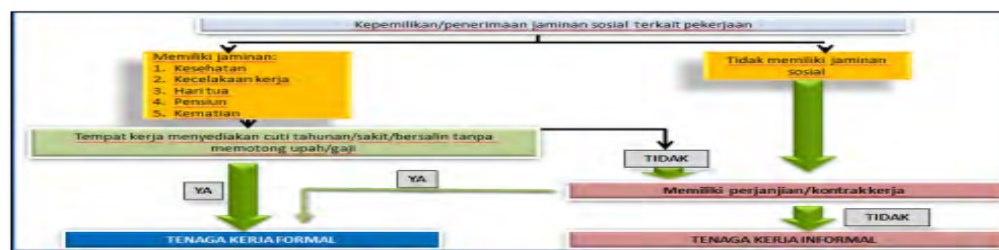
Annex 3: Description of informality dimensions

The paper examines three dimensions of informality: i) output informality, ii) employment informality, and ii) perceived level of informality.

- ***Output informality (model-based and survey-based estimates).*** Model-based estimates and survey-based estimates of informal output are considered in this paper.[31]

  - ➢ *As the first step*, two model-based estimates are used for cross-country comparisons. One is a dynamic general equilibrium model (DGE) created by Elgin and Oztunali (2012) where production in the informal sector is determined by how households optimize their labor allocation between formal and informal economies in each period and how the allocation changes over time. The other one is the multiple indicators multiple causes model (MIMIC), which is a type of structural equation model that can be used to estimate the relative size of informal economic activity. Different from some of the previous approaches (such as the currency demand approach), the MIMIC model takes into account both the multiple possible causes of informal activity and the outcome indicators of it. While both model-based estimates have their own limitations, they stand out in terms of their time and country coverage.[32] Both models provide estimates of informal output in percent of official GDP.

  - ➢ *As the second step*, survey-based estimates of informal output are used for regional comparisons within Indonesia. The survey-based estimates combine the information on employment status, informal employment status, and monthly income (wage) to compute informal output in percent of total employment. The survey-based approach assumes that the output in the informal sector equals the sum of incomes earned by workers in the informal sector. It is available in only a handful of countries where detailed information on employment status and incomes (or wages) is recorded in labor force surveys. In Indonesia, this measure is available for the period 2000-2022.[33]

- ***Employment informality (labor force surveys).*** The most frequently used measure for employment informality is the share of self-employment in total employment (see, La Porta and Shleifer 2014; Maloney 2004).[34] Two other measures are informal employment and

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[31] There are other indirect, model-based estimates of output informality (such as the currency demand approach, and the electricity-demand approach) and alternative MIMIC models. While each model-based estimate has its own advantages and limitations, model-based measures (i.e., MIMIC and dynamic general equilibrium models) included in Elgin et al. (2021a) stand out in terms of their time and country coverage. For the purposes of this paper (i.e., cross-country and overtime analyses), the paper follows existing studies and focuses on the MIMIC estimates of informal output as a share of official GDP. Dynamic General Equilibrium (DGE) models produce similar estimates of informal output in the case of Indonesia. The main findings here do not change when using DGE estimates (for instance, the findings in section 3).

[32] Here the model-based estimates are updated to cover 2021. Specifically, the MIMIC approach delivers a panel of estimates for 160 economies (36 advanced economies and 124 EMDEs) over the period 1993-2021, while the DGE approach provides a panel for 158 economies (36 advanced economies and 122 EMDEs over the period 1990-2021.

[33] The following section provides details on how this survey-based measure is constructed. The weighted measure using the simple definition of informal employment is preferred.

[34] According to the ILO's definition, self-employed workers include four sub-categories of jobs: employers, own-account workers, members of producers' cooperatives, and contributing family members.

employment outside the formal sector.[35] Employment outside the formal sector is an enterprise-based concept that includes persons employed by informal sector enterprises or in households, whereas informal employment is a job-based concept and has a broader definition.[36] The resulting (updated) dataset on self-employment is a panel of 180 economies or regions over the period 1990-2021. The dataset on informal employment covers 72 EMDEs from various years during 2000-2020 whereas the dataset on employment outside the formal sector contains 76 EMDEs from various years during 1999-2020. In addition to those cross-country measures on informal employment, this paper also uses data from SAKERNAS to construct employment informality for the period 2000-2022.

- *Perceived level of informality (firm opinion surveys).[37]* One firm opinion survey stands out in terms of its coverage and data quality: the World Bank's Enterprise Surveys. The World Bank Enterprise Surveys cover 140 economies over the period 2006-2020 (updated to 2022) and yield the following measures of informality: percent of firms competing against unregistered or informal firms (WB1), percent of firms formally registered when they started operations in the country (WB2), (average) number of years firms operating without formal registration (WB3), and percent of firms identifying practices of competitors in the informal sector as a major constraint (WB4). Higher values of WB1, WB3, and WB4 and a lower value of WB2 indicate higher levels of informality.

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[35] ILO presents detailed definitions of these two measures (ILO 2021a, b). Here, the harmonized series of these two measures, which allow for cross-country comparisons, are preferred, despite some remaining limitations (ILO 2021c). These two measures are usually expressed in percent of total employment (or non-agricultural employment). Due to space limitations, the analysis here focuses on these two measures in percent of total employment, which are comparable with the self-employment measure.

[36] Specifically, informal employment comprises all workers in the informal sector and informal workers outside the informal sector. But not all informal employment is in the informal sector, as formal firms can hire workers off the books.

[37] Some household surveys (such as the World Value Surveys) also report people's perceptions (or tolerance) of the extent of informality in an economy (see Elgin et al. 2021 for details). Due to limited data availability and the purpose of this study, firm opinion surveys are preferred here. While the Executive Opinion Surveys conducted by the World Economic Forum used to ask a question about the informal economy, the series has been discontinued since 2018.

Annex 4: MIMIC Model Estimation Results (1993-2021)

	[1]
Latent variable: output informality (% of GDP)	**161 Countries**
Size of government	0.147***
	(0.019)
Unemployment rate	0.101***
	(0.018)
GDP per capita	-0.360***
	(0.020)
Government effectiveness	-0.003
	(0.016)
Indicators	
Growth rate of GDP per capita	-0.174***
	(0.061)
Labor force participation rate	-0.235***
	(0.050)
Currency (M0/M1)	1.000
	(0.000)
Statistical tests	
RMSEA	0.079
p(RMSEA<=0.05)	0.000
Chi^2 (p)	149.590
	(0.000)
AIC	51691.610
BIC	51768.833
CFI	0.789
TLI	0.604
SRMR	0.043
CD	1
Observations	2808

Note: Absolute z-statistics in parentheses. ***, **, * denote significance at the 1, 5, and 10% significance levels. All variables are used as their standardized deviations from the mean. Data sources for variables used in the model are listed in Elgin et al. (2021a). Following the MIMIC models' identification rule, the currency (M0/M1) variable is fixed to an a priori value. The currency variable shows the level of money(cash) in circulation. "AIC" stands for "Akaike's information criterion" and "BIC" stands for "Bayesian information criterion. "RMSEA" stands for "Root Mean Square Error of Approximation". "TLI" stands for "Tucker Lewis Index", "CFI" stands for "Comparative Fit Index", "SRMR" stands for "Standardized Root Mean Square Residual", and "CD" shows the coefficient of determination. These are goodness-of-fit statistics.

Annex 5: The impact transmission channels of the COVID-19 shock on the informal sector

COVID-19 has taken a particularly heavy toll on participants in the informal sector. Several features of the informal sector cause its participants to suffer more severe economic losses than their formal counterparts during lockdowns.

- *Workers.* Workers in the informal sector tend to be less skilled and lower paid, with less access to finance and social safety nets than their counterparts in the formal sector (Loayza 2018; Perry et al. 2007). The absence of social safety nets makes informal workers less able to afford to adhere to social distancing requirements, which undermines policy efforts to contain the spread of COVID-19 (Loayza and Pennings 2020). In EMDEs with the most pervasive informality, people are more likely to be driven into poverty if they have to make direct out-of-pocket payments for health care emergencies.
- *Firms.* Informal firms tend to be labor-intensive and more prevalent in the service sector. Such firms have been particularly hard-hit by measures to curtail social interactions. Informal firms also rely more on internal funds, making them especially vulnerable to disruptions to cashflows caused by mitigation and other control measures (Farazi 2014).

Policy challenges. EMDEs with more informality lack adequate public health systems, and access to clean water and handwashing facilities. The government's capacity to mount an effective policy response to pandemics is more limited. In addition, in countries with widespread informality, governments have limited resources and administrative structures in place to effectively deliver well-targeted relief to those most in need (Muralidharan, Niehaus, and Sukhtankar 2016).