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MIDDLE EAST AND CENTRAL ASIA DEPARTMENT

Informality, Development, and the Business Cycle in North Africa

Prepared by an IMF team led by Roberto Cardarelli and including Azhin Abdulkarim, Adrian Alter, Shant Arzoumanian, Karim Badr, Hippolyte Balima, Aymen Belgacem, Olivier Bizimana, Matt Gaertner, Mahmoud Harb, Mariam El Hamiani Khatat, Chiara Maggi, Priscilla Muthoora, and Jerome Vacher

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Executive Summary

North African economies are characterized by a significant share of informal activity and employment. About two-thirds of workers in North Africa operate without any formal arrangement and social protection, and about 30 percent of GDP is estimated to be produced by informal workers and firms. To a certain extent, this is to be expected. All these economies are at a stage of development at which many firms and workers do not have the capacity to operate under formal legal, tax, and labor market arrangements. Informality may be the only option for these firms and individuals to participate in economic life, rather than remaining idle or completely excluded from any type of production activity. And for some workers at least, informality may work as a complement or substitute to social safety nets when formal jobs are lost under economic crises. At the same time, there may be firms and workers with sufficiently high productivity levels to operate under formal arrangements who are precluded from having that possibility, as a result of policy distortions that segment labor markets or make formality too costly. Several economies in North Africa share some of those policy distortions, in the form of public policy and institutional frameworks that impose large tax and regulatory burdens while failing to provide high-quality public goods and services (from social protection to justice). These distortions might lead to an "excess" of informality, over and above what would be in line with these countries' stage of development and structural, including social and demographic, characteristics.

This paper finds that while a few key structural characteristics could explain "normal" informality in North Africa, policy distortions explain a large share of excess informality.

- Among the structural factors that can lead to high informality, the relatively lower level of human capital and younger population help explain the high informality in the region, as low-skilled and young people generally find it more difficult to operate in the formal sector. While the share of women in informal employment exceeds that of men in most countries in the region, there is less evidence that women are more exposed to informality once other individual characteristics of informal workers in the region are controlled for. The sectoral composition of employment plays an important role. Large public sectors contribute to reducing employment informality in Algeria, Egypt, and Tunisia (albeit at high cost). Still, informal output is relatively high in these economies, reflecting the large number of labor-intensive and informal small- and medium-sized businesses. By contrast, Mauritania's and Morocco's large agricultural sectors may contribute to their relatively higher employment informality, especially for women.

- At the same time, gaps in a set of policy indicators also explain the relatively high informality in North Africa. In particular, this paper finds that gaps in the quality of governance explain about half of the excess informality experienced in North Africa compared with advanced economies. In this context, the expansion of the informal sector in Algeria and Tunisia from the mid-2000s partially reflects the deterioration in a few indicators of their governance and regulatory frameworks. In contrast, the decline in informality observed in Egypt, Mauritania, and Morocco over this period also reflects improved business regulations, governance, and tax systems, in addition to continued progress in economic development.

Country cases suggest a few common challenges for policymakers in North Africa, as they design policies that increase the benefits and reduce the costs of formalization. While the size of the relative policy gaps with the rest of the world varies across countries, all North African economies would need to improve the quality of their governance, reduce the burden from government regulations, widen the availability of financial services, design efficient and non-distortionary tax systems, and remove unnecessary labor market rigidities. Policy simulations show that cutting the costs to operate in the formal sector can reduce employment informality by up to 30 percent and boost long-term growth. While the relative contribution of different policy measures depends on how binding the related distortions are, the greatest impact comes

from implementing all measures simultaneously. The implication for policymakers is that a coordinated and comprehensive approach to reducing informality should be preferred to a piecemeal approach in which isolated measures are introduced with little attention to their consistency with the overall policy framework.

Finally, while informality has traditionally buffered regional labor markets against the impact of recessions, the COVID-19 crisis has been different. North African economies have generally exhibited relatively stable unemployment rates, including during recessions, largely owing to their high levels of informality. However, informal employment has fallen significantly in North Africa during the pandemic, as lockdown measures have particularly affected high-informality service sectors. As the pandemic subsides and the lockdown measures are removed, the recovery of regional labor markets could exhibit a stronger-than-usual rebound of informal employment. Ensuring an inclusive recovery from the pandemic would call for renewed efforts to construct more modern (digitalized), more efficient, and fairer systems of social protection, building on the progress achieved in the region during the pandemic in extending safety nets to informal workers.

1. Introduction

North African economies exhibit sizable informality (Gatti and others 2014).[1] Despite some differences across countries, about two-thirds of workers in North Africa are not subject to labor legislation, do not pay taxes, and do not receive social protection. Moreover, a large share of the region's production is generated informally, that is, by firms that do not report their earnings to tax administrations, register with statistical offices, produce financial statements, affiliate with social security, or any combination of these. Medina and Schneider (2019) estimate that informal production in North Africa accounts on average for about 30 percent of GDP.

A vast literature exists on the negative consequences of informality for economic development (de Soto 1989; Farrell 2004; La Porta and Shleifer 2014; Amin and Okou 2020). Informal workers tend to have poor working conditions and restricted access to social-protection systems (Williams and Lansky 2013; Williams and Horodnic 2019). Firms in informal sectors cannot benefit from the services and protection provided by the state and legal and regulatory frameworks. They also have limited access to credit and international markets. The narrow tax base that results from large informality means less resources for much-needed public spending, excessive tax burdens imposed on formal firms and workers, or both. For all these reasons, widespread informality might lead to a misallocation of resources, slow capital accumulation, and weak productivity growth and ultimately results in low and scarcely inclusive economic development (Kanbur 2017).

Informality, however, is also a symptom of economic underdevelopment. Workers and firms with little (human and physical) capital and very low productivity levels may have no other choice than to remain informal, as the regulatory and tax burden imposed by the requirements for entering the formal labor market is simply untenable for them (Loayza 2018). In these cases, informal sectors provide the only opportunity to produce or escape unemployment. For many low-productivity workers, informality could also work as a buffer against the loss of formal employment during the downward phase of the business cycle (David, Lambert, and Toscani 2020).

Informality may also be the consequence of excessively burdensome and distortionary regulatory, tax, and social-protection systems. Even if firms and workers have high-enough productivity levels to produce and work formally and desire to do so, they may be prevented from doing so by excessively rigid regulatory frameworks or policy distortions that lead to market segmentation (Perry and others 2007). Or they may choose to remain informal as a result of a rational decision that considers both the costs of complying with existing regulation and the benefits from accessing public services (Deléchat and Medina 2021).

Distinguishing between "normal" and "excess" informality is important to any well-designed formalization strategy. As highlighted by Loayza (2018), an indiscriminate reduction of informality below the level that could be considered normal might lead to unemployment, poverty, and social tensions. The reduction of this normal informality (which is explained by the level of development) needs to occur through comprehensive structural reforms that boost capital accumulation, productivity, and growth over the medium to longer term. On the other side, excess informality (which is the result of market segmentation and policy distortions) needs to be addressed with specific measures that level the playing field and remove inefficient and burdensome policy frameworks that discourage formality. In any case, significant progress in reducing informality will require a comprehensive, well-designed, and integrated formalization strategy.

Against this background, this paper addresses a few key questions:

[1] In this paper, North Africa includes Algeria, Egypt, Mauritania, Morocco, and Tunisia. Sudan is not part of the sample owing to lack of availability of relevant data.

- To what extent is informality in North African countries explained by their level of development, as opposed to policy distortions?
- What are the main policy distortions that could lead to excess informality in North Africa?
- How does informality in North African countries affect labor markets during downturns, particularly in light of the COVID-19 crisis?

The paper finds that the high level of informality in North Africa can be partly explained by a few key structural characteristics of North African economies. Low-skilled and young people tend to find it more difficult to escape informality in the region. There is less evidence of a uniform gender dimension of informality in North Africa. For example, once all other individual characteristics are controlled for, women do not seem to have a higher probability of working in the informal sector in Morocco (possibly reflecting their higher level of human capital; see Lopez-Acevedo and others 2021). The sectoral composition of employment plays a role in explaining differences in informality rates across the region. Mauritania's and Morocco's higher levels of employment informality may reflect the relatively important role of the agricultural sector in these economies. As women (mainly working in family-run businesses) are overrepresented in this sector, this may explain why informality rates look particularly high for women in Morocco even in the absence of a "pure" gender dimension in that country. By contrast, Algeria's, Egypt's, and Tunisia's relatively lower employment informality may reflect the relatively larger public sectors in these economies.

However, a significant part of informality in North Africa is associated with policy distortions. This paper assesses the relative contribution to informality from sociodemographic factors and gaps in policy frameworks in a cross-country regression framework. While issues of collinearity and endogeneity call for caution in interpreting the paper's results, the analysis points to a significant role for both set of factors. After the role of variables that proxy for the level of economic development is controlled for, a set of policy indexes is found to be significantly associated with the size of the informal sector in the region. In particular, gaps in the quality of governance tend to explain about half of the excess informality levels experienced in North Africa compared with advanced economies. Additionally, while the decline in informality observed in Egypt, Mauritania, and Morocco over the past two decades reflects continued progress in economic development, the paper finds that improvement in business regulations, governance, and tax systems in these economies has also played a role. In contrast, the expansion of the informal sector in Algeria and Tunisia since 2008 reflects both weaker contributions from economic development variables and the deterioration in a few indicators of their governance and regulatory framework.

Coordinated reforms to remove various policy distortions have the greatest impact on reducing excess informality. This paper studies the impact that policy measures could have on informality and growth using a dynamic, small open-economy general equilibrium model, with formal and informal labor and product markets. In this model (calibrated to replicate key characteristics of Morocco's economy and policy framework) individuals need to decide whether to work in the formal or informal sector, and their decision in the model depends on a few variables controlled by policymakers, namely, firm entry costs, payroll taxes, and hiring costs. The paper's policy simulations show that cutting the costs to operate in the formal sector can significantly reduce informality and boost long-term growth. While the relative contribution of the different policy measures depends on how binding the distortions are, a general principle emerges that the greatest impact comes from applying these measures simultaneously.

While informality has traditionally buffered regional labor markets against the impact of recessions, the COVID-19 crisis has been different. North African economies have generally exhibited relatively stable unemployment rates, including during recessions, also thanks to their high levels of informality. However, in contrast to what took place in previous economic downturns, over the course of 2020 informal employment fell significantly in North Africa, as lockdown measures particularly affected high-informality service sectors (and the drought hit Morocco's agricultural sector). As the pandemic subsides and the lockdown measures

are removed, the recovery of regional labor markets could exhibit a stronger-than-usual rebound of informal employment. Ensuring that the recovery from the pandemic is of the same "quality" as past recoveries and does not lead to persistent inequalities and wider segmentations of regional labor markets would require renewed efforts to develop more modern (digitalized), more efficient, and fairer systems of social protection, building on the progress achieved during the pandemic in reaching out to informal workers.

Country cases suggests a few common challenges for policymakers in North Africa as they design policies that increase the benefits and reduce the costs of formalization. While the size of the relative policy gaps with the rest of the world varies country by country in the region, all North African economies would need to improve the quality of their governance, reduce the burden from government regulations, widen the availability of financial services, design efficient and non-distortionary tax systems, and remove unnecessary rigidities in labor market codes. The recent experiences in many North African economies suggest that, consistent with the results of the model developed in this paper, a coordinated and comprehensive approach to reducing informality should be preferred to a piecemeal approach in which isolated measures are introduced with little attention to their consistency with the overall policy framework.

The rest of the paper is organized as follows. Chapter 2 presents a few key stylized facts on informality in North Africa and uses survey data to look at which individual characteristics are most relevant in determining the probability of being informal in the region. Using a cross-country regression framework, Chapter 3 gauges the contribution to informality from level-of-development variables as opposed to policy indicators. Chapter 4 presents the general equilibrium model with informality and simulations on the macroeconomic effects from removing policy distortions. Chapter 5 discusses the role of informality in North Africa's business cycle, and Chapter 6 discusses country-specific policy challenges, as county authorities try to encourage formalization in their countries.

2. Informality in North Africa: Stylized Facts

A. Measuring Informality

There is much debate in both the academic literature and policy circles as to what constitutes the informal economy. Loosely speaking, the informal economy can be defined as the part of the economy that is not covered or is insufficiently covered by formal arrangements, including government regulations for business registration, the payment of social contributions on behalf of employees, and the payment of taxes related to business transactions.

International statistical standards define the concept of informality around the following key dimensions (see also ILO 2018; Quiros-Romero and others 2021):

- *Informal sector.* It mainly consists of unincorporated enterprises that are not registered with a national government authority (for example, for social security or tax purposes). Typically, these units are single-person operations or family firms and operate with a low level of organization, on a small scale, and with little or no division between labor and capital.

- *Informal employment.* In contrast to the concept of the informal sector that is based on the characteristics of the economic unit in which the activity takes place, the concept of informal employment is based on the characteristics of the jobs. Informal employment thus comprises all workers with employment relationships that are not subject to national labor legislation, income taxation, entitlement to social protection, or certain other employment benefits. These workers could be employees, employers, and own-account workers (that is, self-employed individuals without hired workers) and could operate either in the formal or informal sector. Informal employment also includes all contributing family members (those working in a market-oriented establishment operated by a related person living in the same household) and workers who produce goods or services for their own final use within their household (including paid domestic employees).

- *Informal economy.* While the informal sector and informal employment are distinct concepts, they are also complementary. The informal economy encompasses both perspectives and is defined as all economic activities by economic units and workers that are, de facto or de jure, not covered or insufficiently covered by formal arrangements.

Measuring informality is a complex issue. As informal activity occurs outside the legal and regulatory frameworks, it is difficult to measure it with precision. There are a range of measures, based on two different approaches: (1) a direct one, based on surveys, voluntary replies, and other compliance methods that allow the number of informal workers and firms to be qualified; and (2) an indirect one that infers the size of informality by looking at certain observable characteristics related to informal economic activity (such as electricity consumption, night-light satellite data, and cash in circulation).

This paper will look at a series of commonly used indicators of informality:

- The *Schneider index* is an estimated measure of informal production, defined as the share of goods and services in national GDP hidden from official authorities for monetary, regulatory, and institutional reasons. This index combines different indirect methods to estimate the share of a country's production that is not declared to tax and regulatory authorities—such as the Multiple Indicators, Multiple Causes model (in which informal activity is estimated as a latent variable that both depends on a set of observed causal variables and is the cause of several indicators of informality), the physical-input model (based on

Table 1. Cross-sectional Bivariate Correlations between Informality Measures

	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
Informal employment	1			
Noncontributors to pension scheme	0.942***	1		
Self-employment	0.907***	0.802***	1	
Schneider index	0.719***	0.586***	0.588***	1

Source: IMF staff estimates.
Note: Correlations use the latest available data for each indicator and are calculated for indicators available for 178 countries over the period 1990–2020.
***p < .01.

the consumption of electricity), and the excess- currency-demand approach (based on the assumption that transactions in the informal sector are undertaken in the form of cash payments) (for more details, see Medina and Schneider 2019 and Schneider and Buehn 2016).

- The *share of informal employment in total employment*, estimated by the International Labour Organization (ILO) based on national (labor and household) survey data. While this is the broader and more consistent measurement of informal employment as defined earlier, its availability is limited across countries and time. The paper thus also looks at the two other measures of employment informality that have been generally used in the literature:
  - The *share of workers that do not contribute to a retirement pension scheme*, as reported in the World Bank's pensions database.
  - The *share of self-employed workers* in total employment, as reported by the ILO, based on national survey data. Self-employed workers include all workers whose compensation directly depends on the profits made from the goods and services produced. These include self-employed workers with employees (employers), self-employed workers without employees (own-account workers), members of producers' cooperatives, and contributing family workers (also known as "unpaid family workers").

Although different conceptually and in their construction, taken together these indicators can help shed light on the size and characteristics of informality across countries. As shown in Table 1, in the sample of countries considered in this paper, these measures tend to be positively correlated across each other, with bivariate correlation coefficients ranging between 0.59 and 0.94—high enough to reflect the same phenomenon without being mutually redundant (see also Gatti and others 2014). As expected, the higher correlations are observed among the different measures of employment informality, that is, informal employment, noncontributors to pension schemes, and self-employment.[1]

B. Informality in North Africa

North Africa generally exhibits relatively high informality based on these indicators. According to the Schneider index, about 31 percent of overall GDP is undeclared on average across North African countries, compared with 14 percent in advanced economies and 29 percent in emerging markets (Figure 1). All North African economies show output informality above the averages for other emerging market regions,

[1] Bonnet, Vanneck, and Chen (2019) shows that self-employment accounted for the vast majority (64 percent) of informal employment at the world level in 2016 (mostly own-account workers and contributing family workers). This share increases to 79 percent in developing countries, reflecting the large size of self-employment in agriculture. Globally, excluding agriculture, self-employment represents 45 percent of informal employment.

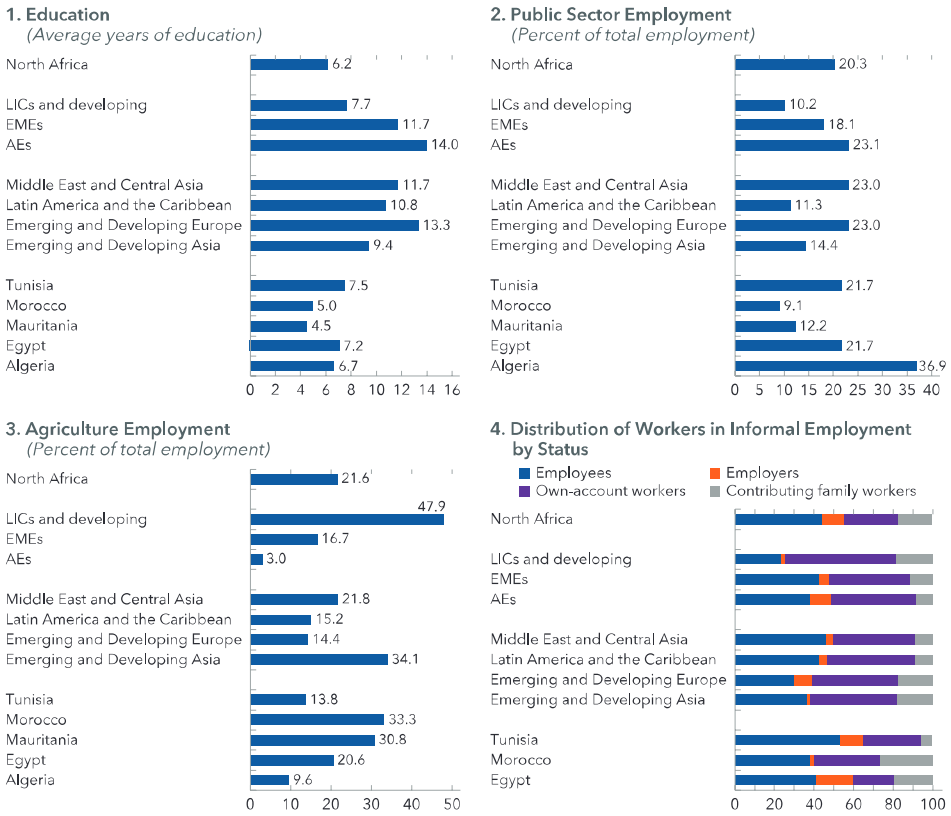
Figure 1. Informality in North Africa and Other Regions

Sources: Medina and Schneider (2019) for Schneider index; ILO (2018) for informal employment as share of total employment; World Bank Human Development Network Social Protection (HDNSP) pensions database for noncontributors to pension scheme as share of labor force; ILOSTAT database for self-employment as share of total employment.
Note: The regional and income groupings exclude the North African countries. For each country and informality indicator, the year is the latest available in the sources reported (see Annex Table 1.1 for more details). AEs = advanced economies; EMEs = emerging market economies; LICs = low-income countries.

with the exception only of Latin America. Indicators of employment informality portray a more nuanced story. ILO estimates of informal employment (those working without any formal arrangement and social protection) and the share of self-employment are higher on average in North Africa compared with both advanced economies and emerging markets (including those in the Middle East and Central Asia), although this mainly reflects the high employment informality in Mauritania and Morocco. By contrast, North Africa has on average a smaller share of workers who don't pay social security contributions compared with other emerging markets (with the exception only of those in emerging and developing Europe), mainly reflecting the low values of this indicator in Algeria, Egypt, and Tunisia.

Algeria's, Egypt's, and Tunisia's high production and low employment informality may reflect several factors. The low share of self-employed workers and workers who do not contribute to pension schemes compared with the share in other emerging markets could reflect the relatively greater role of the public sector as provider of (formal) employment in these economies (Figure 2). Despite the lower employment informality, these economies exhibit higher levels of output informality compared with other emerging markets. This

Figure 2. Education, Public Sector Employment, Agricultural Employment, and Informal Workers' Status in North Africa and Other Regions

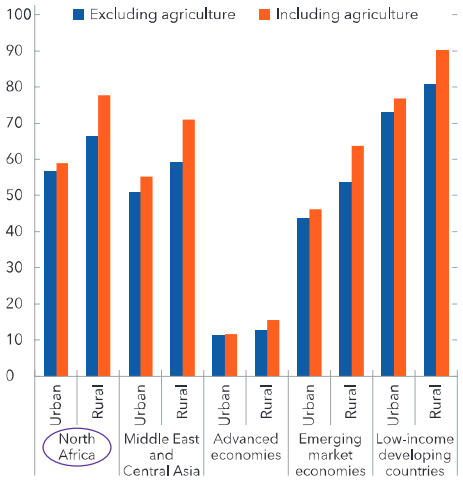


Sources: Education: Institute for Health Metrics and Evaluation (IHME); public sector employment: ILOSTAT; agriculture employment: World Bank, World Development Indicators; distribution of informal employment: ILOSTAT.
Note: For each country and informality indicator, the year is the latest available in the sources reported. AEs = advanced economies; EMEs = emerging market economies; LICs = low-income countries.

may point to the presence of many small and medium-sized firms, which tend to be relatively more labor intensive and informal, in these economies (see also Gatti and others 2014). It could also reflect the fact that a number of formal employees contribute to informal activities by having a secondary occupation. Finally, it may point to a serious underestimation of employment informality in these economies; for example, many formal firms could hide informal employees by keeping them off the books (the intensive margin of informality, as in Ulyssea 2018), possibly exploiting privileges and political connections (Mahmood and Slimane 2018).[2]

[2] A significant intensive margin of informality may help explain why Egypt has a relatively higher share of informal employment as measured from the ILO data, even if its share of self-employed workers and of workers who don't pay social contributions are both lower than the average for emerging markets. Another possible explanation is that Egypt may have a relatively higher share of self-employed workers who are informal (as not all self-employed workers are informal).

Figure 3. Informal Employment in Rural and Urban Areas
(Percent of total employment)



Source: International Labour Organization 2018.

Informality in North Africa is higher in rural areas and the agriculture sector. On average in North Africa, about 80 percent of workers living in rural areas have an informal job, compared with 60 percent in urban areas (Figure 3). This gap, however, does not seem to be particularly out of line with what is observed in other peer countries and regions. The relatively higher employment informality in the region may rather reflect the larger incidence of informal employment in the agricultural sector, which absorbs a significant share of the labor force, especially in Egypt, Mauritania, and Morocco (Figure 2, panel 3). Indeed, about 90 percent of jobs in the agricultural sector in North Africa are informal, higher than the average in other emerging markets (75 percent). Many of these jobs involve workers (mostly women) who work in family-run businesses: this explains why contributing family workers (those working in a market-oriented establishment operated by a related person living in the same household) account on average for about 20 percent of informal employment in Egypt, Morocco, and Tunisia, compared with 10 percent on average for emerging markets (Figure 2, bottom right panel). The relatively higher share of informal employment in Morocco and Mauritania can thus be at least in part a reflection of the relatively higher concentration of their workforces in the agricultural sector.

Informality trends in the region differ by indicator and country. Employment informality, as proxied by the share of self-employed workers in total employment (the indicator of informal employment for which a longer time series is available; see Annex Table 1.1) seems to have declined in all North African economies over the last 20 years (Figure 4). This is consistent with the decrease in agriculture employment, the progressive aging of the population, and the increase in the average level of education during the same period, all factors that this study has found to be critical in affecting employment informality. The Schneider index of output informality, however, has fallen only in Egypt, Mauritania, and Morocco, while it has increased in Algeria and Tunisia since 2008.

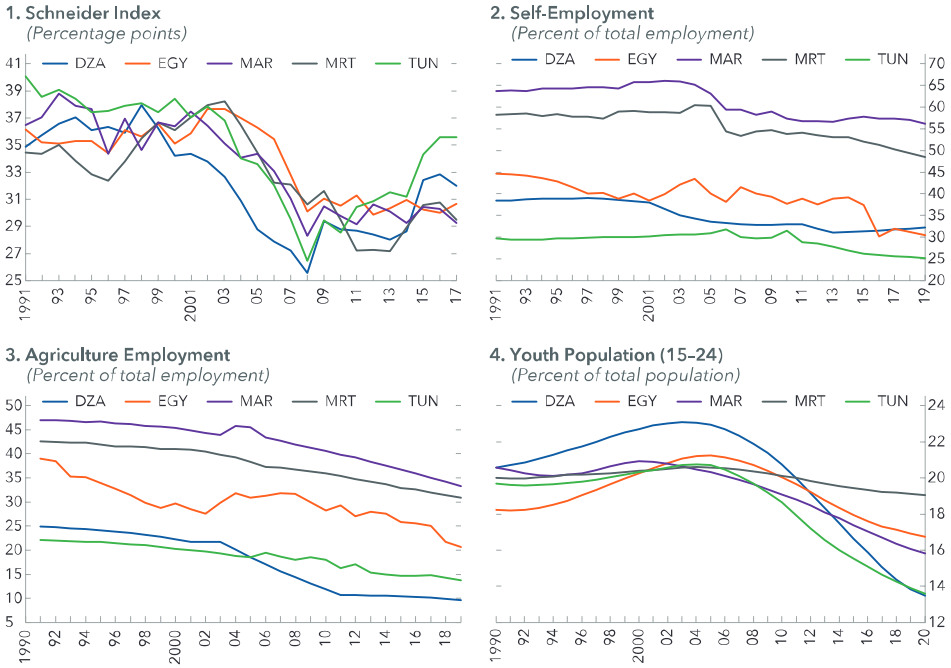
C. What Are the Characteristics of Informal Workers in North African Countries?

To answer this question, this paper uses the latest available survey data for Egypt, Mauritania, Morocco, and Tunisia (Table 2). For Egypt, Mauritania, and Tunisia, the surveys allow "informal" to be defined as respondents who do not pay contributions to social security, while in the survey for Morocco, informality is captured by respondents qualifying themselves as self-employed. The surveys cover workers in all sectors (including agriculture) and all areas of the countries (both urban and rural).

The main findings are as follows (Figure 5):[3]

[3] There was no household survey for Algeria.

Figure 4. Schneider Index and Self-Employment Trends in North Africa



Sources: Medina and Schneider (2019) for Schneider Index; and ILOSTAT database for self-employment.

- *Informality is prevalent among the poor.* Looking at different quintiles of households' income distribution reveals that informality rises as income levels fall in Egypt, Morocco, and Tunisia (in Egypt and Tunisia, the share of informality in the lowest quintile of the income distribution is about twice the level observed in the highest quintile). By contrast, in Mauritania, informality remains high even among the wealthiest, consistent with the existence of an upper-income tier of informal workers whose employment decisions are driven by choice, as well as a lower-income tier of workers potentially stuck in informal employment (Dabla-Norris and others 2020).

- *There is generally higher informality among women than among men, except in Egypt.* The gap is particularly high in Morocco, possibly reflecting its high share of employment in the agricultural sector, which is an important source of employment for women. In Egypt, however, the informality rate is lower for women. While in Egypt, Mauritania, and Tunisia, marital status does not seem to matter much for informality among women, in Morocco the informality share is larger for married women.

- *Informality is generally higher for young workers.* In Mauritania, Egypt, and Tunisia, informality rates are very high among those between the ages of 15 and 24, decrease rapidly until individuals reach 50 to 60 years of age (largely as informal workers find public sector jobs), and increase again as workers move to the informal sector after retiring from their formal jobs. In Morocco informality rates plateau between 25 and 29 years of age and increase monotonically afterward, possibly as relatively low-skilled workers find themselves stuck in informal employment (mainly in the agriculture sector) as they wait for an opportunity to work in the formal (mainly public) sector (Gatti and others 2014).

Table 2. Description of the Surveys for North African Countries

Country	Survey	Year	Description
Egypt	Labor Market Panel Survey (ELMPS)	2018	The 2018 wave of the ELMPS is the fourth wave of a longitudinal survey carried out by the Economic Research Forum (ERF) in cooperation with the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). Using this database, the study defines a worker as informal if he or she is not contributing to social security.
Mauritania	National Survey on Employment and the Informal Sector (ENE-SI)	2017	The ENE-SI was conducted by the National Statistics Office and the Ministry of Employment, Integration, and Vocational Training (see ONS 2017). Using this database, this study defines a worker as informal if he or she is not contributing to social security.
Morocco	National Survey on Household Consumption and Expenditure (ENCDM)	2014	The ENCDM was conducted by the High Commission for Planning (HCP)—Morocco's statistical office—between July 2013 and June 2014. Using this database, this study defines a worker as informal if he or she is self-employed.
Tunisia	National Survey on Household Budget, Consumption and Standard of Living (NSHBCSL)	2015	The NSHBCSL is carried out by the National Institute of Statistics every five years. Using this database, this study defines a worker as informal if he or she is not contributing to social security.

Sources: Egypt Labor Market Panel Survey (2018); Mauritania National Survey on Employment and the Informal Sector (2017); Morocco National Survey on Household Consumption and Expenditure (2014); and Tunisia National Survey on Household Budget, Consumption and Standard of Living (2015).

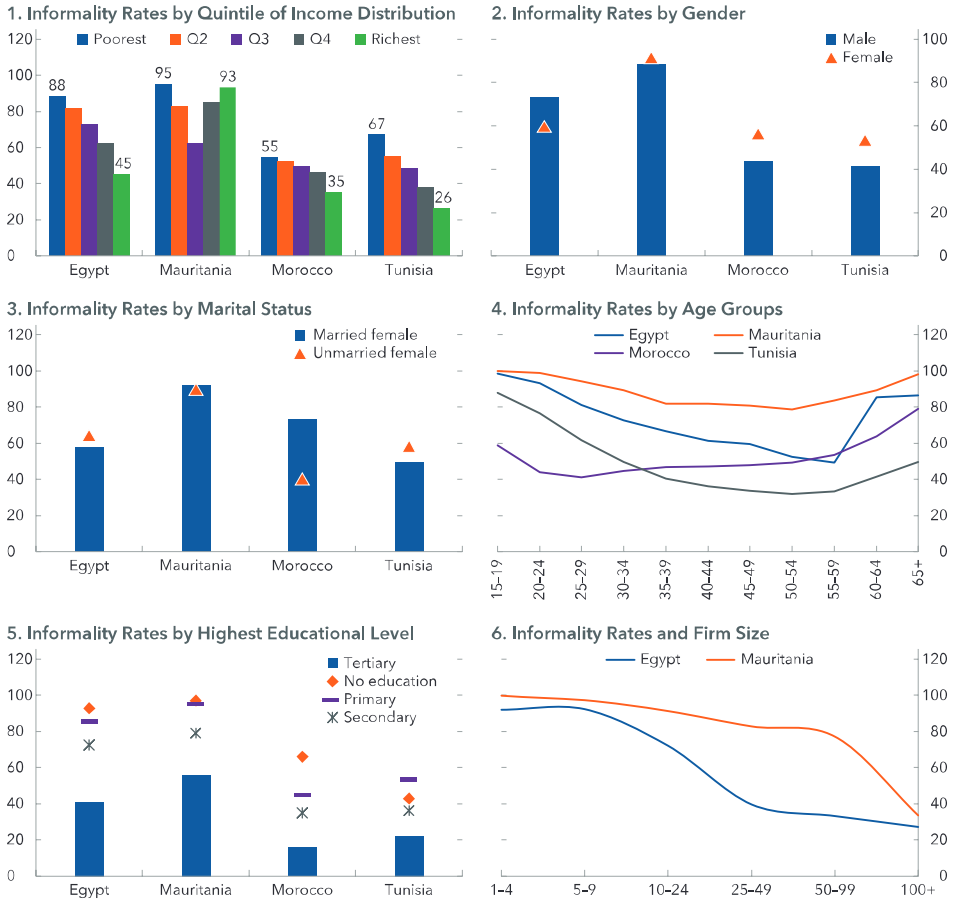
- *Informality shares are much higher for workers without education or with only primary education* than for workers who have completed secondary or secondary and tertiary education.
- *Informality is more prevalent among workers in small firms*. Data for Egypt and Mauritania show informality is concentrated in very small firms (with fewer than nine workers).[4]

Having a job in the public sector significantly reduces the probability of being informal in all North African economies. To assess which individual characteristics are more important for informality, a regression analysis (a linear probability model) of informality is conducted on all characteristics taken together (see Annex I for more details and results). With all other factors controlled for, working in public administration reduces the likelihood of being informal in all countries, by up to 35 percent in Morocco, relative to having a job in the secondary sector. Working in the agricultural sector increases the probability of being informal in Morocco and Tunisia, while working in the service sector reduces the probability of being informal only in Egypt. In addition to working in the public sector, other factors that seem to reduce the probability of having an informal job consistently across North African economies are (1) being head of a household and (2) having a formal worker in the household (by up to 60 percent).

The estimated probabilities also confirm the importance of education levels as a determinant of informality in North Africa. With all other factors controlled for, workers attaining tertiary education have a lower probability of being employed informally, compared with otherwise similar workers without tertiary education.

[4] This may reflect the lower propensity to grow among firms in the informal sector compared with those in the formal sector, but also the existence of regulatory or market barriers that force firms to remain small and informal despite their potential (Galiani and Weinschelbaum 2012).

Figure 5. Informality and Workers' Characteristics in North Africa
(Percent)

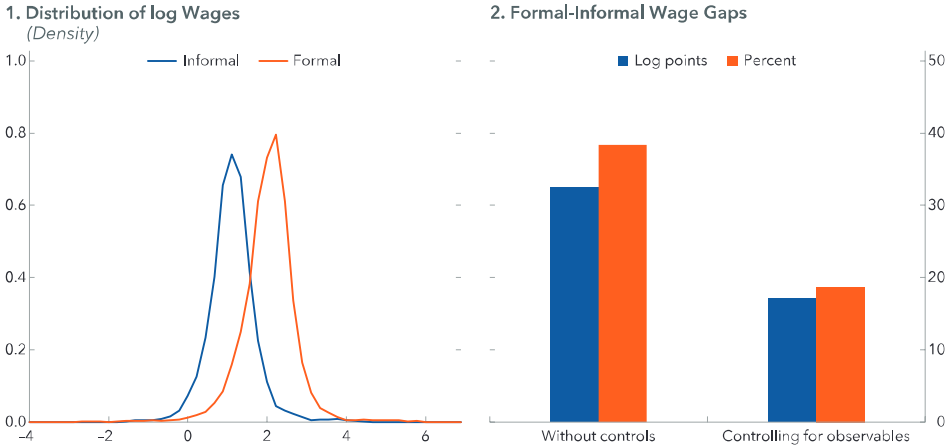


Sources: Economic Research Forum (Egypt), Egypt Labor Market Panel Survey (ELMPS) (2018); National Statistical Office and Ministry of Employment, Integration, and Vocational Training (Mauritania), National Survey on Employment and the Informal Sector (ENE-SI) (2017); and World Bank, Global Monitoring Database.
Note: Q2 = second quintile; Q3 = third quintile; Q4 = fourth quintile.

Interestingly, the negative link between education and the probability of being informal is stronger for the private sector than for the whole economy in Egypt, Morocco, and Tunisia. This confirms that the differences in informality rates by education levels shown in Figure 4 are not driven just by higher-education workers finding jobs in the public sector (as is the case for other economies in the Middle East and North Africa [MENA]; see Gatti and others 2014).

The results point to some differences in the role of gender, age, and the rural-urban divide as determinants of informality in the region. In particular:

Figure 6. Wage Gap in Egypt's Informal Sector



Source: IMF staff estimates.

- *Gender gap*: Once all other individual characteristics are controlled for, being a female is associated with a higher probability of having an informal job in Egypt's private sector and in Tunisia. There does not seem to be a statistically significant gender effect in Mauritania, while women have a 15 percent lower probability of having an informal job in Morocco. In light of these results, the greater informality share for women in Morocco in Figure 5 is likely a consequence of that country's high share of agriculture in overall employment and the concentration of female work in that sector. And the lower informality rate for women in Egypt may reflect the large share of public sector employment in that country and the fact that women who decide to join the labor force generally self-select themselves into public sector or formal jobs (Gatti and others 2014).

- *Urban-rural divide*: Working in urban areas seems to reduce the probability of being informal only in Morocco, while it does not seem to make a statistically significant difference in Egypt and Tunisia. In Mauritania, workers in urban areas are actually more likely to be informal, possibly reflecting the fact that the country's informal jobs are mainly in the trade sector, processing, and service activities—activities that are primarily located in urban areas (ONS 2012).

- *Age profile*: the estimated probabilities confirm that younger workers are more likely to work in the informal sector. In particular, after all other individual characteristics are controlled for, individuals 35–54 years of age are about 10 percent less likely to work in the informal sector than youth aged 15–24 in Egypt. In line with Figure 5, the association between age and informality is less strong (and with the opposite sign for workers older than 55) in Morocco.

A large wage gap exists between informal and formal workers. Comprehensive data on wages in the region are not available for all countries. Nonetheless, data for Egypt show net wages (defined as gross wages less income tax and social security contributions) as being higher in the formal sector (Figure 6). Further analyses show that this informal-formal net wage gap is statistically and economically significant. Results from a regression analysis show that formal workers in Egypt are paid almost 40 percent more than informal workers, even when workers' observable characteristics (like age education and job experience) are not controlled for. Once these characteristics are considered, the gap is reduced to close to 20 percent. This suggests that market segmentation gives rise to a "formality premium" that can explain about half of the difference in wages between formal and informal workers in Egypt (El Badaoui, Strobl, and Walsh 2010; Ulyssea 2018).

3. Informality, Level of Development, and Policy Distortions

This chapter assesses to what extent informality in North Africa can be associated with the level of economic development, as opposed to policy distortions. A set of development and policy variables is first assembled, and a cross-country regression framework is then used to evaluate their relative importance in accounting for informality in North Africa, compared with other regions. The study then employs a principal component analysis framework to assess the relative contribution of development and policy variables to the change in informality over the past two decades in North African economies. Given the uncertainty on the measurement of informality, the analysis presented considers both output informality, as proxied by the Schneider index, and employment informality, as proxied by the share of workers that do not contribute to a retirement pension scheme.

A. Correlates of Informality

First, an index of sociodemographic factors is built that proxies the level of economic development. Following Loayza and Wada (2010), the index is built for 177 countries as the simple (unweighted) average of the latest annual values for four variables: (1) the average years of schooling (from Barro and Lee 2013), (2) the share of youth in the population (from the World Bank's *World Development Indicators*, or WDI), (3) the share of agricultural employment (from the ILO), and (4) the share of rural population (from WDI). All these variables likely reflect a country's level of economic development, with least developed countries typically having lower levels of education, a younger population, more agriculture employment, and a higher incidence of rural population.[1]

Institutional and policy correlates of informality are then examined. For the same countries, these variables are grouped into four categories–(1) business regulation, (2) taxation, (3) labor market regulation, and (4) governance:

- *Business regulation*. To capture the relationship between informality and the business environment, several indicators are considered independently, including (1) an index of the *burden of government regulation* (from the World Economic Forum), (2) an index of regulatory quality from the World Bank (World Governance Indicators, or WGI) and (3) an index of the *availability of financial services* (from the World Economic Forum). Burdensome business regulation increases the costs of operating formally, while limited access to financial services reduces the benefit from formality.

- *Taxation*. While avoiding taxes is a key driver of informality, the relation between tax systems and informality is a complex one, as it depends on the motives for informality and country-specific circumstances (Box 1). As a first broad approximation, and in line with the cross-country analysis conducted in this paper, an index is constructed for the size of the tax burden as the average of the *top marginal income tax rate* (from the Fraser Institute, *The Economic Freedom of the World*, based on Pricewaterhouse Coopers tax data) and *total-value-added-tax-revenues-to-GDP* ratios (from the IMF). An indicator on the *effect of taxation* on incentives to work, from the World Economic Forum, is also examined. The larger the wedge between pretax total labor costs in the formal economy and after-tax labor earnings, the greater the incentives for firms and workers to work in the informal sector. Tax evasion from informal firms erodes the productivity advantage of formal ones, typically of larger size, forcing the government to collect more taxes from the formal sector.

[1] Each of the four variables is rescaled to a range between 0 and 1 by using the formula $(X - X_{min}) / (X_{max} - X_{min})$ (in which X_{max} and X_{min} are the highest and lowest values across the sample).

Box 1. Taxation and Informality

While this paper uses a broad indicator of the tax burden as a correlate to informality, the role played by tax systems in affecting firms' and workers' decisions to operate formally is a complex one, as it depends on the type of informality and specific-country idiosyncrasies. As discussed in Chapter 1, informality is a multifaceted phenomenon, involving highly heterogenous agents as diverse as low-skilled or subsistence workers, microbusinesses lacking capacity to access formal markets, and more productive firms and skilled individuals deliberately seeking to avoid regulation and evade taxes or other legal obligations. Moreover, rather than being a binary phenomenon, informality may be present in varying degrees, with economic agents meeting some criteria of formality but not all. For example, a registered and formal firm could hire workers off the books (Ulyssea 2018; Benjamin and Mbaye 2012), or a formal sector employee could have an informal side job.

While a complete taxonomy is outside the scope of this paper, a few tax-policy measures that can prove effective in either pushing agents toward informality or rebalancing the cost-benefit trade-off underlying deliberate noncompliance can include:

- *Simplified tax regimes for small businesses and the self-employed.* Small businesses and the self-employed tend to have a weak ability to bear registration and tax compliance costs. To circumvent this capacity constraint, a number of North African countries (including Algeria, Mauritania, Morocco, and Tunisia and more recently, Egypt) have introduced simplified flat-tax regimes for small businesses, in line with similar systems across emerging market economies. The evidence on the success of these regimes in encouraging formalization has been mixed, though, with either low take-up rates (Morocco) or high take-up rates but a tendency to underdeclare sales (Tunisia) or to include also larger taxpayers (Algeria). This points to significant difficulties in setting the right design of these regimes. For instance, in Morocco, eligibility conditions could have been set too tight (only self-employed workers are allowed, and with relatively low revenue eligibility thresholds) (CESE 2021); in Mauritania, onerous bookkeeping requirements might have limited the attractiveness of the regime for small and medium-sized enterprises; in Tunisia, the possibility of paying a small lump-sum tax for small businesses falling below a certain turnover threshold might have encouraged underreporting of revenue under the simplified regime; and the abuses in Algeria could reflect weak controls and generous eligibility conditions (high threshold and inclusion of both self-employed workers and juridical persons). Furthermore, a few factors may limit the attractiveness of simplified tax regimes in North Africa. For instance, joining the simplified regime does not generally imply an automatic participation by a particular business in social-protection systems. Ongoing reforms to simplified tax regimes in North Africa could address these limitations. For example, Morocco and Tunisia have moved toward new simplified tax regimes that include access to social protection (see Chapter 6), whereas Algeria has tightened eligibility conditions.

- *More efficient value-added tax (VAT) "chains of compliance" for formal firms.* Participation in VAT chains could work as an incentive to formalization, as compliant firms benefit from tax credits on purchased inputs. As such, compliance (and evasion) spreads along the VAT chain: compliant firms tend to trade with each other, and so do evaders (De Paula and Scheinkman 2010). Appropriate enforcement of VATs could tilt the cost-benefit trade-off for both large and small businesses toward voluntary compliance, or at a minimum, level the playing field by ensuring at least partial taxation of noncompliant businesses. All countries in the region now levy VATs, since the introduction of the tax in Egypt in 2016. In particular, the collection of VATs on imports, an important source of revenue for North African countries (generating, for example, more than 60 percent of Algeria's VAT receipts), should help spread compliance (Keen 2008). However, VAT exemptions are

Box 1. Taxation and Informality *(continued)*

a common feature across the region, raising risks of breaking compliance chains, particularly when they concern sectors with high informality rates, such as agriculture. The pervasiveness of cash is another challenge, but ongoing efforts to promote bank-based payments (Box 2) could help the development of VAT compliance chains in cash-intensive sectors, such as retail. Focusing VAT enforcement on large firms would be key in building compliance chains, given their small number and pivotal role as suppliers to and customers of smaller businesses (IMF 2015). In a similar vein, governments could consider creating withholding obligations for large firms or state-owned enterprises (as is done in Tunisia, for example), leveraging their large footprint in the economy to expand VAT compliance chains.

- *Lower "net formalization cost" of labor.* A high labor tax wedge may discourage participation in the formal sector. On one side, sufficiently high taxation on labor could reduce the demand for low-skilled labor. On the other, unskilled workers may find that the taxes they need to pay and contributions they need to make if engaging in formal work relations do not correspond to the benefits and quality of services they expect to receive and could decide to opt out of formal institutions (Perry and others 2007). In North African economies, there are features of the tax and transfer system that may act as a disincentive to work in formal employment. The average tax wedge on labor (difference between cost of labor and take-home pay after taxes are considered) tends to be relatively large, compared with that in other economies in the Middle East and North Africa, mainly reflecting relatively high social security contributions (Box Table 1.1). Lower taxes on labor income could be associated with the elimination of inefficient tax exemptions, a key priority under fiscal reform strategies across the region. Algeria, Morocco, and Tunisia have introduced temporary exemptions from taxes and social contributions for informality-prone categories, including young people and first-time job seekers or sectors such as agriculture and tourism. While these measures

Box Table 1.1. Statutory Tax Rates (2021)
(Percent)

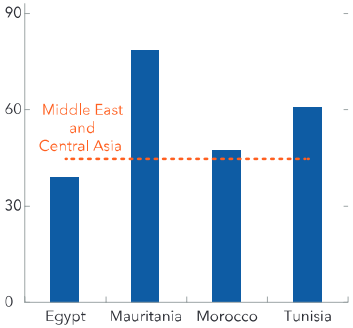
	Top PIT rate	Social security contribution rate	
		Employer	Employee
Algeria	35	26	9
Egypt	25	18.8	11
Mauritania	40	20	5
Morocco	38	21.1	6.7
Tunisia	35	16.6	9.2
Averages			
Middle East and Central Asia	18.3	14.2	6.4
Advanced economies	39.9	17.1	10.7
Emerging market and developing economies	24.5	12.6	8.4

Sources: KPMG Tax Rates Online; and national authorities.

Box 1. Taxation and Informality *(continued)*

can have some effect at the margin, the existence of a large wage premium for formal jobs in the region (estimated at 20 percent of net wages in Egypt; see Chapter 2) suggests a reduction of the tax wedge may have an impact on informality only if implemented aggressively and on a more persistent basis.[1] In parallel, delinking tax allowances or social transfers from the number of earners in a household (and allowing all earners to benefit from them) would encourage the participation of both spouses (particularly females) in the formal labor market.

Box Figure 1.1. Competition from the Informal Sector
(Percent of respondents facing competition from the informal sector)



Sources: WBES (latest available data); and IMF staff.

- *Strengthen tax enforcement.* Enforcement is crucial to promote formalization while balancing considerations of cost-effectiveness and economic equity. Focusing on evasion by the most affluent or larger firms would go a long way toward bolstering revenue collection and a culture of compliance. Also, targeting smaller informal players would send a powerful signal that the state is tackling unlawful competition to formal enterprises from unregistered, lower-cost businesses (Box Figure 1.1). Temporary waivers of penalties and tax amnesties (Algeria, 2015 and 2022; Egypt, 2021; Morocco, 2021; Tunisia, 2022) should be avoided, and if they must be implemented, they should be on an exceptional basis and followed by perceptible strengthening of enforcement, lest the credibility of the tax system be undermined by expectations of more in the future. Strong enforcement should be accompanied by adequate institutional safeguards to counterbalance the administration's discretionary power and enhance taxpayers' trust in the equity of the system and the fairness of treatment. Dabla-Norrris and Inchauste (2007) find that a higher quality of enforcement and judicial institutions is associated with stronger growth of formal firms, which could partly offset their compliance cost. Enforcement policies also need to avoid raising pressure on vulnerable segments of the population to excessive levels, or where formal employment opportunities are scarce, to avoid aggravating poverty, stoking social tensions, or generating worse social outcomes, such as mergers between informal and criminal networks.

[1] This may help explain why empirical evidence of the link between tax wedges and informality has been difficult to establish, although the relationship is more apparent for low-income individuals (OECD/IDB/CIAT 2016). Colombia provides one successful example in which a major reduction in labor taxes (a 13.5 percentage point reduction in employer social security contributions in 2012) has been associated with a 1–2 percentage point reduction in informality (Fernandez and Villar 2016; OECD 2017).

- *Labor market regulation*. The paper uses a set of variables that capture the degree of rigidity of labor market laws and institutions, including (1) an index of *hiring and firing practices* (from the Fraser Institute, based on the World Economic Forum), (2) a *flexibility of wage determination* index that captures the extent to which wages are set in a collective bargaining process (also from the Fraser Institute, based on the World Economic Forum), and (3) *minimum wages* (as a ratio to the average value added per worker, computed using data from the ILO and World Bank). While intended to protect workers, excessively rigid and cumbersome labor legislation (especially if associated with poor governance and low institutional quality) may have the unintended effect of discouraging firms from hiring formal employees.

- *Governance*. The quality of governance is captured through a few indicators, including the *integrity of legal system* index, which captures the strength and impartiality of the legal system, as well as general compliance with the law (from the Fraser Institute, based on PRS Group, *International Country Risk Guide*); the *rule of law* index (from the World Bank, WGI), which captures the quality of the justice system, contract enforcement, and property rights; the *government effectiveness* index, which captures perceptions of the quality of public services and policy formulation and implementation (from the World Bank, WGI); the *control of corruption* index (from the World Bank, WGI); and finally, the *transparency of government policy-making* indicator, from the World Economic Forum. Governance-related indicators are typically found to be negatively associated with the prevalence of informality, as the lack of a strong rule of law and efficient court systems and lack of transparency on government policies reduce the legal benefits of formality and also point to the state's weak enforcement powers (Dreher and Schneider 2009; Botero and others 2004). Better institutions and more impartial legal systems typically also lower transaction costs (North 1991) and positively affect investment in the formal sector (Maiti and Bhattacharyya 2020).

Simple bivariate correlations between output informality and these variables all have the expected signs (Figure 7). Consistent with what is shown in Chapter 2, the index of sociodemographic factors (higher shares of agricultural employment in the economy, lower average education levels, and a younger labor force, along with a greater rural population) tends to be associated with a higher prevalence of the informal sector. As for the policy indicators, there exists a clear positive correlation between the size of output informality and both the burden of government regulation and taxation. By contrast, a greater availability of financial services, more wage flexibility, and better governance are all associated with lower levels of output informality. The majority of correlation coefficients are statistically significant, particularly those for the indicators of governance and availability of financial services, while the link between labor market policy variables and informality appears to be relatively weaker.

Although there is some variation in the region, on average North African economies score relatively low on many of these indicators. On average over the last two decades, the indicators of governance and business climate generally show North Africa scoring well below advanced economies and emerging markets (Figure 8). The gap seems to be less pronounced when one compares indicators capturing the tax burden and labor market rigidities. Chapter 6 discusses in more detail the differences in policy indicators across North African economies, recent policy changes, and remaining challenges.

B. Regression Results

An empirical analysis is next conducted of the correlates of informality in North Africa. The correlation patterns shown in Figure 7 suggest that the sociodemographic factor index and the indicators of policy distortion considered in the previous subsection are all correlates (and potential determinants) of informality. The relative role of these indicators in accounting for informality in a multivariate (cross-section) regression framework, in which they serve as explanatory variables of output and employment informality, is now assessed. Obviously, the results of the regressions should not be taken to indicate a causal relationship between the regressors and informality, given potential endogeneity issues. A potential problem in

Figure 7. Output Informality and Its Relationships With Various Indicators
(Averages, 2000–19)

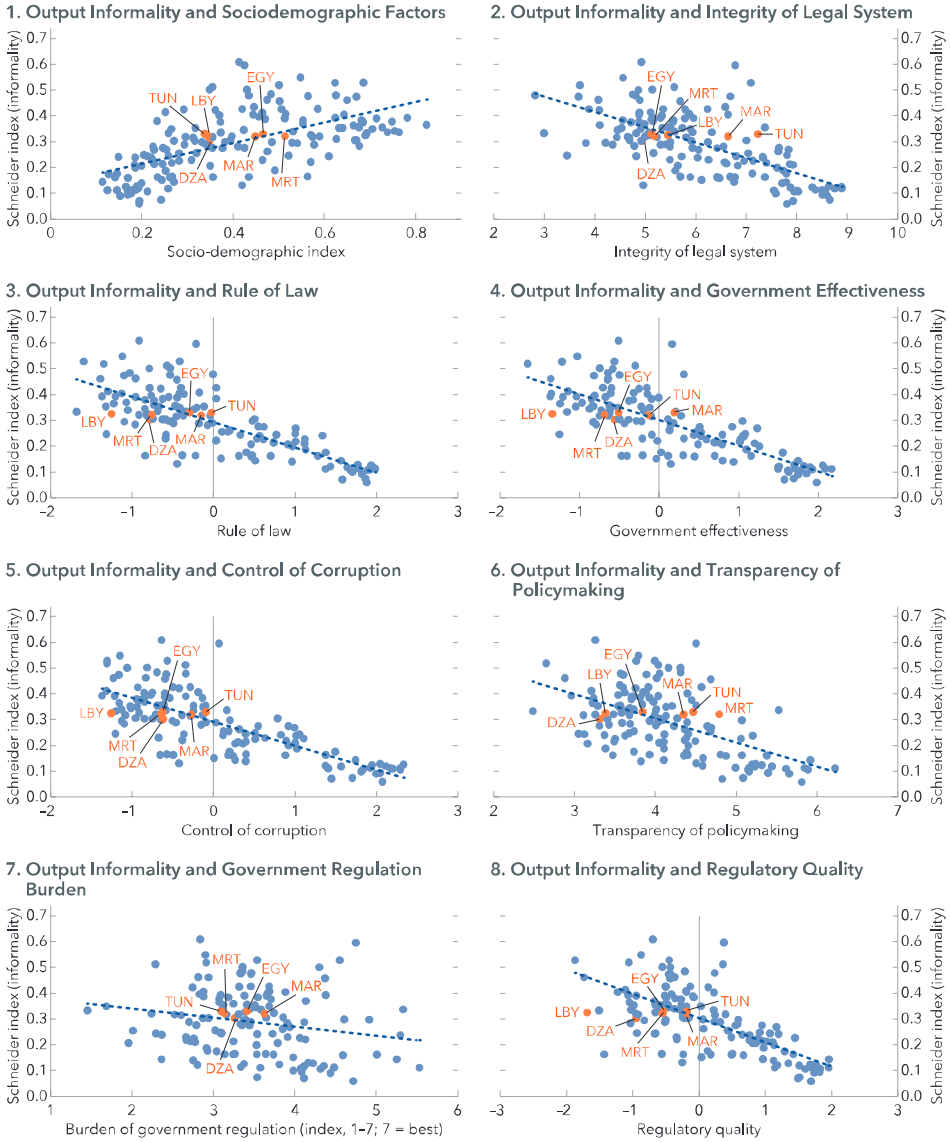
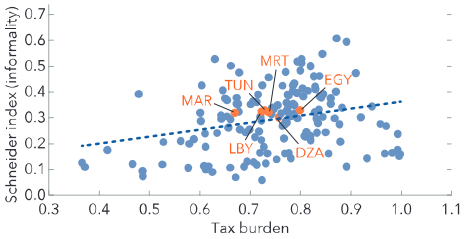
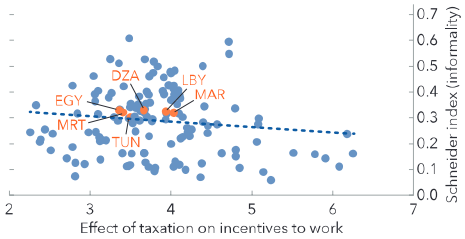


Figure 7. Output Informality and Its Relationships With Various Indicators (Continued)
(Averages, 2000–19)

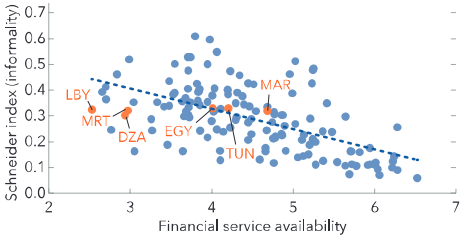
9. Output Informality and Tax Burden



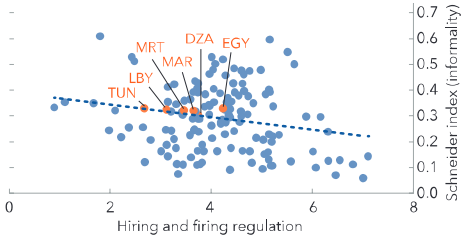
10. Output Informality and Effect of Taxation on Work Incentives



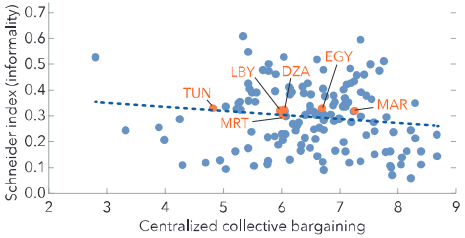
11. Output Informality and Availability of Financial Services



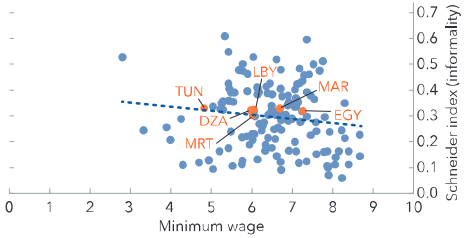
12. Output Informality and Hiring/Firing Regulation



13. Output Informality and Collective Bargaining



14. Output Informality and Minimum Wage



Source/Note: The *sociodemographic factor* index (IMF staff estimates) ranges between 0 and 1, with a higher value associated with a lower level of economic development. The *integrity of legal system* index (Fraser Institute, based on PRS Group, *International Country Risk Guide*) ranges between 1 and 10, with a higher value indicating greater strength and impartiality of the legal system. The *rule of law*, *government effectiveness*, *control of corruption*, and *regulatory quality* measures (World Bank) are standardized to have a mean of 0 and a standard deviation of 1 and range from –2.5 to 2.5, with higher values corresponding to better governance and lower regulatory burden. The *transparency of government policymaking* index (World Economic Forum, or WEF) ranges between 1 and 7, with a higher score associated with a more transparent government. The *burden of government regulation* index (WEF) ranges from 1 to 7, with a higher score associated with a smaller government regulatory burden. The *tax burden* index (IMF staff estimates) ranges between 0 and 1, with a higher score signaling a greater tax burden. The *effect of taxation on incentives to work* index (WEF) ranges from 1 to 7, with a higher score associated with a less distortionary tax system. The *financial services availability* index (WEF) ranges between 1 and 7, with a higher score associated with greater availability of financial products and services. The *hiring and firing regulations* index (Fraser institute, based on WEF) ranges from 1 to 10, with higher values associated with lower costs for employers associated with hiring and firing employees.The *flexibility of wage determination* index (Fraser Institute, based on WEF) ranges between 1 and 10, with a higher value indicating greater flexibility (a smaller role for centralized bargaining). The *minimum wage* (International Labour Organization; World Bank; and IMF staff calculations) ranges from 1 to 10, with a higher average value added per worker associated with higher labor costs for the employer. Data labels in the figure use International Organization for Standardization (ISO) country codes. AEs = advanced economies; EMEs = emerging market economies; LICs = low-income countries.

Figure 8. Policy Indicators
(Averages, 2000-19)

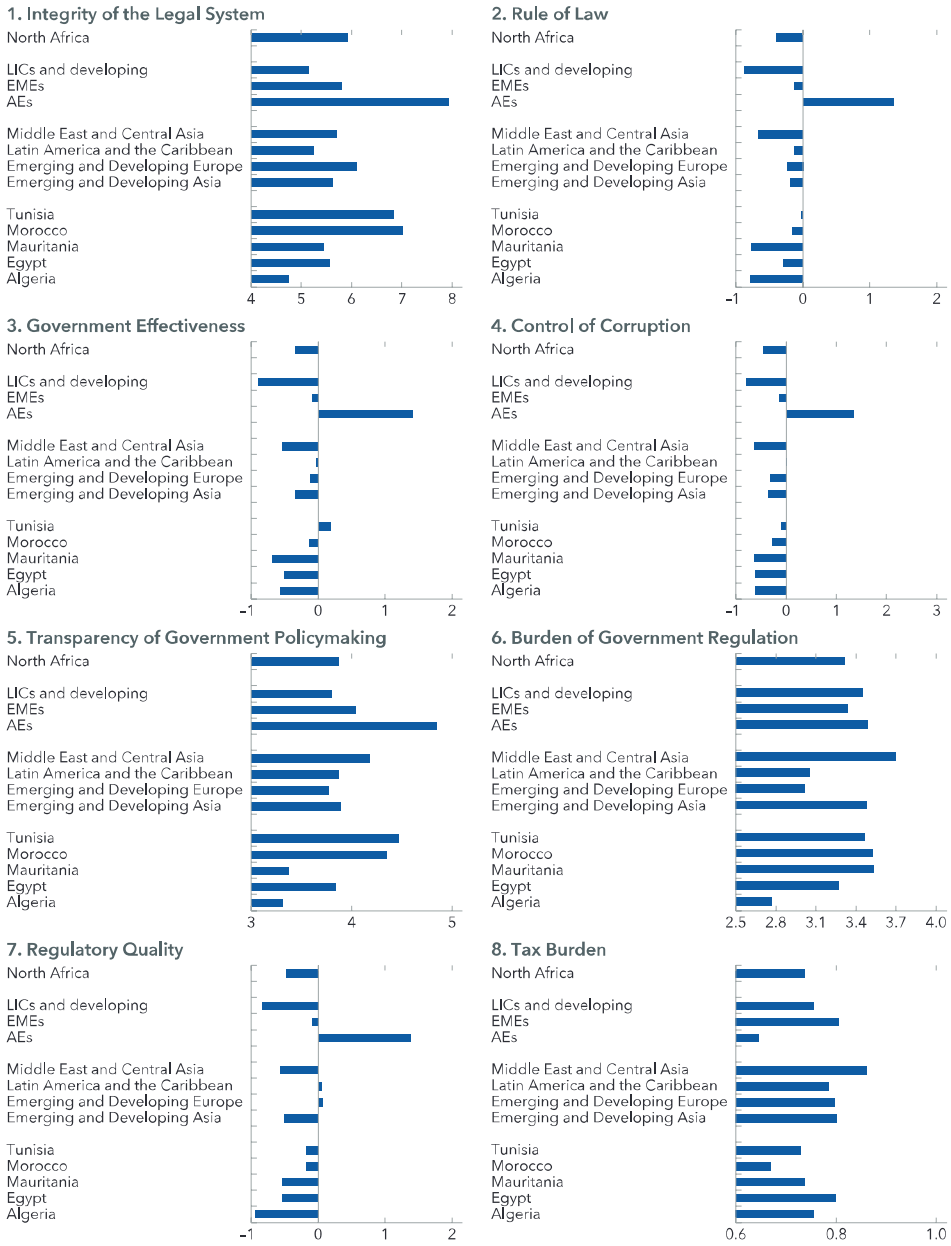
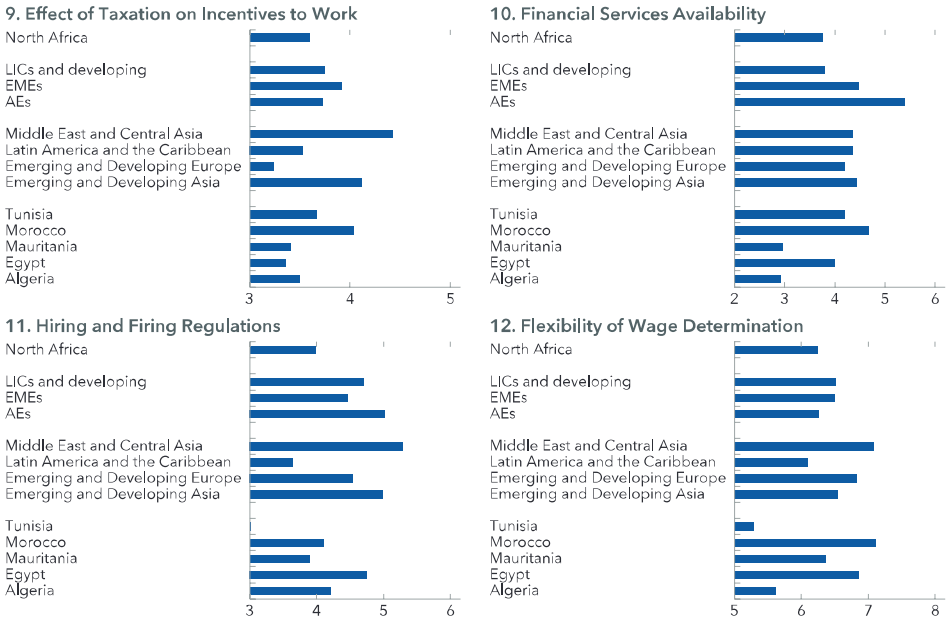


Figure 8. Policy Indicators (Continued)
(Averages, 2000-19)



Source/Note: The *sociodemographic factor* index (IMF staff estimates) ranges between 0 and 1, with a higher value associated with a lower level of economic development. The *integrity of legal system* index (Fraser Institute, based on PRS Group, *International Country Risk Guide*) ranges between 1 and 10, with a higher value indicating greater strength and impartiality of the legal system. The *rule of law*, *government effectiveness*, *control of corruption*, and *regulatory quality* measures (World Bank) are standardized to have a mean of 0 and a standard deviation of 1 and range from –2.5 to 2.5, with higher values corresponding to better governance and lower regulatory burden. The *transparency of government policymaking* index (World Economic Forum, or WEF) ranges between 1 and 7, with a higher score associated with a more transparent government. The *burden of government regulation* index (WEF) ranges from 1 to 7, with a higher score associated with a smaller government regulatory burden. The *tax burden* index (IMF staff estimates) ranges between 0 and 1, with a higher score signaling a greater tax burden. The *effect of taxation on incentives to work* index (WEF) ranges from 1 to 7, with a higher score associated with a less distortionary tax system. The *financial services availability* index (WEF) ranges between 1 and 7, with a higher score associated with greater availability of financial products and services. The *hiring and firing regulations* index (Fraser institute, based on WEF) ranges from 1 to 10, with higher values associated with lower costs for employers associated with hiring and firing employees.The *flexibility of wage determination* index (Fraser Institute, based on WEF) ranges between 1 and 10, with a higher value indicating greater flexibility (a smaller role for centralized bargaining). The *minimum wage* (International Labour Organization; World Bank; and IMF staff calculations) ranges from 1 to 10, with a higher average value added per worker associated with higher labor costs for the employer. Data labels in the figure use International Organization for Standardization (ISO) country codes. AEs = advanced economies; EMEs = emerging market economies; LICs = low-income countries.

this analysis is the issue of collinearity across the indicators employed—if the sociodemographic factor index and the policy variables are highly correlated across each other (which would be the case if countries with relatively greater policy distortions are also the ones with relatively lower levels of development), that would undermine the interpretation of their relative contribution in explaining the informality levels predicted by the regression model. Table 3 suggests that many of the bivariate correlations across the study's regressors are relatively low (the average absolute value of the bilateral Pearson's correlation coefficient is about 35 percent), although the indicators of governance quality exhibit a relatively stronger correlation among themselves, with the sociodemographic factors index, and with the indicator of access to financial services. This concern is taken into consideration in the regression model employed, which tries to minimize the risk of collinearity in the methodology, and in interpreting the results.

Table 3. Correlation Matrix of Independent Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Sociodemographic index	1													
2	Tax burden	0.211	1												
3	Effect of taxation on incentives to work	-0.014	0.341	1											
4	Government effectiveness	-0.750	-0.354	0.157	1										
5	Transparency of government policymaking	-0.355	-0.134	0.549	0.723	1									
6	Integrity of legal system	-0.572	-0.322	0.077	0.801	0.617	1								
7	Control of corruption	-0.703	-0.405	0.203	0.953	0.752	0.838	1							
8	Rule of law	-0.712	-0.355	0.178	0.968	0.728	0.856	0.972	1						
9	Burden of government regulation	0.195	0.223	0.748	0.144	0.663	0.150	0.195	0.171	1					
10	Regulatory quality	-0.713	-0.267	0.156	0.961	0.716	0.786	0.930	0.958	0.172	1				
11	Financial services availability	-0.572	-0.172	0.369	0.823	0.747	0.593	0.777	0.791	0.263	0.818	1			
12	Hiring and firing regulations	0.050	0.232	0.648	0.237	0.525	0.149	0.226	0.249	0.717	0.274	0.347	1		
13	Minimum wage	0.135	-0.018	0.026	-0.105	0.057	0.008	-0.061	-0.060	0.089	-0.084	-0.017	0.017	1	
14	Flexibility of wage determination	-0.011	0.358	0.330	0.123	0.289	0.162	0.093	0.158	0.365	0.219	0.188	0.499	0.029	1

Source: IMF staff calculations.

The regression results show that sociodemographic factors and policy distortions are associated with informality in a statistically and economically significant way. The cross-sectional analysis covers about 130 countries and uses averages for the 2000–19 period for all variables (if available, or approximate period averages if data are missing). Initially, only the proxy for economic development is considered as a regressor, and then subsequently the policy distortion variables are added one at the time, in a stepwise fashion, to address multicollinearity concerns. Irrespective of the specification, the results are remarkably robust: all regression coefficients have the expected signs and are highly statistically significant (Annex Tables 2.2 and 2.3).[2] The regression with the strongest prediction power (the highest R-squared) is the one in which all policy distortion variables are jointly considered, suggesting that no single explanatory variable is sufficient to explain informality and all of them have independent explanatory power with respect to informality. Based on the average R-squared and coefficient significance, the regression with the indexes on business regulation, tax burden, integrity of legal system, and flexibility of wage determination is used as the baseline regression specification (column 14 in the regression tables). The comparison of realized and fitted values also points to a relatively solid goodness of fit, especially for the Schneider indicator of informality (Annex Figure 2.2). Finally, tests for the degree of multicollinearity show limited reasons for concern.[3]

To assess the relative importance of the correlates of informality in North Africa, two different exercises are undertaken:

- *Dominance analysis*. First, the relative contribution of each explanatory variable in predicting the level of informality is assessed by comparing its additional contribution to the *R*-squared value when it is inserted into the baseline regression. As regressions cannot be performed only for North African countries, the sample is restricted to the group of countries with a medium level of informality, which includes all North African economies (see Annex Table 2.1).

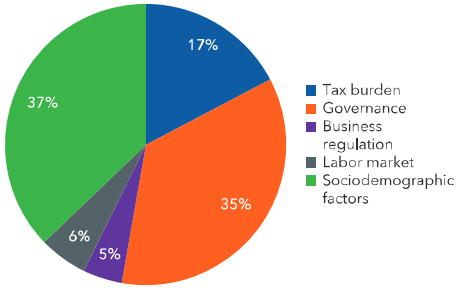
- *Distance from the frontier*. Second, the importance of the socioeconomic index and policy distortion variables in explaining the difference in informality between North African economies and advanced economies is assessed. The contribution of each variable is obtained by multiplying the corresponding baseline regression coefficient by the difference between the value of this explanatory variable in each North African country and its average for advanced economies. The importance of each determinant of informality is thus a function of the size of its effect on informality in the cross-country regression and how far the North African economies are from the advanced economies comparator group regarding this variable (Loayza and Wada 2010).

The "dominance analysis" shows that policy distortions contribute significantly to the predicted output informality in medium-informality countries. The socioeconomic index accounts for about one-third of the predicted output informality in the medium-informality group of countries, with the rest explained by policy distortion variables. Among these variables, the indicators of governance quality and tax burden seem to play a more important role, as together they explain about one-half of the informality in the medium-informality group of countries (Figure 9). While these results are in line with the ones obtained for the full sample of countries, the tax burden seems to be a more relevant determinant of informality in the medium-term informality group compared with the full sample, as it explains about 17 percent of informality in this group, compared with 10 percent in the full sample. Although labor market frictions are found to explain only 6 percent of the informality for the medium-informality group, the least among the policy variables, they are relatively more meaningful than in the full sample (2 percent).

[2] As robustness checks, 64 additional regressions are performed in which each indicator of business climate and governance is considered alongside indicators of labor market regulation, with the ones with the highest R-squared values selected. This robustness check also motivates the variable choice in Annex Tables 2.2 and 2.3.

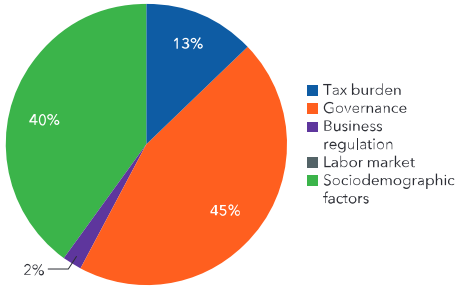
[3] As reported in Annex Tables 2.2 and 2.3, the average variance inflation factor (VIF) values are well below 10 (the tolerance level), meaning that no individual regressor appears to be a linear combination of other regressors.

Figure 9. Dominance Analysis–Medium Informality Group
(Percent, using Schneider index)



Source: IMF staff estimates.

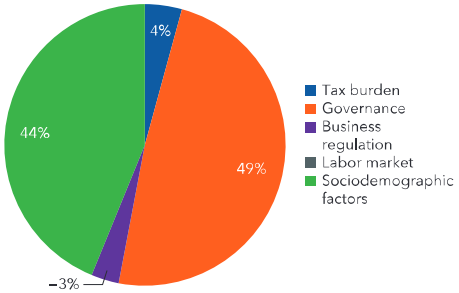
Figure 10. Distance to Frontier: Excess Informality between North Africa and Advanced Economies
(Percent of total difference, Schneider index)



Source: IMF staff estimates.

The "distance from the frontier" exercise confirms a significant role of policy distortions in driving output informality in North African economies. About 60 percent of the difference in the predicted output informality between North Africa and advanced economies is found to be explained by differences in policy variables between the two groups of countries (Figure 10). In looking at the role of the policy variables individually, the indicators of quality of governance and of the tax burden are the most important contributors to the predicted surplus of output informality in North Africa compared with advanced economies. The figure shows that if governance indicators for North Africa were to achieve the same levels as those in advanced economies, this could reduce the explained informality gap between the two regions by about 45 percent, while eliminating the gap in the tax burden would reduce the explained informality gap by 13 percent.

Figure 11. Distance to Frontier: Excess Informality between North Africa and Advanced Economies
(Percent of total difference, pension scheme)

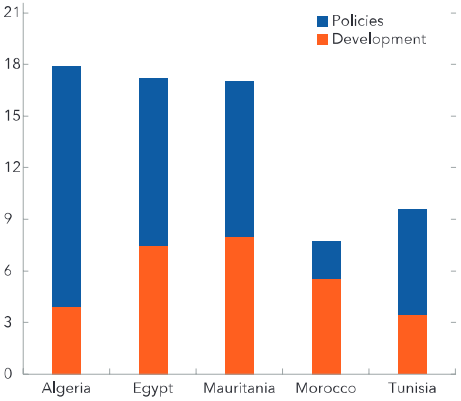


Source: IMF staff estimates.

Using an employment measure of informality suggests a somewhat smaller, but still relevant, role for policy distortions in North Africa. Conducting the cross-country regressions on the share of employed workers who do not pay social security contributions yields the result that about 44 percent of the predicted employment informality surplus in North Africa relative to advanced economies is associated with the region's relatively lower level of development, with the rest accounted for by differences in policy distortions (Figure 11). Among those, the relatively weaker quality of governance seems to be the most important contributor to the higher level of informality in North Africa, followed by the greater tax burden and a relatively less business-friendly environment in the region.

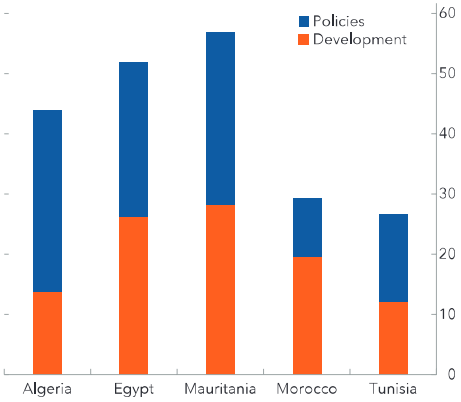
Looking at the breakdown for North African economies confirms the significant role played by policy gaps in explaining those economies' higher informality levels. Differences in policy indicators relative to advanced economies can explain between 30 and 75 percent of North African informality surplus, depending on the informality indicator (Figures 12 and 13). Among North African economies, Algeria is the country where policy gaps seem to explain the greatest share of the informality gap, while Morocco is the one with the lowest share. Country-by country differences in the policy indicators are discussed in more detail in Chapter 6.

Figure 12. Factors Explaining the Informality Gap between North African Countries and Advanced Economies
(Percentage points, Schneider index)



Source: IMF staff estimates.

Figure 13. Factors Explaining the Informality Gap between North African Countries and Advanced Economies
(Percent, pension scheme)



Source: IMF staff estimates.

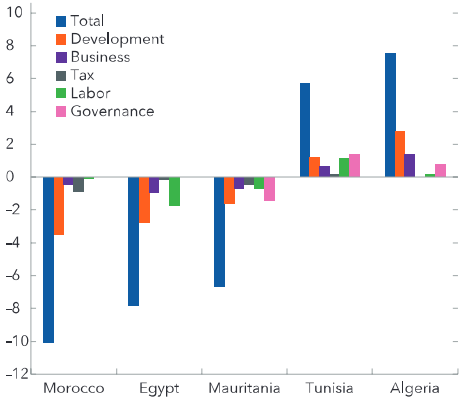
C. Informality Trends in North Africa

This subsection assesses the relative contribution of sociodemographic factors and policy variables to the change in informality in North Africa over the past two decades. As shown in Chapter 2, while measures of self-employment show a decline in all countries in the region since early 2000, the patterns of informality have not been homogenous across North African countries in this period. While Egypt, Mauritania, and Morocco experienced a decline in informal output, the Schneider indicator increased in Algeria and Tunisia, particularly after the global financial crisis. The cross-country regression analysis of the previous subsection is complemented by assessing the contributions of sociodemographic, development, and policy variables to such variation of informality in North Africa.

This is accomplished using a principal component analysis of informality trends in North Africa over the last decade. The aim of the principal component analysis is to construct country-specific composite indices of informality (meaning that they encompass both the output and employment dimension of informality) for five North African countries, covering the 2005–17 period. These indices are the first principal component of a set of variables that include the indicators of informality considered in Chapter 2, as well as the variables related to the level of development and policy distortions considered in this section, as available in time-series format for the North African economies (Annex Table 2.4). The first principal component is the weighted linear combination of standardized values of all these variables that captures most (at least 60 percent) of their combined variation (see also HCP 2020 for a similar methodology) (Annex Figure 2.2). The contribution of each variable to the change in the composite index of informality over the period 2005–17 is then calculated.

The results show that changes in informality in North African countries during the period are partly attributable to policy factors. On average across North African economies, more than 30 percent of the changes in the composite informality index in North Africa between 2005 and 2017 is explained by the changes in the policy variables considered in the analysis presented in this paper. This average, however, masks significant differences across countries (Figure 14). In particular, improvement in policy variables plays some role in explaining the decline of the composite indicator of informality employed in this paper over 2015–17 in

Figure 14.Contribution of Development and Policy Variables to the Change in Informality between 2005 and 2017
(Index points, 2005–2017)



Source: IMF staff estimates.

Egypt, Mauritania, and Morocco (although most of the decline reflects nonpolicy variables, in line with what observed in Chapter 2), while higher informality in Algeria and Tunisia reflects failure to remove policy distortions, in addition to slower progress in accelerating economic development.

4. Policies to Reduce Informality: A Model Approach

This chapter presents a general equilibrium model to study the impact of selected labor and product market reforms on informality and growth in North Africa. There are several advantages in adopting a model-based approach relative to relying on cross-country empirical regressions. First, in the absence of a quasi-experimental setting to study the impact of specific reforms, cross-country evidence cannot provide information regarding the causal impact of structural reforms on informality and growth. In addition, reduced-form regressions are silent on the underlying channels of structural reforms and their relative quantitative importance. Moreover, empirical results can measure only partial equilibrium effects, while the model employed here is able to account for the general equilibrium impact of reforms by allowing wages and prices to respond endogenously.

The model builds on Lambert, Pescatori, and Toscani (2020) and describes a dynamic small open economy in general equilibrium, with formal and informal labor and product markets. It features a representative household that consumes both formal and informal goods. Importantly, the household's preferences are such that the consumption of the informal good is independent of income level. This means that, for a given relative price of the informal good, the share of the informal-good expenditure declines as income increases, thus leading to a negative relationship between GDP per capita and informality.

In the model, firms and workers decide whether to operate in the formal or informal sector. This decision depends on three key variables: (1) firm entry costs, (2) payroll taxes, and (3) hiring costs. Firms decide to enter the formal sector only if their expected discounted profits are greater than the immediate entry costs. Elevated hiring costs also work as a disincentive to formality, as they reduce the expected profits from operating in the formal sector. Payroll taxes affect households' decisions to supply labor in the formal sector. The higher the payroll taxes, the higher the wage level that formal employers have to offer, and therefore the lower the demand for formal work.

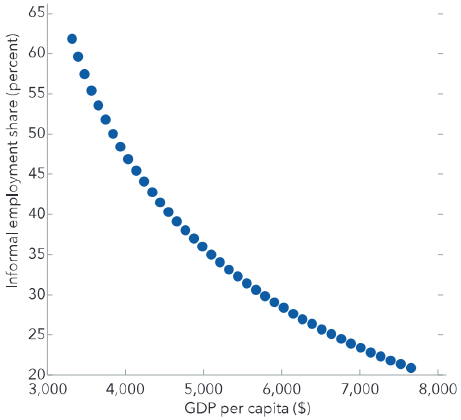
The model is calibrated to target key moments of the Moroccan economy, using quarterly and annual data for the period between 1991 and 2020. Table 4 shows that the steady-state values of a few key variables in the model match the actual ratios relatively well. In particular, the model at steady state is able to reproduce Morocco's main labor market ratios, such as the share of informal labor and relative (formal to informal sector) wages, and does reasonably well with other major macroeconomic variables, such as the share of informal output, the investment-to-GDP ratio, and the imports-to-GDP ratio (Table 4).

Table 4. Steady-State Model Ratios and Data

Targeted Moments	Description	Data	Model
L_I/L	Informal labor share	0.54	0.63
W_F/W_I	Formal-to-informal-wage ratio	1.25	1.26
U	Unemployment rate	0.09	0.17
$P_I Y_I/GDP$	Informal output share	0.29	0.49
$P^{inv} I/GDP$	Investment-to-GDP ratio	0.33	0.21
$P^f M/GDP$	Import-to-GDP ratio	0.41	0.31

Source: IMF staff calculations.

Figure 15. GDP and Informality



Sources: IMF staff calculations.

Starting from the baseline calibration, how the informal share of employment responds to increases in the level of total factor productivity in the formal sector (relative to the informal one), with everything else kept constant, is also investigated. As illustrated in Figure 15, the model does remarkably well in generating a negative and convex relationship between GDP per capita and informality, along a range of GDP per capita values that fit those of North African countries.

The model is used to investigate the role of structural (labor and product market) reforms in reducing informality and boosting growth in the long term. To do that, four different simulations are conducted: (1) one in which entry costs in the formal business sector are reduced by half, (2) one with a 50 percent reduction in payroll taxes for formal workers, (3) a scenario with 50 percent lower hiring costs for formal workers, and finally (4) a scenario in which entry costs, payroll taxes, and hiring costs are simultaneously reduced by 50 percent.

The simulation results point to significant macro effects of structural policies that manage to reduce informality. Table 5 reports the (steady-state) level of GDP and informality in the four different scenarios. A reduction of entry costs increases GDP by about 5½ percent and reduces the share of labor informality from 63 percent in the baseline to 58½ percent. An equivalent reduction in hiring costs increases GDP by only 1.5 percent and reduces labor informality by 1.4 percentage points. Halving payroll taxes delivers an 8.9 percent increase in GDP and reduces labor informality by approximately 13 percentage points relative to the baseline. When all the three structural bottlenecks are simultaneously reduced, GDP increases by about 19 percent, and informality falls by about 30 percent.

In principle, two main mechanisms are behind the reduction in informality: (1) a direct channel, as lower bottlenecks increase the expected profits associated with being formal and so induce more workers and firms to enter the formal sector; and (2) an indirect channel, according to which more entry in the formal sector increases GDP and thus decreases households' share of informal-good consumption, via the quasi-linear preference structure described earlier. Table 5, however, shows that the direct channel accounts for almost the totality of the reduction in informality following the reforms considered.

Table 5. The Steady-State Impact of Reforms on GDP and Employment Informality

Variable	Baseline	1. Lower Entry Costs (-50%)	2. Lower Hiring Costs (-50%)	3. Lower Payroll Taxes (-50%)	4. Flexible Equilibrium (-50% all bottlenecks)
Real GDP	-	+ 5.6%	+ 1.5%	+ 8.9%	+ 19.3%
Employment informality share	63%	**Direct:** 59.4% **Total:** 58.7%	**Direct:** 61.8% **Total:** 61.6%	**Direct:** 50.9% **Total:** 49.8%	**Direct:** 45.8% **Total:** 44.4%

Source: IMF staff calculations.

While these results apply to Morocco, the general implication of the model can be extended to other North African economies with similar levels of economic and institutional development: structural reforms that significantly reduce the distortions preventing firms and workers from choosing to operate in the formal sector promise to help lower informality and boost long-term growth. While the relative contribution of each policy measure depends on how binding are the distortions it aims to reduce (with a cut in payroll taxes seemingly the largest contributor to formalization in Morocco), a general principle emerges that the greatest impact comes from applying these reforms simultaneously, in line with conclusions reached in other papers following similar research methodologies (see, for instance, Bouis and Duval 2011; Cacciatore, Duval, and Fiori 2012; IMF 2017, 2019; and Sarr, Benlamine, and Munkacsi 2019).

5. Informality, the Labor Market, and Business Cycles

While there is a rich literature on the determinants of informality and its impact on growth and welfare, there are fewer studies on the link between informality and the business cycle (see World Bank 2019a). Some studies show that the share of informal employment tends to rise during economic downturns, suggesting a countercyclical role for informality as it provides a buffer for workers who lose their (formal) job during recessions, in the absence of strong safety nets (Loayza and Rigolini 2011; Ohnsorge and Yu 2021). Other studies, however, mainly using indicators of output informality, find informality to behave procyclically (see, for example, Ferreira-Tiryaki 2008 and Ohnsorge and Yu 2021).

This chapter focuses on the role played by employment informality in affecting labor market adjustments to output fluctuations in North Africa. After documenting key features of labor markets in five North African economies (Algeria, Egypt, Mauritania, Morocco, and Tunisia), the chapter examines how informality affects the short-term relationship between labor market developments and output fluctuations (Okun's law) in North Africa, compared with other regions. To do this, it investigates the cyclicality of informal employment using various methodologies, including correlation analysis, econometric regressions, and event studies that distinguish between the upswing and downswing phases of the business cycle. The chapter finds that the response of labor markets to business cycle fluctuations is relatively more muted in countries with relatively higher informality levels, like the North African economies, compared with countries with lower levels of informal employment. It concludes by discussing how informal employment was affected during the pandemic and the possible role of informality in the labor market recovery.

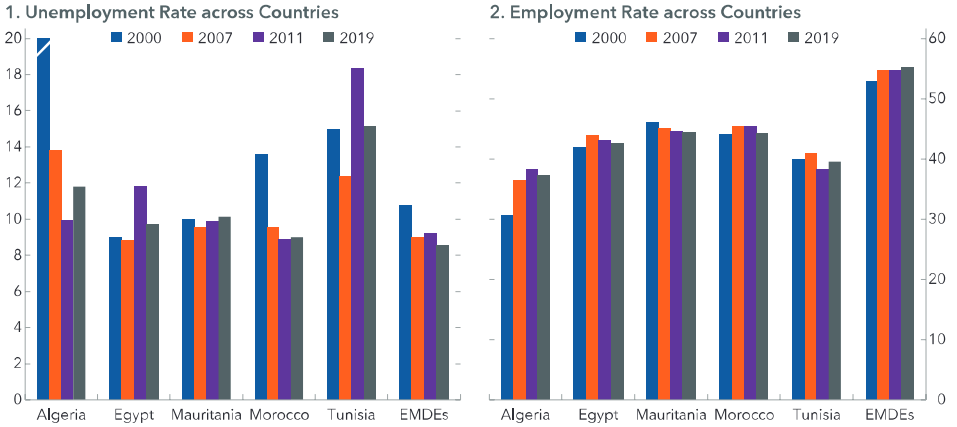
A. Labor Markets in North Africa: High Unemployment and Low Cyclicality

This subsection presents an overview of key labor market characteristics across North Africa over the past two decades. Given the existence of a large informal sector in the region, informal employment should be expected to play an important role in labor market adjustment. A few stylized facts stand out:

- *High and stable unemployment rates*: Unemployment rates in North Africa have been some of the highest in the world over the past two decades, averaging nearly 11 percent in 2019 (Figure 16). At the same time, the region has some of the lowest participation rates and employment-to-population ratios. The average labor force participation rate has remained broadly stable over the past decade, averaging about 45 percent in 2019. The low overall participation rate in the region is largely due to the much lower female labor force participation rate, at about 22 percent in 2019 compared with an average of about 50 percent in emerging markets and developing economies (EMDEs). Meanwhile female and youth unemployment rates have remained stubbornly high across the region, indicating elevated structural unemployment.

- *Little variability over the business cycle*: Labor market indicators in North Africa have been broadly stable over the past two decades, despite fluctuations in economic activity. As in other EMDEs, employment rates expanded slightly during the pre–global financial crisis period in all North African economies, but they remained resilient during the crisis (except in Tunisia) and were broadly steady in the prepandemic period. Consistent with that, unemployment rates fell during the precrisis period across the region and have shown little variation since, except in a few countries during the crisis (mainly Egypt and Tunisia). Labor force participation rates have been on a slight downward trend in most countries. These labor market patterns in North Africa contrast sharply with developments in advanced economies, where labor markets have exhibited high cyclicality over recent decades.

Figure 16. Key Labor Market Characteristics across North Africa
(Percent)



Sources: ILOSTAT; International Labour Organization modeled estimates; and IMF staff calculations.
Note: EMDEs = emerging market and developing economies.

As discussed in Chapter 2, North African economies tend to have high employment informality rates. This chapter uses the share of self-employed in total employment from ILO as its indicator of employment informality. While an imperfect proxy,[1] this measure presents some advantages compared with other indicators, as it has a relatively long time span and broad coverage, which allows for cross-country and time-series comparison. In addition, it tends to correlate well with other measures of informality. Despite a downward trend over the past two decades, informal employment remains relatively high in North Africa, representing about 40 percent of total employment in 2019 (Figure 16). This level is, however, lower than the average for EMDEs, in which self-employment represents on average 50 percent of total employment. Indeed, using the same group of countries considered in Chapter 3 (but ranking them based on self-employment rather than on the Schneider index and the share of workers who do not contribute to pensions), most of the North African economies are in the medium-informality group when the distribution of this indicator of employment informality is considered, with the exception only of Mauritania (which is in the high-informality group) (see Annex 3).[2]

B. Employment Informality and Okun's Law

This subsection examines how the elasticity of unemployment to output fluctuations, a relation captured by the Okun's law coefficient, is affected by informality. Okun's law postulates that there is an inverse relationship between cyclical fluctuations in output and the unemployment rate, which can be represented by the following equation:

[1] As discussed in Chapter 2, according to the ILO, self-employed workers are those with jobs in which the remuneration is directly dependent upon the profits derived from the goods and services produced. They include employers, own-account workers, contributing family workers, and members of producers' cooperatives. While the last two categories are always presumed to be informal by the ILO, employers and own-account workers may not necessarily be informal (as they may work in the formal sector).

[2] In this chapter, the sample of countries is split into three groups based on the size of informal employment, proxied by self-employment (Annex Table 3.1). The low-informality group (top 1/3rd percentile) includes mainly advanced economies and some EMDEs (informal employment accounts on average for about 10 percent of total employment in this group). The medium-informality group (middle 1/3rd percentile) is mainly composed of EMDEs, with informal employment averaging about 35 percent of total employment. The high-informality group (bottom 1/3rd percentile) is mainly composed of low-income countries; informal employment in this group accounts on average for more than 70 percent of total employment.

$$u_t - u_t^* = \beta^g (y_t - y_t^*) + \varepsilon_t \quad (1)$$

in which u_t and y_t are the unemployment rate and (the logarithm of) output, respectively, while u_t^* and y_t^* are the trend components of the unemployment rate and output.[3] The Okun's coefficient (β^g) is expected to be negative, so that a positive (negative) change in output is associated with a lower (higher) unemployment rate.[4] While equation (1) is referred to as the "gap" specification, another version of Okun's law is expressed as a relationship between changes in the unemployment rate and the growth rate of output:

$$u_t - u_{t-1} = \alpha + \beta^c (y_t - y_{t-1}) + \omega_t \quad (2)$$

The ratio α/β^c measures the rate of output growth consistent with a stable unemployment rate, that is, how fast output would need to grow to maintain a given level of unemployment (the "unemployment threshold"). Equation (2) is referred to as the "change" specification. The two versions are equivalent if potential growth and the natural rate of unemployment are constant (see Ball, Leigh, and Loungani 2017). As this assumption is unlikely to hold empirically, the gap version appears preferable and is used as benchmark specification.

To examine how informality affects the elasticity of unemployment to economic activity, panel regressions are conducted separately for different groups of countries. As a large informal sector may absorb workers who lose their formal jobs during economic downturns, the adjustment to business cycles in economies with high informality is likely to occur more through wages, working hours, or both in the informal sector, rather than through a reduction in the number of employed (see Maloney 2004). This helps to dampen the rise in unemployment during recessions. To test whether a higher share of informal employment reduces the response of labor markets to economic activity, separate regressions are run for high-, medium-, and low-informality groups and for advanced economies, EMDEs, and low-income countries (LICs). The Okun's coefficients are statistically significant and with the expected signs (negative) for most of the country groups and are lower (unemployment responds less to output fluctuations) in countries with high informality compared with countries with low informality (Figure 17).[5] Consistent with this result, the Okun's coefficient in advanced economies is about 3 and 30 times larger than that in emerging markets and LICs, respectively.[6]

The findings from the global panel estimates hold for North African economies. Those with relatively higher shares of informal employment (Mauritania and Morocco) have relatively smaller Okun's coefficients (in absolute value) compared with the other countries. While the labor market in Mauritania barely responds to output, a 1 percentage point increase in output above its trend corresponds to a 0.1 percentage point reduction in cyclical unemployment in Morocco (broadly in line with the average in medium- and high-informality countries). In contrast, labor markets in Algeria, Egypt, and Tunisia are much more responsive to output than the average of the medium-informality group and EMDEs: on average, a 1 percentage point deviation of output above its trend is associated with a 0.4–0.5 percentage point decline in the cyclical unemployment in these three countries (which is broadly comparable with the average for advanced economies).

Differences in labor market responsiveness to output may reflect not only different levels of informality, but also other structural characteristics. This subsection looks at the following other potential determinants of Okun's coefficients across countries:[7]

---

[3] The trend is computed using a standard Hodrick-Prescott filter with a smoothing parameter of 100. Using a smoothing parameter value of 6.25 yields qualitatively similar results (see Ravn and Uhlig 2002). To address the end-point problem associated with the Hodrick-Prescott filter, the GDP and unemployment rate series were extended to 2023 using the IMF's October 2019 *World Economic Outlook* projections.

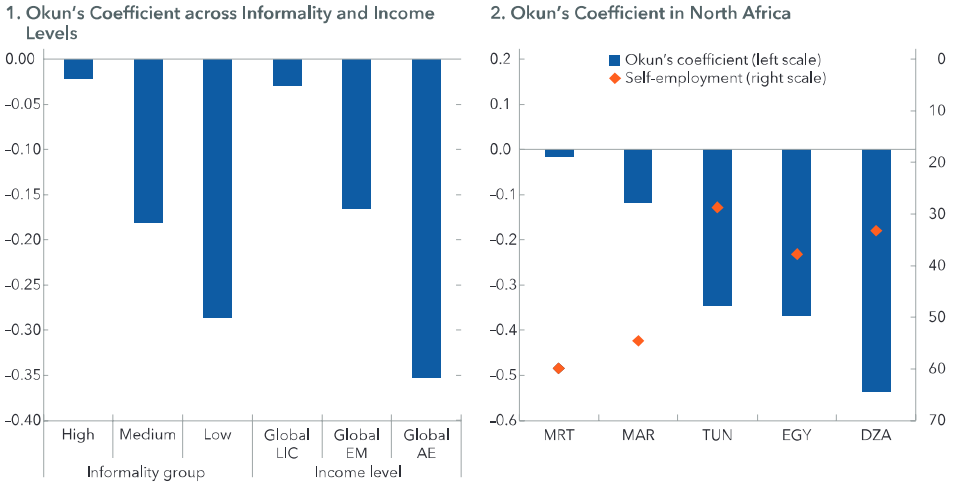
[4] The error term ε_t captures factors that shift the cyclical unemployment-output relationship, such as unusual movements in productivity or in labor force participation.

[5] Ahn and others (2019) find a lower cyclical sensitivity of labor markets with high levels of informality.

[6] Ball and others (2019) find an average value of the Okun's coefficient of –0.4 for a group of advanced economies and –0.2 for developing economies.

[7] See Ball and others (2019), David and others (2019), and Farole, Ferro, and Gutierrez (2017) for recent studies on determinants of Okun's coefficients in emerging markets and developing economies.

Figure 17. Okun's Law Coefficients from Panel Regressions



Source: ILOSTAT; International Labour Organization modeled estimates; and IMF staff estimates.
Note: The bars show the estimated Okun's coefficients from the gap specification. Data labels on the horizontal axis in the right panel use International Organization for Standardization (ISO) country codes. AE = advanced economies; EM = emerging markets; LIC = low-income countries.

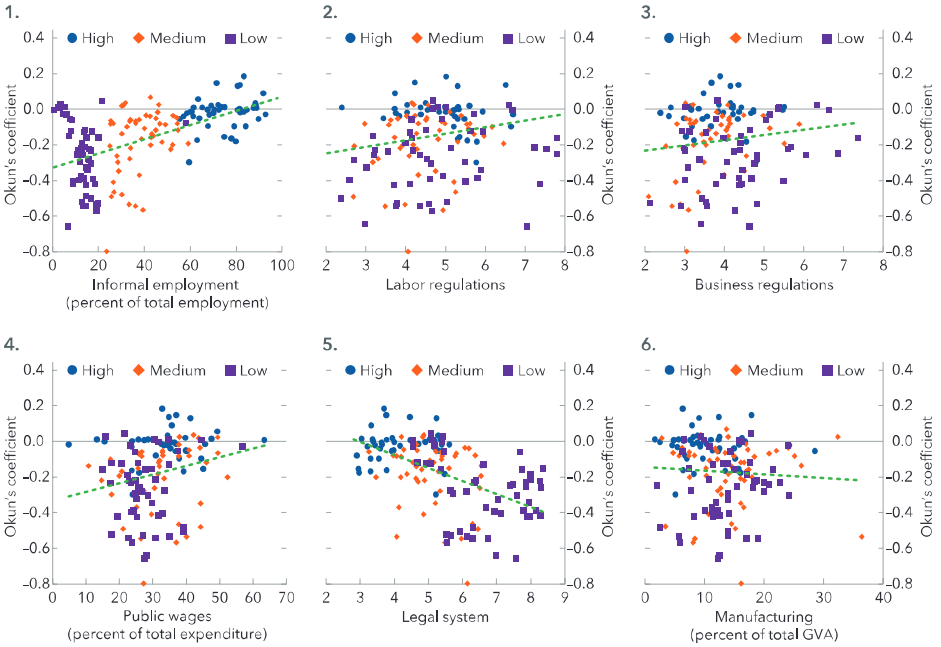
- *Economic structure*: The sectoral composition of employment could influence the way labor markets respond to the business cycle. For example, unemployment could be more sensitive to output in economies with higher shares of employment-intensive service sectors. By contrast, in economies with relatively higher shares of capital-intensive manufacturing sectors, unemployment could be less responsive to changes in output (at least in the short term). However, some studies have found that the negative relationship between output and unemployment is stronger in industrial-intensive economies (see, for example, Farole, Ferro, and Gutierrez 2017).

- *Labor and product market rigidities*: Excessively protective labor market codes could discourage businesses from hiring new employees during economic upturns and prevent them from laying off workers during downturns and therefore dampen the responsiveness of labor markets to business cycles (see, for example, Ahmed, Guillaume, and Furceri 2012). Product market distortions that create barriers to entry for new firms and restrict competition in key sectors could also affect labor demand and productivity growth and hence the responsiveness of unemployment to economic activity (see, for example, Crivelli, Furceri, and Toujas-Bernaté 2012).

- *Large public sector employment and high wage premiums*: The public sector is a large and more stable source of employment in many countries, especially in North Africa (see Ahmed, Guillaume, and Furceri 2012). Additionally, higher public sector wage premiums can divert labor from the private sector. Hence, employment is expected to be less responsive to economic activity in countries in which the public sector accounts for a large share of the workforce.

- *Quality of institutions*: The empirical literature has shown that better institutions are associated with higher investment and growth (see, for example, IMF 2003). Hence, one should expect better quality of institutions, measured, for example, by indicators of legal systems, to be associated with stronger employment outcomes and more responsiveness of labor markets to output fluctuations (see, for example, Farole, Ferro, and Gutierrez 2017).

Figure 18. Factors That Influence Okun's Coefficients



Sources: Frazier Institute/World Economic Forum; ILOSTAT; IMF, *World Economic Outlook*; International Labour Organization modeled estimates; World Bank, *World Development Indicators*; and IMF staff calculations.
Note: Larger values for labor market (hiring and firing regulations subindicator), product market (administrative requirements subindicator), and legal system indicate better outcomes (that is, fewer regulations and better legal system).

Even after other structural factors are controlled for, informality remains an important determinant of Okun's coefficients.[8] Conducting regressions in which all variables are introduced one by one in a stepwise fashion shows that labor informality and the indicator of the quality of institutions have the expected sign and remain statistically significant, while the labor market institution variable does not seem to matter for the Okun's coefficient (Annex Table 3.2).[9] The regression with employment informality has also the highest R-squared value.[10]

C. Employment Informality and the Business Cycle

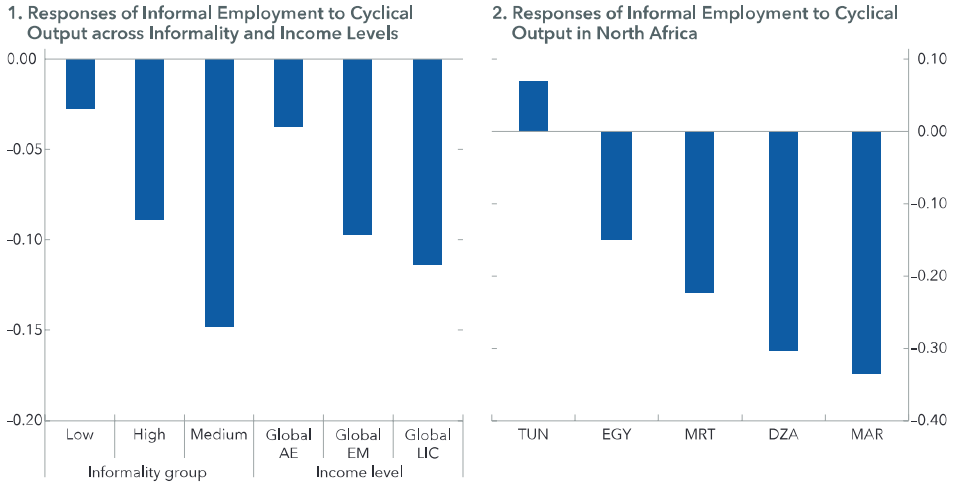
Informal employment appears to behave more countercyclically in economies with higher informality, including in North Africa, indicating that it acts as a safety net during economic downturns when the formal sector is shedding jobs. Simple correlation analysis shows that the correlation between informal employment

[8] The regression also controls for the level of real GDP per capita, as the global panel regressions have shown that the Okun's coefficient decreases (in absolute value) with the level of income—that is, it is larger for advanced economies than for EMDEs and for LICs.

[9] This result is in line with previous studies that find a relatively small role of labor market institution variables in explaining employment outcomes (see, for example, Farole, Ferro, and Gutierrez 2017 and Ball, Leigh, and Loungani 2017). However, these results could also be affected by the presence of some collinearity among the various variables, and among these variables and informality, as shown in Chapter 3.

[10] For robustness purposes, interaction terms between output and each of the structural factors are also included, yielding broadly consistent results (see Annex Table 3.3).

Figure 19. Response of Employment Informality to Cyclical Output



Source: IMF staff estimates.
Note: The bars show the estimated coefficients of informality with respect to output. Data labels on the horizontal axis in the right panel use International Organization for Standardization (ISO) country codes. AE = advanced economies; EM = emerging markets; LIC = low-income countries.
*$p < .10$; **$p < .05$; ***$p < .01$.

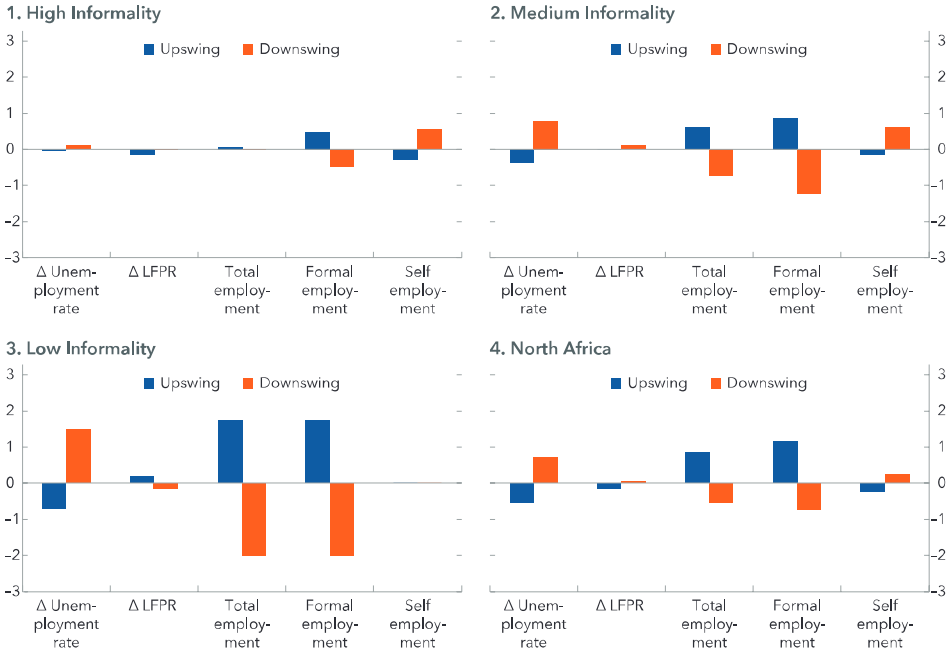
and cyclical output (the difference between GDP growth and its trend) is negative (–0.3) and statistically significant in countries with medium and high levels of informality (compared with –0.1 for low-informality countries). Within North Africa, informal employment appears to be countercyclical in countries with relatively more informality (Algeria, Mauritania, and Morocco). In Mauritania and Morocco, the share of informal employment is high enough to make overall employment countercyclical, something that is observed in general only for countries in the high-informality group.

Formal regression analysis confirms that informal employment is more countercyclical in medium- and high-informality countries. The cyclical component of informal employment (the deviation from its trend) is regressed on cyclical output (see Annex Table 3.4 for details). The elasticity of informal employment to cyclical output is quantitively larger (in absolute value) in the medium- and high-informality groups (Figure 19). Country-by-country regressions show that the countercyclicality of informal employment is also observable in North Africa, particularly in countries with higher shares of informality (Mauritania and Morocco), consistent with the correlation analysis.

Finally, an event analysis is used to look at how informal employment changes during the upswing and downswing phases of the business cycle. GDP growth is examined for all the countries in the sample between 1991 and 2019, with the events identified as years in which GDP growth fell below or exceeded a country's average level of growth by a particular threshold (1.5 standard deviations in advanced economies and 1 standard deviation in emerging markets and LICs).[11] Downswings (upswings) are defined as any country-year observations with GDP growth lower (higher) than 1.5 standard deviations in advanced economies and 1 standard deviation in emerging markets and LICs in all years of the sample. How labor market indicators

[11] This approach allows for varying trend growth rates among different countries. In particular, the value of the cutoff is based on different standard deviations by country income group, as business cycles are more volatile in emerging market economies than in advanced economies (Aguiar and Gopinath 2007). The algorithm of Harding and Pagan (2002) is also used as a robustness check, yielding similar results (available from the authors upon request).

Figure 20. The Labor Market during Downswings and Upswings



Sources: ILOSTAT database; International Labor Organization modeled estimates; and IMF staff calculations.
Note: Data in the event studies are for 1990–2019. Downswings and upswings are computed using all years and countries for which GDP data are available. Informal employment is proxied by self-employment. Formal employment is measured as total employment excluding self-employment. The statistics for employment correspond to the de-meaned growth and the contributions to growth by status (formal and informal employment). Δ = change (in); LFPR = Labor force participation rate.

(unemployment, labor force participation, and employment rates) behaved during these events on average in the high- and medium-informality groups is then examined, along with whether there are notable (statistically significant) differences between these two groups and the low-informality group.

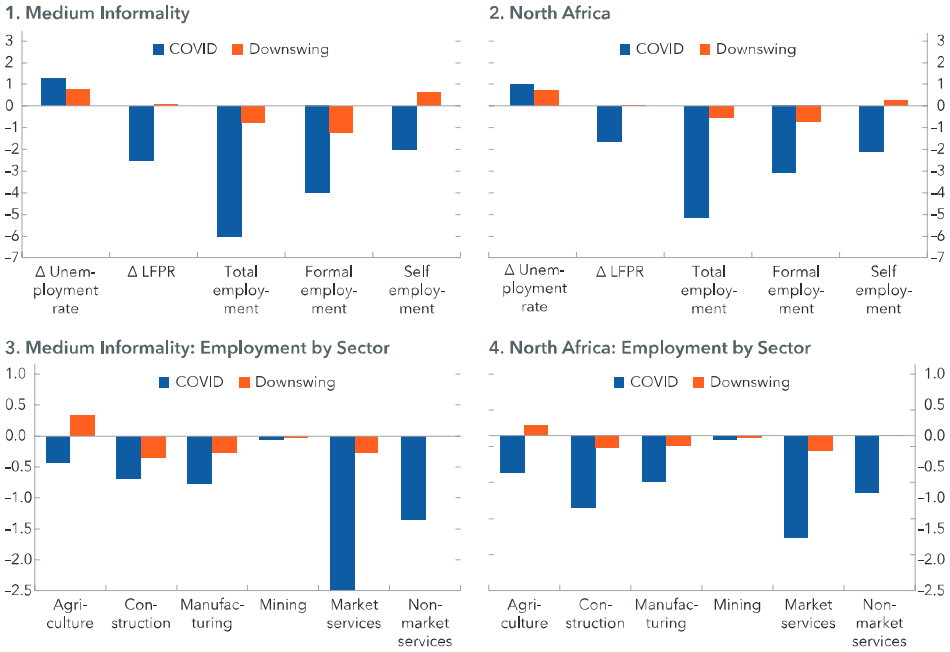
The results suggest that, in countries with relatively higher levels of informality, the increase in informal employment during downswings does not seem to be fully reversed during upswings:

- *During economic downturns, informal employment acts as a buffer in countries with relatively higher informality* (Figure 20). Informal employment tends to rise during downturns in medium- and high-informality groups (including North African economies), offsetting the contraction in formal employment and thus dampening the fall in total employment (which actually increases during recessions in high-informality countries). The rise in unemployment is also more limited in these countries, compared with low-informality ones.

- During economic upturns, informal employment could slow the recovery of the formal labor market.[12] If the increase in informal employment during downturns reflects the transition to informality of workers who have lost their formal jobs, one would also expect to observe a reverse of that phenomenon during the expansionary phase of the business cycle—that is, an equivalent fall in informal employment that

[12] The slow or incomplete recovery in formal employment could also be explained by hysteresis effects due, for example, to high labor and product market rigidities that could limit job creation.

Figure 21. The Labor Market during Downswings and the COVID-19 Recession



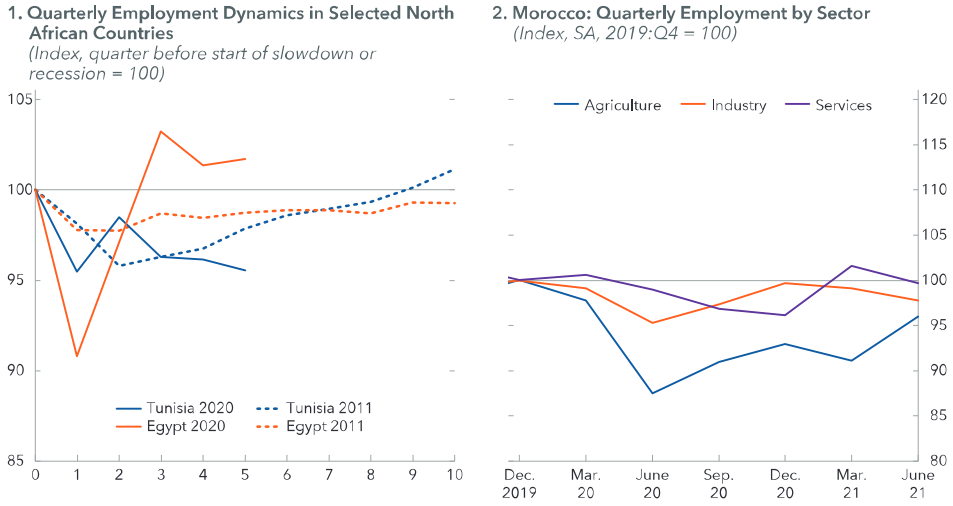
Sources: ILOSTAT database; International Labour Organization modeled estimates; and IMF staff calculations.
Note: Data in the event studies are for 1990–2019. Downswings and upswings are computed using all years and countries for which GDP data are available. Informal employment is proxied by self-employment. Formal employment is measured as total employment excluding self-employment. The statistics for employment correspond to the demeaned growth and the contributions to growth by status (formal and informal employment) and by sector, respectively. The data for 2020 are from ILO (2021). Δ = change (in); LFPR = Labor force participation rate.

boosts the rise in formal jobs. However, in high- and medium-informality countries, including North African economies, informal employment tends to fall only modestly during economic recoveries (less than it increases during downswings). This is consistent with the recovery's creating new job opportunities in the informal sectors of these countries, but also with an incomplete return to formal jobs of those who lose them during economic downturns. While more work is needed to shed light on these transition dynamics, one could not rule out the risk of a hysteresis phenomenon associated with informality—that is, while individuals who lose their formal job may find refuge in informality during recessions, it may be difficult for them to transition back to formality during the recovery owing to loss of human and social capital (networking) potentially associated with informality.

D. Is the Pandemic Recession Different?

Contrary to what took place in past recessions, informality doesn't seem to have provided much of a buffer to the pandemic shock in North Africa. In 2020, informal employment contracted sharply in countries with relatively higher informality, including those in North Africa (Figure 21). This unusual response of informality reflects the extraordinary nature of the shock, as well as the drastic measures taken to contain the spread of

Figure 22. Employment in North African Economies during Previous Downturns and the COVID-19 Shock



Sources: Haver; and IMF staff calculations.

the coronavirus.[13] Lockdowns and social-distancing measures have led many formal and informal businesses to shut down. As a result, the informally employed, many of whom work in highly contact-intensive service sectors (accommodation and food services, entertainment, wholesale, and retail trade), have been affected in their daily activities. In all the informality-level groups, employment in market services—which include trade, transportation, accommodation, and food—in which informality is common, plunged in 2020, whereas it was resilient during past downturns.

The unusual severity of the pandemic suggests that a faster-than-usual labor market recovery is possible in North Africa, driven by more informal jobs. Available quarterly labor market statistics for selected economies in the region that suffered an economic downturn over the past twenty years (Egypt and Tunisia in 2011) indicate that job recoveries have been very sluggish—pointing to risks of labor market hysteresis, possibly reflecting labor and product market rigidities.[14] Recent evidence also suggests a slow recovery of labor markets so far in North Africa, with employment in Egypt, Morocco, and Tunisia remaining below its prepandemic levels as of the third quarter of 2020 (Figure 22). However, a faster recovery of employment could not be ruled out. As informal employment did not increase this time, the risk of hysteresis effects associated with informality (that workers who found jobs in the informal sector will remain in that sector as the recovery takes place) could be lower than in the past. Moreover, given that lockdown measures severely affected employment in sectors with a high degree of informality (high-contact services) and that informal jobs are subject to minimal hiring and setup costs (Alfaro, Becerra, and Eslava 2020), postpandemic North African labor markets could be characterized by a faster-than-usual rebound of informal employment.

The possibility of a strong rebound of informal jobs in North Africa points to the importance of measures to reach out to informal workers and encourage formalization. The pandemic crisis has offered some lessons on how social safety nets can be extended to informal workers, in which several countries (such as Egypt,

[13] In Morocco, this also partly reflects the impact of the drought that cut agricultural production by about one-third in 2020.

[14] See Ahmed and others (2012) on discussion on the effects of labor and product market institutions as well as other rigidities on MENA's labor market.

Morocco, and Tunisia) introduced targeted cash transfer programs, leveraging financial innovation and digitalization (Box 2). In the medium to long term, encouraging formalization should be the priority. As discussed in next chapter, doing so will involve implementing a package of tailored policy measures, including reducing the burden from cumbersome government regulations and distortionary taxation, strengthening the quality of governance, removing unnecessary rigidities in labor market codes, invigorating private sector activity, and facilitating access to financial services.

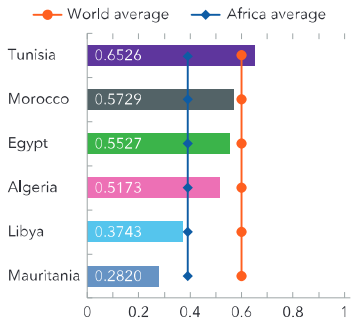
Box 2. Digitalization and the Informal Economy

Digitalization and Government

Digitalization of government services can reduce informality through two channels. First, it could lead to better enforcement of laws and regulations, by facilitating the identification and verification of individuals and firms in their various interactions with the public sector. Second, it could provide incentives for more voluntary compliance with the existing regulatory framework, by simplifying the requirements for firms to start operating and for individuals to pay taxes and apply to social-protection programs. Moreover, digitalizing government services, such as tax filing and company registration, can boost the development of a digital footprint for businesses and individuals, allowing for greater access to financial services.

One measure of a government's digitalization is the E-government capacity index (Box Figure 2.1), which captures a country's provision of online services, telecommunication connectivity, and human capacity for digitalization (United Nations 2020). Based on this index, Tunisia has the most developed e-government in North Africa, reflecting in part its early development of open data portals.[1]

Box Figure 2.1. 2020 E-Government Capacity Index



Source: United Nations.

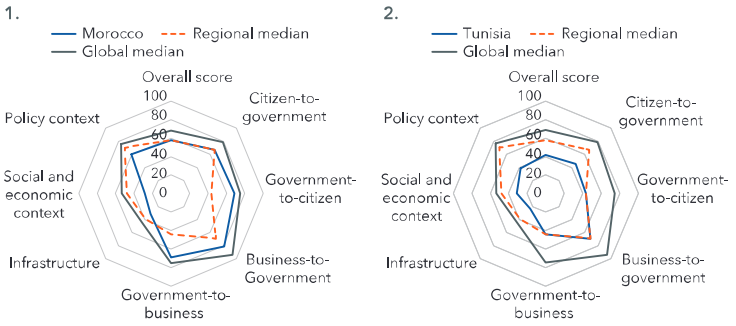
This index, however, does not fully capture the extent to which many administrative services have been digitalized, including government-to-person transfers and receipts. This dimension is better captured by another measure of digitalization at the government level, produced by the Economist Intelligence Unit (2018) (Box Figure 2.2). This measure focuses on the extent to which the interactions between government and citizens occur through digitalization, instead of solely on the amount of information available online and the government's digital capacity. Morocco scores high on this index, reflecting progress in digitalizing government-to-business and government-to-citizen services (the overall number of operations that are digitalized, including declarations, different administrative requirements, and duty stamps, is five times higher than in 2016, and 93 percent of tax receipts are now paid electronically).[2]

[1] However, Tunisia has lost some position over the years in that ranking as it moved from 66th position in 2010 to 91st in 2020, in a sample of 193 countries.

[2] In 2019 Morocco's Digital Development Agency also developed a digital road map, including on digital inclusion.

Box 2. Digitalization and the Informal Economy *(continued)*

Box Figure 2.2. Government E-Payment Adoption in Morocco and Tunisia (EIU, 2018)



Source: Economist Intelligence Unit (2018).

COVID-19 has offered an important opportunity to governments in the region for digitalizing a series of government services, including the provision of social benefits. In Morocco, the authorities launched an online platform to allow informal workers who were adversely affected by the health crisis to claim cash benefits. Informal workers were asked to register on this platform in March 2020 and were able to start claiming the transfers in April, as they received text messages on their mobile phones. In 2020, Tunisia introduced a unique individual identifier number for accessing government services and social benefits, which allowed it to disburse a one-off cash transfer to approximately 370,000 households working in the informal sector. In Egypt, one-off monetary compensation was provided for three months to informal workers registered in the database of the Ministry of Labor and Manpower Payment.

The Role of Digital Payments and Financial Inclusion

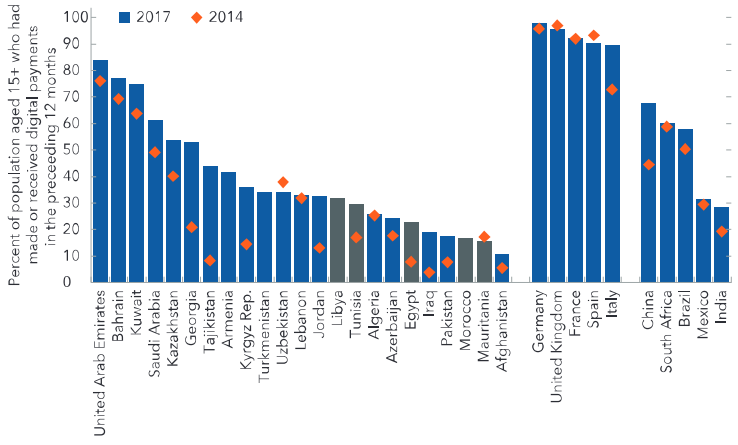
The increased use of mobile and digital payments (Box Figure 2.3) could contribute to reducing informality by facilitating the inclusion into the financial system of people who were previously excluded (G20 2018) and reducing the role of cash as an easy conduit for informal activities (Rogoff 2016).

Jacolin and others (2019) investigate the impact of mobile financial services, including mobile money, credit, and savings, on the informal sector. Using both parametric and nonparametric methods on panel data from 101 emerging market and developing economies over the period 2000–15, they find that mobile financial services negatively affect the size of the informal sector by 2–4 percentage points of GDP. These formalization effects may be transmitted in a variety of ways: easier access to credit, increase in the productivity and profitability of informal firms, and indirect effects from stronger growth of firms already in the formal sector.

A. T. Kearney and others (2018) also find a negative correlation between digital payments and the informal economy. According to their study, about two-thirds of government policies aimed at reducing informality now focus on efforts to achieve greater access to, and use of, digital payments, compared with only a third in 2007. These efforts include the provision of incentives to use digital payments, such as

Box 2. Digitalization and the Informal Economy *(continued)*

Box Figure 2.3. Use of Digital Payments



Sources: World Bank, Global Findex Database.

a lower tax rate and simplified procedures for tax filings, and measures to discourage the use of cash (such as numerical limits on individual cash transactions, as recently implemented in Egypt and Tunisia). Recent evidence from Peru (Bellon and others 2019) shows that electronic invoicing for the value-added tax enhances compliance by lowering compliance costs and strengthening deterrence.

Despite high mobile penetration rates (according to the OECD [2021], North Africa is the best-connected region on the African continent, with 68 percent mobile penetration and 83 percent 4G coverage), the use of digital payments remains underdeveloped in North Africa relative to other economies in the Middle East and North Africa and other regions. Cash is still playing a large role, in particular for small transactions (as evidenced by the high share of currency in circulation in broad money, in particular in Algeria and Mauritania).[3]

This lag in the adoption of digital payments mainly reflects regulatory constraints, lack of competition among providers of financial services, and limited access to data. Except Morocco, North African countries fare relatively poorly in the mobile money regulatory index (GSMA 2019).[4] Efforts have been underway to address regulatory constraints. In 2014, Bank Al-Maghrib passed legislation allowing nonbank entities to provide electronic payment solutions and giving actors in the marketplace (including telecom operators) the freedom to position their e-wallets and adapt their offerings. Egypt and Tunisia's central banks have recently opened a regulatory sandbox for fintech and put in place a regulatory framework to enable e-banking.

[3] Also, despite the extensive usage of mobile phones, many informal workers and businesses are still left out of digitalization. In Africa, for example, 50 percent of all own-account workers have a smartphone (Chacaltana and others 2018). However, it is estimated (OECD 2021) that only 16 percent of self-employed workers regularly use the internet (compared with 58 percent in formal jobs).

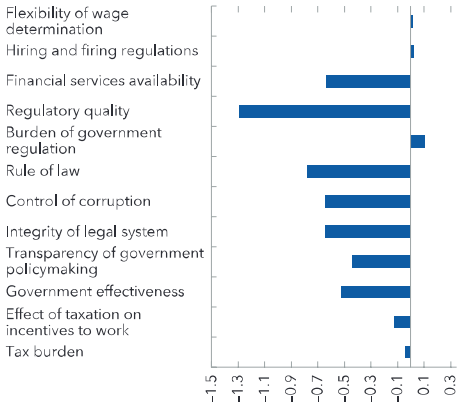
[4] This index analyzes six dimensions: (1) authorizations, (2) consumer protection, (3) transaction limits, (4) Know Your Client (KYC), (5) agent networks, and (6) investment and infrastructure environment. In a sample of 81 countries, Morocco ranks 37th, Egypt 68th, Tunisia 72nd, and Mauritania 81st.

6. Country Cases

A. Algeria

Persistent policy distortions help explain why informality remains high in Algeria. At 32 percent in 2019, estimated output informality in Algeria is above the regional average. In particular, the use of cash is pervasive in the economy, pointing to a large share of unreported transactions: the ratio of currency in circulation to broad money, a common measure of "excessive" demand for cash, averaged 31 percent in 2015–17, one of the highest levels in the MENA region. However, self-employment, especially the share of workers not contributing to pension schemes, is much smaller, possibly reflecting the large size of public sector employment (which in 2017 accounted for 37 percent of the total workforce, about twice as much as the rest of North Africa, on average). The decline in employment informality over recent years also appears to be largely due to the expansion of the public sector, which created nearly four times as many jobs as the private sector between 2009 and 2013. By contrast, as shown in Chapter 3, output informality increased in Algeria after 2008, partly reflecting the persistence of a few major policy distortions, in particular, a few weaknesses in the governance system (complex regulation, red tape, and pervasive price controls) and limited access to financial services (Figure 23).[1]

Figure 23. Algeria: Policy Indicators, Latest Available Year
(Relative to world average)



Source: IMF staff estimates.

The Algerian authorities have deployed a range of measures to reduce informality in recent years. Their efforts have focused on encouraging voluntary compliance while attempting to strengthen enforcement (see Table 6 for more details). In particular, the Algerian government has introduced:

- Measures to streamline administrative processes, including simplifying business registration procedures and setting up a one-stop shop to comply with custom obligations.

- Temporary schemes for voluntary tax compliance and registration of unaffiliated workers for social security were introduced in 2015. These were aimed at both employers (with waived penalties for those accepting and opting in) and employees. For informal workers, it offered access to social security in exchange of the payment of a flat fee for a period of three years.

[1] In all the figures presented in this chapter, the policy indicators are standardized so that they indicate the difference of North African economies relative to the rest of the countries in the sample. To accomplish this, their z-scores are reported (for each indicator, the average across the sample of countries is subtracted, and the result is divided by the standard deviation). The only exceptions are the World Governance Indicators of the World Bank (regulatory quality, rule of law, control of corruption, and government effectiveness), which are already standardized (their average is 0 and their standard deviation is 1). See the legends of Figures 7 and 8 for more details on the indicators.

- Measures to discourage the use of cash and promote settlement through more formal channels of payments, for example, the nondeductibility of expenses in cash and ongoing plans for mandatory installation of electronic payment terminals in shops.
- A strategy to broaden access to financial services, including through tax and regulatory measures to promote Islamic finance and the creation of a dedicated government agency providing interest-free microcredit loans (Agence Nationale de Gestion du Micro-crédit en Algérie, or ANGEM).
- Reforms to enhance monitoring and enforcement, for example, by introducing new third-party reporting obligations for certain categories of enterprises.

These measures have been only partly successful. Data on the implementation of policy initiatives aiming at promoting formalization in Algeria are scant, precluding a thorough assessment of their impact. However, publicly available information suggests that these initiatives have not made deep inroads into informality so far. The use of cash remains pervasive despite efforts to promote bank-based payment instruments. And the schemes for voluntary tax compliance and affiliation with social security had low take-up rates (Charmes and Remaoun 2016). One explanation is that given their temporary nature, most incentives for voluntary compliance have not permanently altered the costs and benefits of informality. Another is that past voluntary compliance schemes have not been followed with adequate enforcement to avoid creating inequality among taxpayers and weakening the credibility of the tax system. Lastly, the wide range of measures and number of state agencies involved in their implementation could create coordination challenges.

Reducing informality in Algeria will require coordinated policy efforts in the context of a comprehensive national formalization strategy (see IMF 2021a for further discussion). Preliminary lessons from recent policy efforts indicate a need for a comprehensive approach, taking into account informality's multiple dimensions. Ex ante survey-based information on the demography of informality and ex post impact studies would help adapt formalization policies and define targeted measures to formalize actors that are as diverse as large tax evaders and subsistence workers. Reform priorities, some of which have been identified in the 2021 Government Action Plan, which explicitly aims at reducing informality, include the following:

- *Pressing ahead with governance reforms*. Creating a relationship of trust, accountability, and reciprocity between the state and the public would promote a culture of compliance and tax morale. In particular, reform of local taxation and the development of local property taxes could help strengthen this relationship of accountability. Grounding formalization policies in social dialogue would guarantee wide support and minimize resistance.
- *Product and labor market reforms*. Enhancing competition, removing barriers to entry on product markets, and minimizing price distortions should help spur formalization. In parallel, reducing rigidities in labor markets and aligning wage gains with productivity dynamics, while protecting the most vulnerable through social-protection reforms, would encourage job creation in the formal sector.
- *Discouraging the use of cash*. Credible enforcement of the use of bank-based means of settlement for transactions exceeding a certain value would go a long way in improving traceability and the capacity of the tax administration to monitor and control. This could go hand in hand with financial deepening and improved access to credit to enhance the benefits of formality.
- *Fiscal reforms*. Minimizing distortions by streamlining tax exemptions, eliminating unproductive taxes, and developing simplified tax regimes with optimal coverage could improve registration of transactions. In parallel, continuing efforts to modernize taxpayer services in cooperation with the private sector and enhancing the autonomy of the tax administration to streamline processes would reduce compliance costs. Strengthening enforcement and control, for example, by intensifying audits, would reinforce the credibility of the tax system and equality among taxpayers.

Table 6. Selected Recent Policy Measures to Address Informality in Algeria

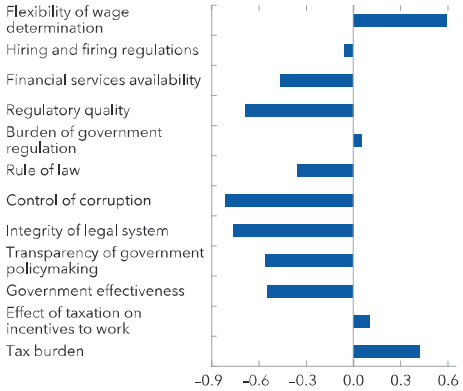
Encouraging voluntary compliance	• Several measures under the August 2015 Supplementary Budget Law: - Voluntary tax compliance program: holders of funds generated from nonillicit informal activities were temporarily allowed to deposit them with domestic banks in exchange for the payment of a 7% flat tax - Temporary possibility for all nonaffiliated employees and their dependents to benefit from health and maternity coverage for three years, in exchange for the payment of a flat social security contribution of 12% of the minimum wage - Staged repayment of overdue social contributions and waiver of penalties and fines - Exemption from sanctions of employers who regularize the situation of nonaffiliated employees within a set timeframe • Temporary partial exemption of low-income workers from the flat income tax • Construction of hundreds of indoor and outdoor market facilities and temporary work permits for young traders and temporary tax exemptions and rebates for newly settled traders
Supporting job creation and improving the business climate	• Simplification of business registration and the creation of an online portal for business registration in less than 12 hours • Multiple schemes to support the employment of youth and the long-term unemployed • Extending subsidized loans to young entrepreneurs and VSMEs under various schemes • Granting privileged access to public procurement bids and tax exemptions dedicated to young entrepreneurs
Strengthening enforcement	• Enhancing third-party reporting obligations: creation of reporting obligations regarding customer identity and key features of transactions for suppliers subject to the professional tax, that is, large suppliers (2018 Budget Law) • Substantial increase in the amounts of fines and creation of an imprisonment punishment for employers in cases of nonaffiliation of their employees with social security (2015 Budget Law)
Enhancing financial inclusion, developing digitalization, and reducing the use of cash	• The imposition of mandatory use of bank checks for the settlement of all transactions exceeding a certain threshold taken in 2011 and 2014 • A host of measures to encourage the development of Islamic finance, including by making tax treatment uniform with traditional finance under the 2021 Supplementary Budget Law • Nondeductibility of eligible expenses exceeding DA 300,000 settled in cash (2018 Budget Law) • Launch of online portals for tax declaration and payment on a trial basis (Jibaya'tic and Moussahama'tic)

Sources: 2015 Supplementary Budget Law; Algerian authorities; Charmes (2016); and various media reports.

B. Egypt

Policy distortions explain a nonnegligible share of Egypt's informality. As shown in Chapter 2 (Figure 1), activity in the informal sector accounts for a relatively high share of GDP (an estimated 30.7 percent in 2019, compared with an average for other emerging markets of 29 percent). Indicators of employment informality portray a mixed picture, though. While according to the ILO indicator of informal employment, about 63 percent of Egypt's employment is informal, compared with an emerging market average of 52 percent, Egypt has a lower share of workers who don't pay pension contributions or are self-employed (partly reflecting the relatively more significant role of the public sector in overall employment).[2] Chapters 2 and 3 suggest that while informality could reflect a few structural characteristics of Egypt's economy (such as its relatively low level of human capital and young population), a few policy distortions could discourage formality by affecting individuals' choices between working in the formal and informal sectors. Based on the policy indicators considered in Chapter 2, compared with all the countries in the sample, Egypt appears to be characterized by lower quality of governance, a relatively higher tax burden, and lower access to financial services (Figure 24).

Figure 24. Egypt: Policy Indicators, Latest Available Year
(Relative to world average)



Source: IMF staff estimates.

Improvements in a few policy areas have contributed to lowering informality in Egypt. Informality in Egypt has declined since the mid-2000s, despite the political and economic instability in the country, especially from 2011 to 2014. The decline is partially on account of the structural reforms that started in 2003 and have contributed to an increase in GDP per capita (in purchasing power parity terms) by about 80 percent since then. In particular, progress has been made in a few policy areas:

- *Tax system.* Corporate income tax rates were reduced (from 45 to 22.5 percent) and brackets reformulated. Moreover, the Ministry of Finance and the Egyptian Tax Authority have initiated a series of reforms of the tax administration system to facilitate the filing and processing of taxation. These include the automation of tax process through the introduction of e-invoices and e-filing, the restructuring of the tax authority, and the integration of tax procedures for both income tax and value-added tax systems.

- *Business environment.* The approval of the Investment Law in 2017 and the signing of several international investment and trade agreements may have contributed to improve the business environment and therefore lower informality (OECD 2020; AfDB 2016). The Investment Law introduced a series of incentives for firm registration (including an online portal), prohibited nationalization and confiscation of the private sector's assets, and curtailed government interference in the pricing decisions of private companies. The introduction of nonjudiciary mechanisms, such as dispute settlement committees, has speeded up the resolution of commercial disputes. Finally, Egypt has made significant progress in simplifying the issuing of licenses and permits for firms in the industrial sector (bureaucratic steps to issue an industrial license were reduced from 11 to 1, and a notification licensing system was introduced for low-risk industries).

[2] As indicated in Chapter 2, a possible explanation for this divergence is that Egypt may have a relatively higher share of self-employed workers who are informal, a relatively higher share of informal employees (the intensive margin of informality), or both.

Further reduction in informality will require policy changes in a few key areas. In addition to boosting Egypt's level of development, these policies will reduce the distortions that induce firms and workers to operate in the informal sector:

- *Improvement in business regulations and governance*. Despite recent progress businesses perceive government regulations as excessively burdensome. The cost to establish a company in Egypt is higher than in peer countries, and the number of steps and procedures for licensing and permits is frequently cited by businesses as cumbersome. Simplifying the requirements to obtain licenses and permits for firms in nonindustrial sectors would reduce the cost of establishing a business also in the (high-informality) service sector. High Lawyers Syndicate fees (legal registration of companies) also contribute to the high costs of establishing a business in Egypt and should be reduced. Furthermore, continued improvements in control of corruption will reflect positively on governance and will encourage companies, particularly small and medium-sized enterprises (SMEs), to formalize. Specifically, control of corruption can be further improved through automation and digitalization of government services, enhancing transparency in government procedures and procurement, and simplifying and clarifying the regulations governing the business environment. Finally, it is essential to improve the efficiency of the justice system, through further investment in infrastructure (including digitalization) and number and training of judges.

- *Continued enhancement of the tax system and administration*. Egyptian firms mention high tax rates and an inefficient tax administration as the most significant obstacles to setting up a business (2020 World Bank Enterprise Survey). The adoption of automation and digitalization in public administration would significantly reduce the regulatory burden and cost of compliance (Box 2).

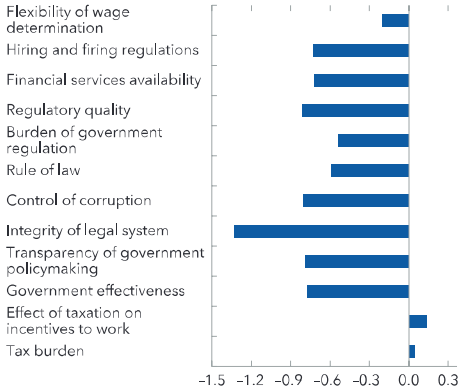
- *Access to finance*. According to the World Bank (2020), only 4.4 percent of firms in Egypt have access to finance (this compares with 25 percent in the MENA region and 32 percent worldwide). Access to finance is particularly limited for SMEs, which explains why informality is particularly diffused among small firms in Egypt (Chapter 2). Improving access to finance would require a series of measures, including facilitating know-your-customer regulations for informal SMEs to encourage them to access banks and developing nonbank financial institutions (NBFIs) to cater to SMEs. NBFIs can play an important role in financing SMEs though leasing, providing factoring services on the debt side, and supporting public listing and start-up financing on the equity side. At a more macroeconomic level, lowering the budget deficit would also help broaden access to credit, as the abundant supply of high-yield Treasury bills has generally crowded out lending to SMEs.

C. Mauritania

Informality in Mauritania owes much to the country's low level of development, but policies also matter. According to the Schneider index, the informal sector was estimated to account for about 30 percent of GDP in Mauritania in 2017, with Mauritania's 2017 National Survey on Informality reporting an even higher number, about 50 percent of GDP. The same survey showed that 63 percent of the employed population was informal, while World Bank data show that 87 percent of workers are not contributing to a pension scheme. As shown in Chapters 2 and 3, these high levels of informality are, to a large extent, a reflection of Mauritania's high share of agriculture in overall value added and employment, low education levels, and young population. Still, policy distortions are found to account for about half of Mauritania's higher informality relative to advanced economies. In particular, based on the policy indicators considered in this paper, Mauritania exhibits a relatively high burden from government regulation, low quality of governance, and scarce access to financial services (Figure 25).

The authorities have taken a series of measures to improve the policy framework and encourage formalization. Fiscal and monetary reforms and progress in improving institutions (including the introduction of property ownership legislation, the modernization of customs, the amendment of trade deals, and the simplification of procedures and requirement for business creation) may have bolstered macroeconomic stability and strengthened the business climate (World Bank 2019b), contributing to the reduction in informality over the past decade (Chapter 3). A few measures have been adopted more recently that should increase the benefit of formality and reduce its costs, in particular:

Figure 25. Mauritania: Policy Indicators, Latest Available Year
(Relative to world average)



Source: IMF staff estimates.

- A *tax identification number* for firms was introduced in 2019, which can be obtained through a single window (guichet unique) and without a fee. However, the procedures to get registered remain cumbersome and lengthy, and there is a requirement of a minimum of three employees for a firm, while self-employment is not recognized.
- The *tax code* was made available in Arabic in 2020 (before, it was available only in French).
- A *credit bureau* was set up in 2019, together with a *centrale des risques* at the central bank, and a new law on electronic payments was introduced in 2021 with the objective of establishing an appropriate legal and regulatory framework allowing banks and nonbank financial institutions to provide payment services and issue electronic money.

Despite recent efforts, more is needed to make a dent in the significant role of the informal sector. A number of policies could be put in place for more rapid gains in formalization that would

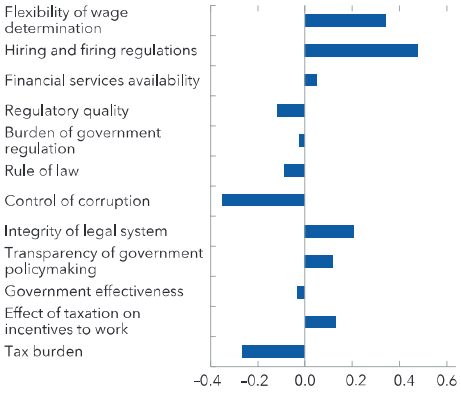
- *Reduce the burden of government regulations*, by helping small firms have access to the necessary information on how to register and simplifying procedures to register land. Tax compliance is also quite inefficient and costly, with different taxes and fees collected by various (central and local) branches of government, limited capacity, and shortages of tax inspectors.
- *Lower the tax burden.* Social security contributions are relatively high (health insurance contributions are 9 percent of gross wages for both employers and employees, but access to health services remains limited, and this forces many to purchase private health insurance). The simplified tax regime for small businesses is based on the maximum of a 2.5 percent tax on turnover or 25 percent income tax, which could be high for low-margin businesses.
- *Improve governance.* Almost half of the firms in the 2014 World Bank Enterprise Survey identified the legal system as a major constraint to setting up a business. Among the major steps needed to address this issue are (1) better enforcement of technical regulations and competition laws, (2) investing in infrastructure to address capacity limitations in the court system, and (3) bringing penalties up to date.
- *Ease access to finance.* Banks have made little progress in providing services to individuals, and about 70 percent of the population still does not have a bank account. Credit to small business is impaired by the lack of an effective SME guarantee fund and still-limited debtor-creditor information sharing. More efforts

are being deployed to enhance financial infrastructure and digitalization and foster financial inclusion. In particular, the central bank is preparing regulations for money transfer institutions and payment institutions to implement the new law on electronic payments. In addition, with the assistance of the African Development Bank under the financial infrastructure modernization project, a new payment system will be established soon, including a real-time gross system, a central securities depository, and an automated clearing house.

D. Morocco

Employment informality is particularly high in Morocco, owing to a few structural characteristics of the Moroccan economy. While at 30 percent of GDP in 2017, the Schneider estimate of informal activity in Morocco was broadly in line with the average for the region and other emerging markets, all the different indicators presented in Chapter 2 show a relative higher share of informal workers in Morocco. To a large extent, this reflects a few structural characteristics of the Moroccan economy, including a large role of the agricultural sector, a low level of education, and the country's relatively young population (as the probability of being an informal worker is particularly high among the young). Still, a few policy distortions also help explain the higher informality that Morocco exhibits in both output and employment indicators relative to advanced economies. Comparing Morocco to other countries in the sample shows that Morocco's main areas for improvement are the quality of its governance system (as shown by the low relative scores on the rule of law and control of corruption indexes) and government regulatory quality (Figure 26).

Figure 26. Morocco: Policy Indicators, Latest Available Year
(Relative to world average)



Source: IMF staff estimates.

Progress in the policy framework and business climate over the past decade has helped reduce informality. Chapter 2 shows that both indicators of output and employment informality (as proxied by the share of self-employed) have fallen in Morocco since early 1990s. This paper's analysis of the determinants of the evolution of the composite indicator of informality in Chapter 3 shows that the decline between 2005 and 2017 can be attributed both to progress in the level of development of Morocco's economy (which coincided with the lower employment share of the agricultural sector) and improvements in the policy framework. The reform of the tax system that reduced the tax burden on firms, the simplification of administrative procedures and regulatory framework, and the strategy to attract foreign direct investment and join a few complex global value chains (as in the automotive sector) have all contributed to reducing the size of the informal sector in Morocco (Lahlou, Doghmi, and Schneider 2020; El Rhaz and Bouzimer 2020).

The *New Model of Development* report contemplates measures that would encourage formalization in Morocco. The report, commissioned by King Mohamed VI and published in April 2021, sets the ambitious objective to reduce the share of informal jobs in Morocco to 20 percent by 2035. To a large extent this could be considered as the by-product of the deep transformation of the Moroccan economy envisaged by the report over the next 15 years, during which GDP per capita is expected to double. Still, a few policy measures discussed in the report would directly or indirectly encourage formality, including

- The systematic elimination of all administrative and regulatory barriers, licenses, and permits, including through the deployment of a "guillotine approach" whereby the burden of proof is reversed, so that regulators must justify their regulations according to certain criteria or otherwise see them eliminated.
- A system of "professional cards" that would give informal workers access to vocational training, public procurement, and government services (including health care and family allowances, consistent with the ongoing generalization of the social-protection system).
- Measures to improve the efficiency and transparency of Morocco's judicial system, including by accelerating the digitalization of internal procedures, the publication of court decisions, and the creation of an e-justice platform. Together with stronger enforcement mechanisms, through a more effective application of existing laws and regulations, the passing of legislation on illicit enrichment and the publication of beneficial ownership information of legal entities that are awarded public procurement contracts should improve the rule of law and discourage informality.

The generalization of social protection and the introduction of a single professional contribution tax for low-income self-employed workers is expected to increase formalization. Under the new system, launched in 2020, self-employed workers with revenues below a certain threshold can decide to pay a single tax (replacing the flat-rate income tax, the professional tax, and the tax on communal services). By opting into the new system, the self-employed can also access the health-care insurance scheme (Assurance Maladie Obligatoire, or AMO) by paying a (small) supplementary contribution. Both the tax rate and health-care contribution rates are fixed and vary by activity, which makes it difficult to assess the fairness of the system and envisage whether there will be cross-subsidization. But the simplified conditions for joining the system and the possibility of getting the same health-care package as employees at a fraction of their contribution suggest that the measure has the potential to attract self-employed workers who are outside of the tax system (see also CESE 2021).[3]

While Morocco scores relatively well on the indicators of labor market flexibility, its labor market code presents a few rigidities that could discourage formalization. In particular, restrictions on the use of fixed-term contracts could limit the demand for formal jobs and also induce workers (especially women and young people who need to combine work with home activities or study) to accept (more flexible) informal jobs.[4] Moreover, the minimum wage is relatively high by international standards (it represents 50 percent of the average wage in the formal private sector, compared with 40 percent on average in the world; Kuddo and Moosa 2019) and with the average productivity of Moroccan workers (it accounts for 70 percent of the average value added per Moroccan worker). This may contribute to low compliance and act as a disincentive for formal hiring, especially of low-skilled workers (Lopez-Acevedo and others 2021). According to the High Commission for Planning's enterprise survey (2019), 26 percent of Moroccan companies think labor costs are a constraint to hiring (43 percent for large companies). While bringing the minimum wage more in line with productivity could affect vulnerable groups, this effect could be balanced by stronger safety nets under the ongoing generalization of the social-protection system.

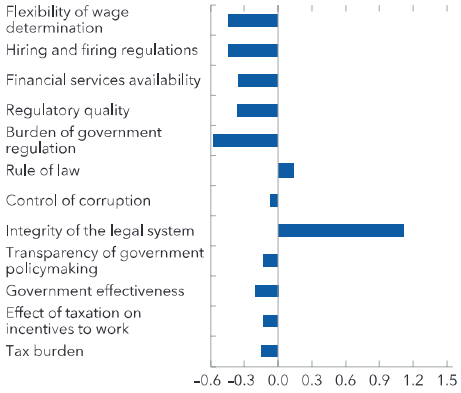
[3] Morocco also has an "auto-entrepreneur" tax regime that came into effect in 2015 with the objective of reducing informal activities. Despite the many tax advantages offered by the regime (low tax rate and the exemption from the value-added tax and business tax for a period of five years), the take-up has been quite small, as only about 5 percent of the potential population had joined as of 2021.

[4] Fixed-term contracts cannot exceed a one-year period, are renewable only once, and are allowed only to temporarily replace an employee, with a temporary increase in the business's activity, for seasonal work, and when opening a business.

E. Tunisia

Informal activity appears to have increased in Tunisia over the past several years, partly on account of persistent distortions in a few policy areas. As shown in Chapter 2, at about 36 percent in 2019, informal activity is Tunisia was among the highest in the region and compared with other emerging markets. Like Egypt, though, Tunisia fares better than other emerging markets and regional economies with regard to the share of workers who don't pay pension contributions or are self-employed, which is consistent with its relatively large public sector (which accounted for about 22 percent of overall employment in 2017). As discussed in Chapter 3, policy indicators explain a relatively high share of Tunisia's informality surplus relative to advanced economies. Moreover, the increase between 2005 and 2017 in the composite index of informality estimated in that chapter also reflects failure to address policy distortions, as the deterioration in governance, business climate, and labor policies may have pushed an increasing number of small businesses into informality (OECD 2017). The policy indicators considered in Chapter 3 reveal that while Tunisia scores relatively high in terms of the quality of governance and the indicator of the tax burden, major areas for improvement are the relatively cumbersome government regulatory framework, rigid labor market regulation, and low access to financial services (Figure 27).

Figure 27. Tunisia: Policy Indicators, Latest Available Year
(Relative to world average)



Source: IMF staff estimates.

High informal activity in Tunisia also reflects significant smuggling activities and price controls. While previously concentrated only along the border with Algeria, smuggling activities have substantially increased with neighboring Libya over the last decade, contributing to unrecorded trade flows and bolstering informal activity. Extensive price and regulatory distortions compound the problem, in particular, the widespread regulation of prices (administered prices account for nearly 30 percent of the consumer price basket, including food items) as well as strict foreign exchange regulation (including the still-limited availability of exchange bureaus after the easing of the restrictions on their opening in 2019), which acts as an incentive to hoard foreign currencies.

A few measures have been considered recently to encourage formalization. These include a lower ceiling for cash purchases (from the equivalent of $1,700 to $1,000) and a tax amnesty for the regularization of funds deposited in the banking system. There have been discussions about the introduction of an "auto-entrepreneur" taxation regime that would attract more people into the formal sector. The new regime would complement the existing simplified, flat-tax regime for businesses (*régime forfaitaire*), under which registered businesses pay a small, fixed tax, provided that their turnover does not exceed a certain threshold. The current system was designed mainly for specific regulated professions, and while 60 percent of existing businesses have registered, only 35 percent declared their turnover to the tax administration in 2020 (down from 61 percent in 2018). This may also explain the low revenues collected under the *régime forfaitaire* (only 0.2 percent of total tax revenues). The low level of the threshold for opting in, the large difference between standard tax rates and the flat-tax rate, and the relatively limited controls from tax administration all act as an incentive to opt in to the flat-tax regime, but also to underdeclare revenues and number of employees.

The new auto-entrepreneur regime would seek to offer more incentives to formalization thanks to simplified administrative procedures (including registration through a digital platform), lower tax rates, and access to social protection at a lower cost.[5]

While the causes of informality are complex, Tunisia's formalization strategy requires a focus on a series of key areas:

- *Improving the efficiency of regulatory and legal systems* to promote business creation, foreign direct investment, market competition, and innovation. The adoption in 2019 of a Start-Up Act, providing tax and foreign exchange regulation benefits for start-ups, is a step in this direction and could be complemented by the elimination of investment authorizations in key economic sectors (such as education, tourism, transportation, and agriculture).

- *Reforming the social-protection system* to address existing loopholes and build a fairer, simpler, more efficient system. According to the OECD (2017), the tax wedge on labor is relatively high in Tunisia, with personal income taxation and social security contributions at about 35 percent of the gross salary, among the highest in the region. Lowering the size of social contributions would likely require a comprehensive reform of the social-protection system, so as to make it more efficient and targeted to those who really need assistance (instead of the current system, based on many small, untargeted transfers and across-the-board subsidies). As there is no formal unemployment insurance in Tunisia, registration in the social security system (Caisse Nationale de Sécurité Sociale) is frequently cited by workers as the most important benefit from formalization.

- *Reforming labor market regulations*. Tunisia's labor market regulations generate disincentives to formalization. For example, the wage bargaining system in Tunisia results in significant mismatches between wages and firm-level productivity. Sectoral collective agreements, for instance, impose similar wage grids across workers, firms, and regions, based on seniority and irrespective of differences in productivity and cost of living. This may also explain why the unemployment rate is higher in interior areas of the country, especially for youth.

- *Easing access to financial services*. Access to financial services in Tunisia is low compared with countries at similar income levels. Building on the experience under COVID-19, the authorities could broaden the implementation of measures aimed at reducing the use of cash and linking bank accounts to bank cards for low-income households. Other measures could include (1) operationalizing the National Collateral Registry, (2) establishing a national credit registry, (3) introducing credit bureaus, (4) repealing limits on interest and deposit rates, and (5) rolling out e-payment centers. Promoting digitalization of financial services would also be key, in addition to improving competition in the banking sector, reducing the crowding-out from large financing needs of the central government and state-owned enterprises, and resolving the overhang from legacy nonperforming loans.

[5] The new system is still to be implemented, as the digital platform to be used for registration and compliance and the implementing decrees are not yet in place.

Annex 1. Informality in North Africa: Stylized Facts

Annex Table 1.1. Data Availability across Informality Indicators

Country	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
North Africa				
Algeria	...	2007	1991–2019	1991–2017
Egypt	2013	2009	1991–2019	1991–2017
Libya	...	2003	1991–2019	1991–2017
Mauritania	...	2000	1991–2019	1991–2017
Morocco	2010	2011	1991–2019	1991–2017
Tunisia	2014	2011	1991–2019	1991–2017
Other Countries				
Afghanistan	...	2006	1991–2019	...
Albania	2013	2008	1991–2019	1991–2017
Angola	2009	...	1991–2019	1991–2017
Argentina	2016	2010	1991–2019	1991–2017
Armenia	2015	2008	1991–2019	1991–2017
Australia	...	2005	1991–2019	1991–2017
Austria	2012	2005	1991–2019	1991–2017
Azerbaijan	...	2007	1991–2019	1991–2017
Bahamas, The	...	...	1991–2019	1991–2017
Bahrain	...	2007	1991–2019	1991–2017
Bangladesh	2013	2004	1991–2019	1991–2017
Barbados	...	2007	1991–2019	...
Belarus	...	2008	1991–2019	1991–2017
Belgium	2012	2005	1991–2019	1991–2017
Belize	...	2010	1991–2019	1991–2017
Benin	2011	2005	1991–2019	1991–2017
Bhutan	...	...	1991–2019	1991–2017
Bolivia	2014	2009	1991–2019	1991–2017
Bosnia and Herzegovina	2005	2009	1991–2019	1991–2017
Botswana	2009	2006	1991–2019	1991–2017
Brazil	2016	2010	1991–2019	1991–2017
Brunei Darussalam	2014	2005	1991–2019	1991–2017
Bulgaria	2012	2008	1991–2019	1991–2017

(continues)

Annex Table 1.1. ***(continued)***

Country	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
Burkina Faso	2014	...	1991–2019	1991–2017
Burundi	...	2006	1991–2019	1991–2017
Cabo Verde	2015	...	1991–2019	1991–2017
Cambodia	2012	2010	1991–2019	1991–2017
Cameroon	2012	2006	1991–2019	1991–2017
Canada	...	2009	1991–2019	1991–2017
Central African Republic	...	2003	1991–2019	1991–2017
Chad	2007	2005	1991–2019	1991–2017
Channel Islands	...	...	1991–2019	...
Chile	2016	2010	1991–2019	1991–2017
China	2013	2010	1991–2019	1991–2017
Colombia	2015	2010	1991–2019	1991–2017
Comoros	2004	...	1991–2019	1991–2017
Congo, Dem. Rep.	2005	...	1991–2019	1991–2017
Congo, Rep.	2009	2008	1991–2019	1991–2017
Costa Rica	2016	2010	1991–2019	1991–2017
Côte d'Ivoire	2016	2004	1991–2019	1991–2017
Croatia	2012	2010	1991–2019	1991–2017
Cuba	...	...	1991–2019	...
Cyprus	2012	...	1991–2019	1991–2017
Czech Republic	2012	2007	1991–2019	1991–2017
Denmark	2012	2007	1991–2019	1991–2017
Djibouti	...	...	1991–2019	...
Dominican Republic	2014	2010	1991–2019	1991–2017
Ecuador	2015	2007	1991–2019	1991–2017
El Salvador	2014	2010	1991–2019	1991–2017
Equatorial Guinea	...	...	1991–2019	1991–2017
Eritrea	...	...	1991–2019	1991–2017
Estonia	2012	2004	1991–2019	1991–2017
Eswatini	...	2009	1991–2019	1991–2017
Ethiopia	...	...	1991–2019	1991–2017

(continues)

Annex Table 1.1. ***(continued)***

Country	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
Fiji	...	2006	1991–2019	1991–2017
Finland	2012	2005	1991–2019	1991–2017
France	2012	2005	1991–2019	1991–2017
French Polynesia	...	...	1991–2019	...
Gabon	...	...	1991–2019	1991–2017
Gambia, The	2012	2006	1991–2019	1991–2017
Georgia	...	...	1991–2019	1991–2017
Germany	2013	2005	1991–2019	1991–2017
Ghana	2013	2012	1991–2019	1991–2017
Greece	2012	2005	1991–2019	1991–2017
Grenada	...	2010	...	...
Guam	...	...	1991–2019	...
Guatemala	2016	2008	1991–2019	1991–2017
Guinea	...	2005	1991–2019	1991–2017
Guinea-Bissau	...	2004	1991–2019	1991–2017
Guyana	...	2002	1991–2019	1991–2017
Haiti	...	2010	1991–2019	1991–2017
Honduras	2014	2009	1991–2019	1991–2017
Hong Kong SAR	...	2009	1991–2019	1991–2017
Hungary	2012	2008	1991–2019	1991–2017
Iceland	2012	2005	1991–2019	1991–2017
India	2012	2006	1991–2019	1991–2017
Indonesia	2016	2010	1991–2019	1991–2017
Iran, Islamic Rep. of	...	2010	1991–2019	1991–2017
Iraq	2012	2009	1991–2019	...
Ireland	2012	2005	1991–2019	1991–2017
Israel	...	2008	1991–2019	1991–2017
Italy	2012	2005	1991–2019	1991–2017
Jamaica	...	2004	1991–2019	1991–2017
Japan	2010	2005	1991–2019	1991–2017
Jordan	2010	2010	1991–2019	1991–2017

(continues)

Annex Table 1.1. ***(continued)***

Country	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
Kazakhstan	...	2009	1991–2019	1991–2017
Kenya	...	2009	1991–2019	1991–2017
Korea, Dem. People's Rep.	...	...	1991–2019	...
Korea, Rep.	2014	2011	1991–2019	1991–2017
Kuwait	...	...	1991–2019	1991–2017
Kyrgyz Republic	2013	2008	1991–2019	1991–2017
Lao P.D.R.	2010	2008	1991–2019	1991–2017
Latvia	2012	2009	1991–2019	1991–2017
Lebanon	...	2003	1991–2019	1991–2017
Lesotho	...	2005	1991–2019	1991–2017
Liberia	2010	...	1991–2019	1991–2017
Lithuania	2012	2009	1991–2019	1991–2017
Luxembourg	2012	2005	1991–2019	1991–2017
Macao SAR	...	...	1991–2019	...
Madagascar	2013	2009	1991–2019	1991–2017
Malawi	2013	...	1991–2019	1991–2017
Malaysia	...	2013	1991–2019	1991–2017
Maldives	...	2004	1991–2019	1991–2017
Mali	2015	2010	1991–2019	1991–2017
Malta	2012	2004	1991–2019	1991–2017
Mauritius	...	2010	1991–2019	1991–2017
Mexico	2015	2010	1991–2019	1991–2017
Micronesia	...	2007	...	...
Moldova	2010	2011	1991–2019	1991–2017
Mongolia	2015	2009	1991–2019	1991–2017
Montenegro	...	2007	1991–2019	...
Mozambique	...	2006	1991–2019	1991–2017
Myanmar	2015	...	1991–2019	1991–2017
Namibia	2016	2008	1991–2019	1991–2017
Nepal	2008	2011	1991–2019	1991–2017
Netherlands, The	2012	2005	1991–2019	1991–2017

(continues)

Annex Table 1.1. ***(continued)***

Country	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
New Caledonia	...	...	1991–2019	...
New Zealand	...	...	1991–2019	1991–2017
Nicaragua	2014	2008	1991–2019	1991–2017
Niger	2011	2006	1991–2019	1991–2017
Nigeria	2013	2010	1991–2019	1991–2017
North Macedonia	...	2009	1991–2019	...
Norway	2012	2005	1991–2019	1991–2017
Oman	...	...	1991–2019	1991–2017
Pakistan	2015	2009	1991–2019	1991–2017
Panama	2014	...	1991–2019	...
Papua New Guinea	...	2009	1991–2019	1991–2017
Paraguay	2015	2004	1991–2019	1991–2017
Peru	2015	2009	1991–2019	1991–2017
Philippines	...	2011	1991–2019	1991–2017
Poland	2012	2008	1991–2019	1991–2017
Portugal	2012	2005	1991–2019	1991–2017
Puerto Rico	...	...	1991–2019	...
Qatar	...	2011	1991–2019	1991–2017
Romania	2012	2008	1991–2019	1991–2017
Russian Federation	2014	2011	1991–2019	1991–2017
Rwanda	2014	2004	1991–2019	1991–2017
Samoa	2012	...	1991–2019	...
São Tomé and Príncipe	...	...	1991–2019	...
Saudi Arabia	...	2010	1991–2019	1991–2017
Senegal	2015	2008	1991–2019	1991–2017
Serbia	2016	2007	1991–2019	...
Seychelles	...	2010	...	...
Sierra Leone	2014	2004	1991–2019	1991–2017
Singapore	...	2009	1991–2019	1991–2017
Slovak Republic	2012	2003	1991–2019	1991–2017
Slovenia	2012	2008	1991–2019	1991–2017

(continues)

Annex Table 1.1. ***(continued)***

Country	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
Solomon Islands	...	2008	1991–2019	1991–2017
Somalia	...	...	1991–2019	...
South Africa	2016	2010	1991–2019	1991–2017
South Sudan	...	...	1991–2019	...
Spain	2012	2005	1991–2019	1991–2017
Sri Lanka	2013	2006	1991–2019	1991–2017
St. Lucia	...	2004	1991–2019	...
St. Vincent and the Grenadines	...	2005	1991–2019	...
Sudan	...	2005	1991–2019	...
Suriname	...	...	1991–2019	1991–2017
Sweden	2012	2005	1991–2019	1991–2017
Switzerland	2012	2005	1991–2019	1991–2017
Syria	2003	2008	1991–2019	1991–2017
Tajikistan	2009	...	1991–2019	1991–2017
Tanzania	2014	2007	1991–2019	1991–2017
Thailand	...	2009	1991–2019	1991–2017
Timor-Leste	2013	2010	1991–2019	...
Togo	2011	2009	1991–2019	1991–2017
Tonga	...	...	1991–2019	...
Trinidad and Tobago	...	2011	1991–2019	1991–2017
Turkey	2015	2008	1991–2019	1991–2017
Turkmenistan	...	...	1991–2019	...
Uganda	2012	2004	1991–2019	1991–2017
Ukraine	...	2010	1991–2019	1991–2017
United Arab Emirates	...	...	1991–2019	1991–2017
United Kingdom	2012	2005	1991–2019	1991–2017
United States	2013	2005	1991–2019	1991–2017
Uruguay	2016	2009	1991–2019	1991–2017
Uzbekistan	...	2005	1991–2019	...
Vanuatu	...	2006	1991–2019	...
Venezuela	2012	2009	1991–2019	1991–2017

(continues)

Annex Table 1.1. ***(continued)***

Country	Informal employment	Noncontributors to pension scheme	Self-employment	Schneider index
Vietnam	2015	2010	1991–2019	1991–2017
Virgin Islands (U.S.)	...	...	1991–2019	...
West Bank and Gaza	2014	...	1991–2019	...
Yemen	2014	2006	1991–2019	1991–2017
Zambia	2015	2010	1991–2019	1991–2017
Zimbabwe	...	2011	1991–2019	1991–2017

Sources: ILO (2018) for Informal Employment; Medina and Schneider (2019) for Schneider Index; World Bank HDNSP pensions database for Non-contributors to Pension Scheme and ILOSTAT database for Self-employment.
Note: "..." denotes that the data is not available."

Microeconomic Correlates of the Probability of Being Informal

The stylized facts presented in Figure 5 are informative, but they cannot be used to disentangle the main correlates of informality. For instance, the fact that a group of workers (such as heads of households) displays low rates of informality may be partially due to other characteristics of that group (such as their educational level or gender).

To assess which workers' characteristic matters the most for informality when all variables are considered at the same time, this paper relies on a multivariate analysis. Using individual-level data, the likelihood of being informal conditional on individual characteristics is investigated by means of a linear probability model for each country:

$$Informal_i = \alpha_i + \beta * X_i + \varepsilon_i$$

in which *Informal* denotes a dummy variable that equals 1 if a worker is engaged in informal employment and 0 otherwise. The set of independent variables X includes individual characteristics, as defined in Annex Table 1.2. These characteristics include the worker's (1) marital status (dummies for being married or being head of the household), (2) sector of employment, (3) age group, (4) level of education, (5) gender and locational characteristics, (6) household characteristics (household size, access to internet, having a formal worker in the household, and income quintile), and (7) the size of the firm that employs the worker. Following Gatti and others (2014), separate regressions are provided for the whole sample and workers in the private sector.

Annex Table 1.3 reports the results of baseline regressions of the likelihood of being informal for Egypt, Mauritania, Morocco, and Tunisia. For ease of interpretation, the estimates of the marginal increase in the probability of being informal are also reported, just for the characteristics that are found to be statistically significant in the regression (Annex Table 1.4).

Annex Table 1.2. Definitions of the Variables Used in the Microanalysis

Variables	Definitions
Married dummy	Dummy equals 1 if the worker is married, 0 otherwise.
Head of household dummy	Dummy equals 1 if the worker is the head of the household, 0 otherwise.
Sectoral dummy	
Agriculture	Dummy equals 1 if the worker is in the agriculture sector, 0 otherwise.
Services	Dummy equals 1 if the worker is in the services sector, 0 otherwise.
Public administration	Dummy equals 1 if the worker is in the public sector, 0 otherwise.
Age group dummy (15–24)	
25–34	Dummy equals 1 if the worker is aged 25–34, 0 otherwise.
35–54	Dummy equals 1 if the worker is aged 35–54, 0 otherwise.
55–64	Dummy equals 1 if the worker is aged 55–64, 0 otherwise.
65+	Dummy equals 1 if the worker is aged 65+, 0 otherwise.
Education dummy (No education)	
Primary	Dummy equals 1 if the worker has a primary education, 0 otherwise.
Secondary	Dummy equals 1 if the worker has a secondary education, 0 otherwise.
Tertiary	Dummy equals 1 if the worker has a tertiary education, 0 otherwise.
Female dummy	Dummy equals 1 if a female worker, 0 otherwise.
Urban dummy	Dummy equals 1 if the worker lives in an urban area, 0 otherwise.
Household size dummy	Dummy equals 1 if the worker's household size is higher than the country average, 0 otherwise.
Internet access dummy	Dummy equals 1 if the worker has access to internet at home, 0 otherwise.
Having a formal worker in the household dummy	Dummy equals 1 if the worker has a formal sector worker in the household, 0 otherwise.
Poorest dummy (Q1)	Dummy equals 1 if the worker's household is in the poorest quintile of the income distribution, 0 otherwise.
Firm size dummy (1–4)	
5–9	Dummy equals 1 if the worker's firm size is 5–9 employees, 0 otherwise.
10–24	Dummy equals 1 if the worker's firm size is 10–24 employees, 0 otherwise.
25–49	Dummy equals 1 if the worker's firm size is 25–49 employees, 0 otherwise.
50–99	Dummy equals 1 if the worker's firm size is 50–99 employees, 0 otherwise.
100+	Dummy equals 1 if the worker's firm size is 100+ employees, 0 otherwise.

Annex Table 1.3. Microeconomic Correlates of the Probability of Being Informal

	Egypt		Tunisia		Mauritania		Morocco	
Independent variables	**All**	**Private**	**All**	**Private**	**All**	**Private**	**All**	**Private**
Married dummy	-0.030***	-0.018*	-0.051***	-0.052***	0.000	0.001		
	(0.008)	(0.009)	(0.008)	(0.009)	(0.004)	(0.003)		
Head of household dummy	-0.082***	-0.093***	-0.222***	-0.246***	-0.000	-0.001	-0.035***	-0.037***
	(0.009)	(0.011)	(0.008)	(0.009)	(0.005)	(0.004)	(0.009)	(0.009)
Sectoral dummy (Secondary sector)								
Agriculture	0.011	0.010	0.099***	0.104***	-0.005	-0.002	0.270***	0.266***
	(0.009)	(0.009)	(0.008)	(0.008)	(0.005)	(0.004)	(0.016)	(0.016)
Services	-0.009	-0.014*	0.045***	0.050***			0.201***	0.205***
	(0.007)	(0.008)	(0.006)	(0.007)			(0.010)	(0.010)
Public administration	-0.176***		-0.172***		-0.109***		-0.342***	
	(0.013)		(0.007)		(0.009)		(0.011)	
Age group dummy (15-24)								
25-34	-0.058***	-0.048***	-0.114***	-0.113***	-0.028***	-0.010**	-0.033***	-0.033***
	(0.014)	(0.014)	(0.012)	(0.013)	(0.005)	(0.004)	(0.010)	(0.010)
35-54	-0.078***	-0.072***	-0.178***	-0.180***	-0.018***	-0.012***	-0.010	-0.009
	(0.013)	(0.013)	(0.013)	(0.013)	(0.005)	(0.004)	(0.011)	(0.011)
55-64	-0.062***	-0.051***	-0.178***	-0.178***	-0.021***	-0.015**	0.057***	0.067***
	(0.015)	(0.016)	(0.014)	(0.015)	(0.008)	(0.007)	(0.013)	(0.014)
65+	-0.049***	-0.039**	-0.186***	-0.190***	-0.021	-0.010	0.143***	0.150***
	(0.019)	(0.019)	(0.020)	(0.021)	(0.013)	(0.011)	(0.017)	(0.017)
Education dummy (No education)								
Primary	-0.010	-0.016*	-0.028	-0.025	-0.004	-0.002	-0.003	0.001
	(0.009)	(0.008)	(0.022)	(0.023)	(0.004)	(0.004)	(0.009)	(0.009)
Secondary	-0.016**	-0.017**	-0.088***	-0.079***	-0.004	-0.012***	-0.040***	-0.036***
	(0.007)	(0.008)	(0.022)	(0.023)	(0.005)	(0.004)	(0.010)	(0.010)
Tertiary	-0.026**	-0.037***	-0.160***	-0.162***	-0.074***	-0.069***	-0.110***	-0.157***
	(0.011)	(0.014)	(0.023)	(0.024)	(0.007)	(0.007)	(0.014)	(0.019)

Female dummy	0.009 (0.010)	0.031** (0.013)	0.029*** (0.008)	0.039*** (0.009)	0.004 (0.005)	0.003 (0.004)	-0.134*** (0.010)	-0.142*** (0.011)
Urban dummy	-0.008 (0.006)	-0.009 (0.008)	0.005 (0.006)	0.010 (0.007)	0.016** (0.006)	0.012** (0.005)	-0.032*** (0.012)	-0.034*** (0.012)
Household size dummy	0.023*** (0.005)	0.020*** (0.007)	0.026*** (0.005)	0.025*** (0.006)	-0.002 (0.004)	-0.007* (0.004)	0.082*** (0.006)	0.087*** (0.007)
Internet access dummy	-0.003 (0.007)	-0.005 (0.011)	-0.047*** (0.007)	-0.053*** (0.008)			0.005 (0.014)	0.005 (0.017)
Having a formal worker in the household dummy	-0.649*** (0.014)	-0.558*** (0.016)	-0.690*** (0.005)	-0.679*** (0.005)	-0.606*** (0.009)	-0.367*** (0.009)	-0.526*** (0.011)	-0.521*** (0.011)
Poorest dummy (Q1)	-0.014** (0.007)	-0.013* (0.007)	0.013* (0.008)	0.014 (0.008)	0.012*** (0.004)	0.013*** (0.004)	-0.004 (0.010)	-0.006 (0.010)
Firm size dummy (1–4)								
5–9	-0.015** (0.007)	-0.013* (0.007)			-0.011** (0.005)	-0.022*** (0.004)		
10–24	-0.037*** (0.010)	-0.021* (0.011)			-0.019*** (0.007)	0.003 (0.006)		
25–49	-0.107*** (0.013)	-0.114*** (0.021)			-0.008 (0.008)	-0.032*** (0.008)		
50–99	-0.127*** (0.015)	-0.166*** (0.024)			0.006 (0.015)	-0.002 (0.016)		
100+	-0.139*** (0.012)	-0.188*** (0.016)			-0.156*** (0.016)	-0.574*** (0.047)		
Constant	1.180*** (0.016)	1.159*** (0.016)	1.302*** (0.024)	1.303*** (0.026)	1.018*** (0.008)	1.009*** (0.007)	0.678*** (0.019)	0.668*** (0.019)
Number of observations	14,975	11,399	26,060	23,256	3,312	3,066	25,726	23,300
R-squared	0.797	0.620	0.504	0.490	0.777	0.469	0.513	0.477

Note: Robust standard errors in parentheses. All = all workers; Private = private sector workers. Omitted categories: Sector: secondary sector; Age group: 15–24; Education: no education; Firm size: 1–4. Q1 = poorest quintile.

* $p < .10$; ** $p < .05$; *** $p < .01$.

Annex Table 1.4. Marginal Increase in the Likelihood of Being Informal

	Egypt		Tunisia		Mauritania		Morocco	
Independent variables	**All**	**Private**	**All**	**Private**	**All**	**Private**	**All**	**Private**
Married dummy	-3.0	-1.8	-5.1	-5.2	N.S.	N.S.		
Head of household dummy	-8.2	-9.3	-22.2	-24.6	N.S.	N.S.	-3.5	-3.7
Sectoral dummy (Secondary sector)								
Agriculture	N.S.	N.S.	9.9	10.4	N.S.	N.S.	27.0	26.6
Services	N.S.	-1.4	4.5	5.0			20.1	20.5
Public administration	-17.6		-17.2		-10.9		-34.2	
Age group dummy (15-24)								
25-34	-5.8	-4.8	-11.4	-11.3	-2.8	-1.0	-3.3	-3.3
35-54	-7.8	-7.2	-17.8	-18.0	-1.8	-1.2	N.S.	N.S.
55-64	-6.2	-5.1	-17.8	-17.8	-2.1	-1.5	5.7	6.7
65+	-4.9	-3.9	-18.6	-19.0	N.S.	N.S.	14.3	15.0
Education dummy (No education)								
Primary	N.S.	-1.6	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Secondary	-1.6	-1.7	-8.8	-7.9	N.S.	-1.2	-4.0	-3.6
Tertiary	-2.6	-3.7	-16.0	-16.2	-7.4	-6.9	-11.0	-15.7
Female dummy	N.S.	3.1	2.9	3.9	N.S.	N.S.	-13.4	-14.2
Urban dummy	N.S.	N.S.	N.S.	N.S.	1.6	1.2	-3.2	-3.4
Household size dummy	2.3	2.0	2.6	2.5	N.S.	-0.7	8.2	8.7
Internet access dummy	N.S.	N.S.	-4.7	-5.3			N.S.	N.S.
Having a formal worker in the household dummy	-64.9	-55.8	-69.0	-67.9	-60.6	-36.7	-52.6	-52.1
Poorest dummy (Q1)	-1.4	-1.3	1.3	N.S.	1.2	1.3	N.S.	N.S.

Firm size dummy (1–4)								
5–9	–1.5	–1.3			–1.1	–2.2		
10–24	–3.7	–2.1			–1.9	N.S.		
25–49	–10.7	–11.4			N.S.	–3.2		
50–99	–12.7	–16.6			N.S.	N.S.		
100+	–13.9	–18.8			–15.6	–57.4		
Number of observations	14,975	11,399	26,060	23,256	3,312	3,066	25,726	23,300
R-squared	0.797	0.620	0.504	0.490	0.777	0.469	0.513	0.477

Note: All = all workers; Private = private sector workers. Omitted categories: Sector: secondary sector; Age group: 15–24; Education: no education; Firm size: 1–4. All coefficients are multiplied by 100. Coefficients that are not statistically significant are denoted by N.S. Q1 = poorest quintile.

Annex 2. Informality, Level of Development, and Policy Distortions

Annex Table 2.1. List of Countries

Country - Low Informality	Schneider Index	Country - Medium informality	Schneider Index	Country - High informality	Schneider Index
Switzerland	0.06	Lithuania	0.25	Uganda	0.35
United States	0.07	Yemen, Rep.	0.25	Guinea	0.35
Austria	0.07	Korea, Rep.	0.25	Suriname	0.35
Luxembourg	0.09	Croatia	0.25	Burkina Faso	0.35
Netherlands	0.09	South Africa	0.26	Nepal	0.35
United Kingdom	0.10	Namibia	0.26	Mali	0.36
Germany	0.11	Bahamas, The	0.27	Mozambique	0.36
New Zealand	0.11	Cyprus	0.27	Eritrea	0.36
Sweden	0.11	Botswana	0.27	Burundi	0.36
Japan	0.11	Brunei Darussalam	0.28	Côte d'Ivoire	0.37
Singapore	0.11	Romania	0.28	Central African Republic	0.38
Finland	0.11	Maldives	0.28	Kazakhstan	0.38
Australia	0.11	Bulgaria	0.28	Niger	0.38
Ireland	0.12	Fiji	0.28	Russian Federation	0.38
Norway	0.12	Lao P.D.R.	0.28	Madagascar	0.38
France	0.12	Lesotho	0.29	Ghana	0.38
Canada	0.12	Mexico	0.29	Philippines	0.39
Denmark	0.13	Turkey	0.29	Sierra Leone	0.39
Iceland	0.13	Cameroon	0.29	Eswatini	0.39
China	0.13	Guyana	0.30	Tajikistan	0.39
Czech Republic	0.14	Malaysia	0.30	Chad	0.39
Hong Kong SAR	0.14	Albania	0.30	Nicaragua	0.40
Slovak Republic	0.14	Equatorial Guinea	0.30	Armenia	0.40
Saudi Arabia	0.15	**Algeria**	0.30	Liberia	0.40
Bahrain	0.16	Lebanon	0.30	Moldova	0.41
Qatar	0.16	Dominican Republic	0.30	Senegal	0.41
Jordan	0.16	Cabo Verde	0.31	Angola	0.41
Chile	0.16	Solomon Islands	0.31	Belarus	0.41
Iran, Islamic Rep. of	0.16	Kenya	0.31	Uruguay	0.41

(continues)

Annex Table 2.1. ***(continued)***

Country - Low Informality	Schneider Index	Country - Medium informality	Schneider Index	Country - High informality	Schneider Index
Mongolia	0.16	Comoros	0.31	El Salvador	0.42
Oman	0.16	Colombia	0.32	Ukraine	0.43
Vietnam	0.16	Bangladesh	0.32	Congo, Rep.	0.43
Belgium	0.18	Bosnia and Herzegovina	0.32	Sri Lanka	0.43
Kuwait	0.18	Trinidad and Tobago	0.32	Zambia	0.43
Portugal	0.19	Togo	0.32	Belize	0.43
Syria	0.19	**Morocco**	0.32	Gambia, The	0.46
Israel	0.20	**Mauritania**	0.32	Myanmar	0.46
Italy	0.21	Ecuador	0.32	Honduras	0.46
Mauritius	0.21	Papua New Guinea	0.32	Cambodia	0.47
Spain	0.21	**Libya**	0.32	Benin	0.48
Latvia	0.21	Pakistan	0.33	Thailand	0.48
Hungary	0.21	**Egypt**	0.33	Congo, Dem. Rep.	0.48
Slovenia	0.22	**Tunisia**	0.33	Guatemala	0.48
India	0.22	Guinea-Bissau	0.33	Azerbaijan	0.50
Poland	0.23	Venezuela	0.33	Gabon	0.50
Estonia	0.23	Jamaica	0.33	Peru	0.51
Costa Rica	0.23	Ethiopia	0.34	Haiti	0.52
Indonesia	0.23	Rwanda	0.34	Zimbabwe	0.53
United Arab Emirates	0.24	Kyrgyz Republic	0.34	Tanzania	0.53
Greece	0.24	Malawi	0.34	Nigeria	0.55
Malta	0.24	Paraguay	0.34	Georgia	0.60
Bhutan	0.24	Brazil	0.34	Bolivia	0.61
Argentina	0.24				

Note: Level of informality is measured by the Schneider Index, ranging between 0 and 1. A higher value corresponds to a higher degree of informality in the economy.

Annex Table 2.2. Output Informality

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		Schneider's Informality Measure													
Taxation	Sociodemographic index	0.140*** (0.012)	0.132*** (0.012)	0.141*** (0.014)	0.027 (0.019)	0.100*** (0.014)	0.078*** (0.016)	0.044*** (0.015)	0.034** (0.017)	0.089*** (0.017)	0.057*** (0.018)	0.069*** (0.017)	0.088*** (0.017)	0.091*** (0.021)	0.090*** (0.016)
	Tax burden		0.194*** (0.054)		0.060 (0.053)	0.178*** (0.049)	0.074 (0.053)	0.038 (0.054)	0.036 (0.048)	0.117* (0.066)	0.075 (0.052)	0.071 (0.054)	0.132** (0.067)	0.088 (0.075)	0.184** (0.081)
	Effect of taxation on incentives to work			-0.017* (0.009)											
Governance	Government effectiveness				-0.079*** (0.011)										
	Transparency of government policymaking					-0.055*** (0.009)									
	Integrity of legal system						-0.039*** (0.007)			-0.033*** (0.009)	-0.029*** (0.010)	-0.034*** (0.008)	-0.031*** (0.009)	-0.030*** (0.010)	-0.030*** (0.009)
	Control of corruption							-0.068*** (0.009)							
	Rule of law								-0.077*** (0.011)						
Business climate	Burden of government regulation									-0.024** (0.012)			0.003 (0.016)	-0.025* (0.015)	-0.021* (0.012)
	Regulatory quality										-0.029* (0.017)				
	Financial services availability											-0.019 (0.012)			
Labor market	Hiring and firing regulations												-0.021** (0.009)		
	Minimum wage													0.001*** (0.000)	
	Flexibility of wage determination														-0.012* (0.007)
	Constant	0.303*** (0.008)	0.158*** (0.040)	0.370*** (0.036)	0.253*** (0.039)	0.397*** (0.052)	0.484*** (0.070)	0.264*** (0.040)	0.266*** (0.036)	0.494*** (0.073)	0.418*** (0.080)	0.541*** (0.082)	0.482*** (0.073)	0.493*** (0.079)	0.498*** (0.071)

Number of observations	134	132	123	132	125	131	132	132	125	131	125	125	96	125
VIF multicollinearity test (average)	1.00	1.03	1.01	2.2	1.21	1.5	2.02	2.02	1.64	2.67	1.75	1.86	1.87	1.68
R–squared	0.409	0.440	0.424	0.586	0.531	0.556	0.569	0.597	0.567	0.568	0.564	0.591	0.541	0.578

Note: Robust standard errors in parentheses; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; VIF is the variance inflation factor which quantifies how much the variance is inflated, potentially due to multicollinearity. A number above 10 is typically associated with multicollinearity.

Sociademographic index = Index summarizing socio-demographic factors such as youth, agriculture employment, rural population, and average years of schooling (Barro and Lee).

Tax burden = Summarizes direct taxes (top marginal tax rates on individual and corporate incomes), and overall tax revenues, including all forms of direct and indirect taxation as a percentage of GDP (various sources).

Effect of taxation on incentives to work = Captures the extent to which taxes reduce the incentive to work (WEF).

Government effectiveness = Captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (WWGI).

Transparency of government policymaking = Captures the level of transparency of government policymaking, the first pillar (i.e., Institutions) of the Global Competitiveness Index (WEF).

Integrity of the legal system = Captures the strength and impartiality of the legal system (ICRG).

Control of corruption = Captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests (WWGI).

Rule of law = Captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (WWGI).

Burden of government regulation = An indicator capturing how burdensome is for businesses to comply with governmental administrative requirements (e.g., permits, regulations, reporting) (WEF).

Regulatory quality = Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development (WWGI).

Financial services availability = An indicator capturing the extent of the financial products and services available for businesses [1 = not at all; 7 = provides a wide variety] (WEF).

Hiring and firing regulations = A quantitative measure that considers regulatory constraints on hiring and hours worked (WEF).

Minimum wage = The ratio of minimum wage to output per worker in local currency (ILO).

Flexibility of wage determination = An indicator capturing the extent of centralized wage setting as part of the labor market regulation (WEF).

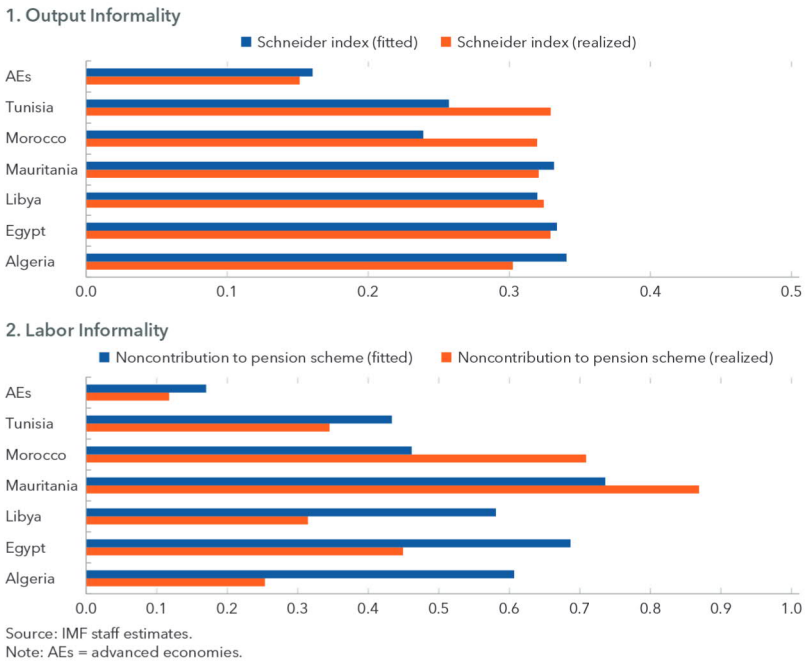
Annex Table 2.3. Labor Informality (Share of Workers Not Paying Pension Contributions)

VARIABLES		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		Noncontributions to Pension Scheme (percent of labor force)													
Taxation	Sociodemographic index	0.518*** (0.041)	0.488*** (0.042)	0.522*** (0.039)	0.313*** (0.060)	0.461*** (0.045)	0.356*** (0.049)	0.366*** (0.055)	0.327*** (0.054)	0.314*** (0.057)	0.331*** (0.063)	0.394*** (0.049)	0.319*** (0.058)	0.321*** (0.066)	0.319*** (0.058)
	Tax burden		0.546*** (0.191)		0.388** (0.166)	0.652*** (0.222)	0.318* (0.187)	0.377** (0.185)	0.358** (0.175)	0.115 (0.175)	0.339* (0.194)	0.312 (0.219)	0.135 (0.174)	−0.118 (0.251)	0.197 (0.204)
	Effect of taxation on incentives to work			0.085** (0.040)											
Governance	Government effectiveness				−0.123*** (0.026)										
	Transparency of government policymaking					−0.021 (0.028)									
	Integrity of legal system						−0.082*** (0.014)			−0.111*** (0.020)	−0.066*** (0.023)	−0.097*** (0.016)	−0.106*** (0.020)	−0.116*** (0.022)	−0.107*** (0.020)
	Control of corruption							−0.088*** (0.023)							
	Rule of law								−0.116*** (0.022)						
Business Climate	Burden of government regulation									0.092*** (0.034)			0.125*** (0.040)	0.080** (0.036)	0.094*** (0.034)
	Regulatory quality										−0.038 (0.044)				
	Financial services availability											0.064*** (0.024)			
Labor Market	Hiring and firing regulations												−0.028* (0.016)		
	Minimum wage													0.175** (0.067)	
	Flexibility of wage determination														−0.012 (0.014)
	Constant	0.622*** (0.018)	0.218 (0.139)	0.302** (0.147)	0.322*** (0.120)	0.217 (0.232)	0.868*** (0.165)	0.326** (0.133)	0.333*** (0.126)	0.876*** (0.198)	0.755*** (0.236)	0.675*** (0.231)	0.851*** (0.194)	1.060*** (0.262)	0.864*** (0.196)
Number of observations		117	117	106	117	108	115	117	117	108	115	107	108	81	108

VIF multicollinearity test (average)	1.00	1.05	1.00	2.13	1.23	1.58	1.95	1.95	1.92	2.92	1.87	2.07	1.67	1.97
R-squared	0.634	0.673	0.659	0.721	0.664	0.731	0.703	0.724	0.738	0.734	0.734	0.744	0.773	0.740

Note: Robust standard errors in parentheses; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; VIF is the variance inflation factor which quantifies how much the variance is inflated, potentially due to multicollinearity. A number above 10 is typically associated with multicollinearity.
Sociademographic index = Index summarizing socio-demographic factors such as youth, agriculture employment, rural population, and average years of schooling (Barro and Lee).
Tax burden = Summarizes direct taxes (top marginal tax rates on individual and corporate incomes), and overall tax revenues, including all forms of direct and indirect taxation as a percentage of GDP (various sources).
Effect of taxation on incentives to work = Captures the extent to which taxes reduce the incentive to work (WEF).
Government effectiveness = Captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (WWGI).
Transparency of government policymaking = Captures the level of transparency of government policymaking, the first pillar (i.e., Institutions) of the Global Competitiveness Index (WEF).
Integrity of the legal system = Captures the strength and impartiality of the legal system (ICRG).
Control of corruption = Captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests (WWGI).
Rule of law = Captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (WWGI).
Burden of government regulation = An indicator capturing how burdensome is for businesses to comply with governmental administrative requirements (e.g., permits, regulations, reporting) (WEF).
Regulatory quality = Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development (WWGI).
Financial services availability = An indicator capturing the extent of the financial products and services available for businesses [1 = not at all; 7 = provides a wide variety] (WEF).
Hiring and firing regulations = A quantitative measure that considers regulatory constraints on hiring and hours worked (WEF).
Minimum wage = The ratio of minimum wage to output per worker in local currency (ILO).
Flexibility of wage determination = An indicator capturing the extent of centralized wage setting as part of the labor market regulation (WEF).

Annex Figure 2.1. Comparing Actual versus Fitted Values of Informality



Source: IMF staff estimates.
Note: AEs = advanced economies.

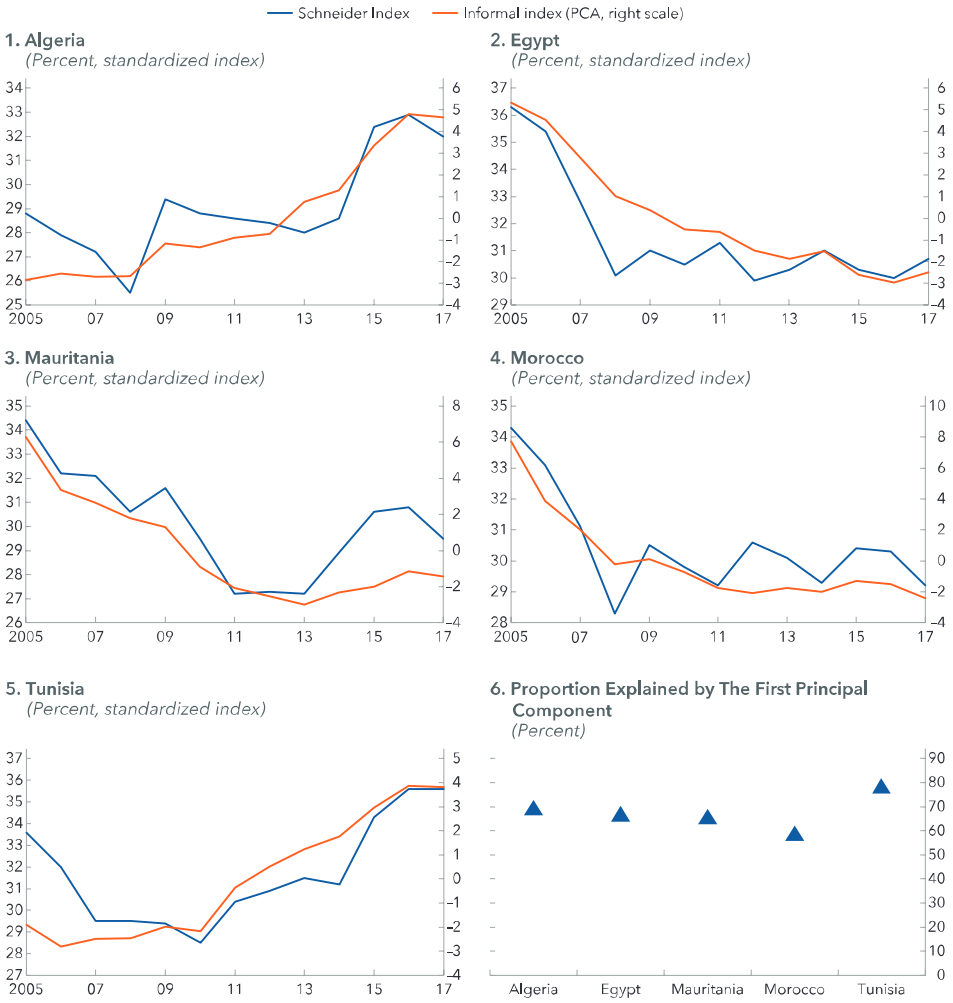
Annex Table 2.4. Data Description and Sources for the Principal Component Analysis

Categories	Components	Indicators	Data sources	Morocco	Tunisia	Egypt	Algeria	Mauritania
Informality and employment variables	Informality and employment variables	Schneider informal size	IMF	*	*	*	*	*
		Monetary base %GDP	IMF	*		*	*	
		Self-employment	ILO	*	*			*
		Employment	ILO and national sources	*		*	*	
		Unemployment 15+	ILO and national sources	*				
		Underemployment 25+	ILO					*
		Underemployment 15+	ILO	*				
Development and policy variables	Development	GNI per capita (current LCU)	WB		*			
		GDP per capita, PPP constant, 2017	WB	*		*	*	
		International trade %GDP	WB	*			*	*
		Poverty rate	WB	*		*		*
		Sociodemographic index	Authors calculation	*		*	*	
	Labor market policies	Centralized collective bargaining	Fraser Institute	*			*	
		SMIG*	National sources		*			
		Hiring and firing rules	Fraser Institute					*
	Business climate	Regulatory quality	World Governance Indicators (WB)	*	*			*
		Business regulation	Fraser Institute			*	*	
		Regulatory burden	Fraser Institute			*		
	Governance	Voice and accountability	World Governance Indicators (WB)		*			
		Political stability and absence of violence/terrorism	World Governance Indicators (WB)		*			*
		Government effectiveness	World Governance Indicators (WB)					*
		Control of corruption	World Governance Indicators (WB)				*	
		Size of government	Fraser Institute				*	*
	Taxation	Total revenues %GDP*	IMF	*		*		
		Corporate tax income %GDP*	IMF	*	*			
		VAT %GDP*	IMF	*				

* : Not available for all countries.

Note: GNI = gross national income; ILO = International Labour Organization; LCU = local currency unit; PPP = purchasing power parity; SMIG = Interprofessional guaranteed minimum wage; VAT = value-added tax; WB = World Bank.

Annex Figure 2.2. Tracking Output Informality in North Africa



Source: IMF staff estimates.
Note: Panels 1–5 shows the informality composite index (from the PCA) and the Schneider index of production informality in North Africa. Panel 6 shows the share of the annual change of the composite index explained by the first principal component.

Annex 3. Countries by Informality Grouping

Annex Table 3.1. List of Countries by Informality Grouping

Low Informality	Informal employment (% of total)	Medium Informality	Informal employment (% of total)	High Informality	Informal employment (% of total)
Trinidad and Tobago	24.5	Honduras	51.4	Niger	95.1
Mauritius	19.8	Colombia	51.4	Central African Republic	93.3
New Zealand	18.4	Ecuador	49.9	Chad	92.6
Barbados	17.2	Morocco	49.4	South Sudan	92.2
Czech Republic	16.9	Georgia	49.2	Guinea	92.1
Netherlands, The	16.7	Mongolia	48.9	Somalia	91.7
Portugal	16.6	Tonga	47.8	Sierra Leone	90.5
Puerto Rico	16.6	China	45.7	Benin	88.7
Australia	16.5	Dominican Republic	43.4	Madagascar	88.2
Spain	16.0	Paraguay	43.1	Eritrea	86.3
Ukraine	15.8	Fiji	42.9	Burkina Faso	86.1
South Africa	15.6	Nicaragua	42.8	Equatorial Guinea	86.0
Canada	15.3	Sri Lanka	42.2	Burundi	85.6
Slovenia	15.2	Guatemala	39.8	Ethiopia	84.7
Bahamas, The	15.1	Jamaica	39.3	Tanzania	84.3
United Kingdom	15.1	El Salvador	38.8	Mozambique	84.2
Ireland	15.0	Libya	38.5	Afghanistan	82.3
Slovak Republic	14.8	Namibia	37.5	Guinea-Bissau	81.7
Switzerland	14.8	Panama	37.4	Mali	81.0
Suriname	14.4	Lebanon	36.8	Nigeria	80.4
Malta	14.4	Philippines	36.5	Liberia	78.4
Belgium	14.0	Armenia	35.6	Angola	78.4
Singapore	14.0	Djibouti	35.2	Nepal	78.0
Jordan	13.8	Uzbekistan	35.2	Uganda	77.8
Cyprus	13.3	Guyana	34.5	Togo	77.0
Finland	13.2	Kyrgyz Republic	34.0	India	76.5
Israel	12.4	Belize	33.6	Papua New Guinea	75.7

(continues)

Annex Table 3.1. ***(continued)***

Low Informality	Informal employment (% of total)	Medium Informality	Informal employment (% of total)	High Informality	Informal employment (% of total)
Iceland	12.2	Greece	33.5	Zambia	75.1
Croatia	12.1	Moldova	33.3	Cameroon	74.9
Austria	12.0	Gabon	32.8	Haiti	73.6
Lithuania	11.7	Brazil	32.8	Ghana	73.2
France	11.6	Samoa	32.7	Gambia, The	72.6
Bulgaria	11.6	Turkey	32.0	Bhutan	72.4
Latvia	11.5	Algeria	32.0	Bolivia	68.5
Estonia	10.7	Cabo Verde	31.9	Vanuatu	68.5
Hungary	10.4	Mexico	31.6	Azerbaijan	68.2
Japan	10.3	Egypt	31.2	Zimbabwe	67.3
Germany	9.9	Tajikistan	30.6	Rwanda	67.1
Sweden	9.7	Serbia	28.3	Myanmar	65.6
Luxembourg	8.6	Uruguay	28.2	Senegal	64.4
Denmark	8.1	Malaysia	27.6	Solomon Islands	63.8
Brunei Darussalam	7.6	Chile	27.1	Malawi	61.9
Norway	6.5	St. Lucia	26.6	Bangladesh	59.9
United States	6.3	St. Vincent and the Grenadines	26.1	Comoros	58.5
Saudi Arabia	4.6	Argentina	25.5	Mauritania	57.1
Belarus	4.2	Tunisia	25.4	Pakistan	57.0
United Arab Emirates	4.0	Romania	25.2	Vietnam	56.1
Oman	3.7	Costa Rica	25.1	Albania	55.5
Bahrain	2.7	Botswana	24.2	Peru	55.2
Kuwait	1.8	Kazakhstan	23.9	Sudan	54.3
Qatar	0.4	Maldives	23.2	Indonesia	51.9
		Italy	22.9	Thailand	51.5
		Iraq	22.6	Kenya	50.3
		Bosnia and Herzegovina	21.4	Cambodia	48.4
		Poland	20.3	Lesotho	47.4
Average	**12.1**		**34.5**		**73.3**

Sources: ILOSTAT, International Labour Organization modeled estimates; and IMF staff calculations.

Notes: high, medium, and low informality represent the top 1/3rd percentile, the middle 1/3rd percentile and the bottom 1/3rd percentile, respectively. Informal employment is proxied by self-employment

Annex Table 3.2. Determinants of Okun's Coefficient–Gap Specification: Global Sample

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Labor market informality	-0.00387*** (0.000489)								-0.00309*** (0.000882)
Labor market regulations		-0.0273* (0.0164)							-0.000553 (0.0165)
Product market regulations			-0.0293* (0.0153)						-0.0647*** (0.0186)
GDP per capita				0.00327*** (0.00108)					-0.00264** (0.00104)
Legal system					0.0728*** (0.00939)				0.0760*** (0.0138)
Manufacturing, share of GDP						0.00336 (0.00286)			-0.000749 (0.00344)
Agriculture, share of GDP							-0.00933*** (0.00114)		
Public wage bill, % total expenditures								-0.00507*** (0.00168)	-0.000698 (0.00139)
Constant	0.328*** (0.0312)	0.305*** (0.0821)	0.292*** (0.0674)	0.107*** (0.0207)	-0.216*** (0.0480)	0.124*** (0.0432)	0.282*** (0.0246)	0.339*** (0.0587)	0.232* (0.128)
Number of observations	150	136	136	149	140	146	150	128	116
R-squared	0.265	0.023	0.021	0.100	0.258	0.010	0.267	0.055	0.438

Robust standard errors in parentheses
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Determinants of Okun's Coefficients: Global Panel Estimation with Interaction Term

Equation (1) is modified by adding the interaction between various potential determinants (D_i) of labor market responsiveness (one at a time) and cyclical output[1]:

$$u_t - u_t^* = \beta_1^g (y_t - y_t^*) + \beta_2^g D_i (y_t - y_t^*) + \varepsilon_t \qquad (A\ 1)$$

β_2^g captures the impact of the interaction term of each of the possible determinants of the magnitude of the Okun's coefficient. Given that the Okun's coefficient is negative, a negative (positive) coefficient associated the interaction term would imply that the underlying factor amplifies (dampens) the impact of cyclical output on the unemployment gap.

Countercyclicality of Informality

The econometric analysis is carried out on a panel of data consisting of the informality groupings and individual countries. The estimated baseline specification is as follows:

$$L_t^I - L_t^{I*} = \alpha + \gamma (y_t - y_t^*) + \mu_t \qquad (A\ 2)$$

in which L_t^I is labor informality—proxied by the share of self-employment in total employment; y_t is the logarithm of output measured with real GDP; L_t^I and y_t^* are the trend of labor informality and the logarithm of real GDP smoothed with the Hodrick-Prescott filter, and $(y_t - y_t^*)$ is the cyclical output.

[1] See, for example, An and others (2017); Dixon, Lim, and van Ours (2017); and Banerji, Lin, and Saksonovs (2015).

Annex Table 3.3. Panel Regression–Gap Specification: Global Sample with Interaction Terms

Variables	(1) Benchmark	(2) Informality	(3) Labor market regulations	(4) Business regulations	(5) GDP per capita	(6) Institutions	(7) Manufacturing share	(8) Public Wages
Cyclical GDP	-0.124*** (0.0207)	-0.246*** (0.0449)	-0.185** (0.0911)	-0.176** (0.0697)	-0.0907*** (0.0258)	0.246*** (0.0492)	-0.0829** (0.0419)	-0.234*** (0.0644)
Interaction term		0.00289*** (0.000688)	0.000515 (0.0172)	-0.00201 (0.0158)	-0.00172 (0.00135)	-0.0761*** (0.0102)	-0.00475 (0.00296)	0.00322* (0.00174)
Number of observations	2,989	2,989	2,209	2,177	2,978	2,652	2,648	2,499
R-squared	0.167	0.238	0.265	0.271	0.182	0.313	0.202	0.186
Number of ifs_code	150	150	136	136	149	140	146	128

Note: Robust standard errors in parentheses.
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Annex Table 3.4. Informality Response to Output Fluctuations–Gap Specification

Variables	(1) Global sample	(2) Low	(3) Medium	(4) High	(5) AE	(6) EM	(7) LIC
Cyclical GDP	-0.0667*** (0.00814)	-0.0259*** (0.00622)	-0.117*** (0.0170)	-0.0638*** (0.0146)	-0.0399*** (0.0117)	-0.0703*** (0.0115)	-0.0758*** (0.0174)
Constant	0.0103*** (0.000390)	-0.00807*** (0.000836)	0.0436*** (0.000869)	-0.00934*** (0.000781)	-0.0218*** (0.00127)	0.0159*** (0.000175)	0.0252*** (0.000904)
Number of observations	2,989	1,040	1,031	918	700	1,411	878
R-squared	0.084	0.030	0.133	0.101	0.060	0.084	0.101
Number of ifs_code	150	52	52	46	35	71	44
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors in parentheses.
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

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