

Soares, Rodrigo R.; Haanwinckel, Daniel

**Article**

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# Fighting employment informality with schooling

## Labor force composition is critical for understanding employment informality in developing countries

Keywords: informality, labor market, education, minimum wage, Brazil

### ELEVATOR PITCH

Developing countries have long been struggling to fight informality, focusing on instruments such as labor legislation enforcement, temporary contracts, and changes in taxes imposed on small firms. However, improvements in the labor force’s schooling and skill level may be more effective in reducing informality in the long term. Higher-skilled workers are typically employed by larger firms that use more capital, and that are more likely to be formal. Additionally, when skilled and unskilled workers are complementary in production, unskilled workers’ wages tend to increase, adding yet another force toward reducing informality.

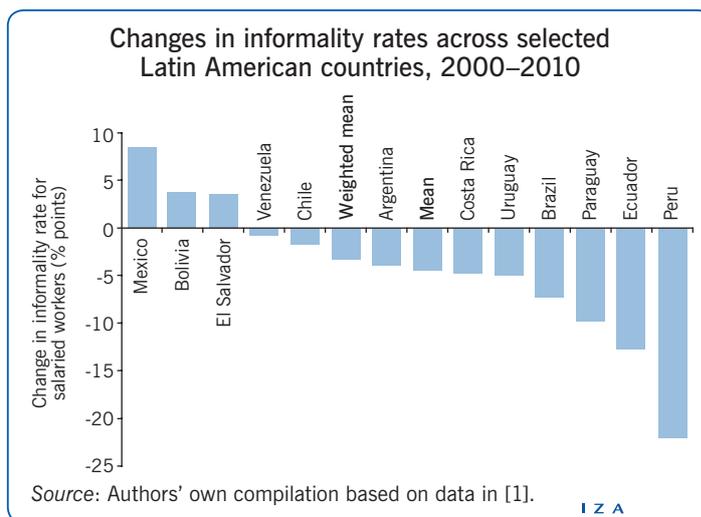
### KEY FINDINGS

#### Pros

- + Informality is strongly responsive to the composition of the labor force.
- + A labor force with higher levels of schooling generates incentives for firms to grow and formalize.
- + A more-educated labor force increases the relative wages of low-skilled workers, reducing their incentives to work in the informal sector.
- + In the long term, human capital investments may be more effective tools to fight informality than labor market policies focused on particular institutions.

#### Cons

- The composition of the labor force does not respond to policy changes in the short term.
- The effect of schooling is driven primarily by the entrance of new and better-educated cohorts; thus, immediate changes in informality may be hard to achieve.
- Human capital has a strong effect on informality only when the minimum wage is binding and/or initial unemployment is high.
- Further research is needed because most existing theories of informality exclude the schooling channel in their basic assumptions (e.g. wages of informal, unskilled workers do not respond to aggregate schooling levels).



### AUTHOR'S MAIN MESSAGE

Many Latin American countries have recently shown sustained reductions in informality among employees, without experiencing major changes in labor regulations, minimum wages, or enforcement. For Brazil, for instance, evidence shows that a change in labor force composition, toward a higher share of more-educated workers, was the main driving force behind reduced informality rates. In general, additional expansion in skill levels is likely to further reduce informality, though less so if the minimum wage is non-binding and unemployment is reduced. This suggests that expanded schooling should become central in future labor market policy debates.

## MOTIVATION

Labor informality is undesirable for three main reasons. First, informal firms can decrease a country's productivity because they have incentives to remain small, have less access to public goods, such as the legal system, and impose unfair competition on firms who comply with regulations. Second, poor workers employed informally fall outside of the social safety net, which may thus fail to protect those who need it the most. And third, informal employment and informal firms evade the payment of taxes, reducing the resources available to the state and imposing an excessive burden on formal firms and workers.

Unfortunately, reducing informality in developing countries is not straightforward, and it is not easy to ascertain the welfare implications of potential policies when informality is prevalent. While some claim that excessive regulation and minimum wages should be avoided because they cause informality, others say that such measures are needed to protect vulnerable workers and reduce poverty. Similarly, some argue for increased enforcement of regulation and punishment of firms that hire informal workers, while others contend that such recommendations would ultimately result in unemployment—especially of poor workers and entrepreneurs who cannot easily access the formal sector. These measures might also reduce the efficiency of the productive sector. Finding policies that reduce informal employment without significant collateral damage is thus a central challenge for policymakers.

Examining how various countries have attempted to address informality may provide evidence on potentially effective policies. However, this exercise is harder than it may appear at first glance. For each case, there are many competing explanations but only one historical time series to analyze. Basic comparisons of data across different countries are of limited use for generating trustworthy scientific evidence, since differences in institutional settings and other country characteristics limit what can be learned from simple correlations. One alternative is to focus on a specific country and model the behavior of its labor market in detail, and then, from that, try to uncover what candidate factors seem more likely to be able to explain the observed reduction in inequality, as is done in [2].

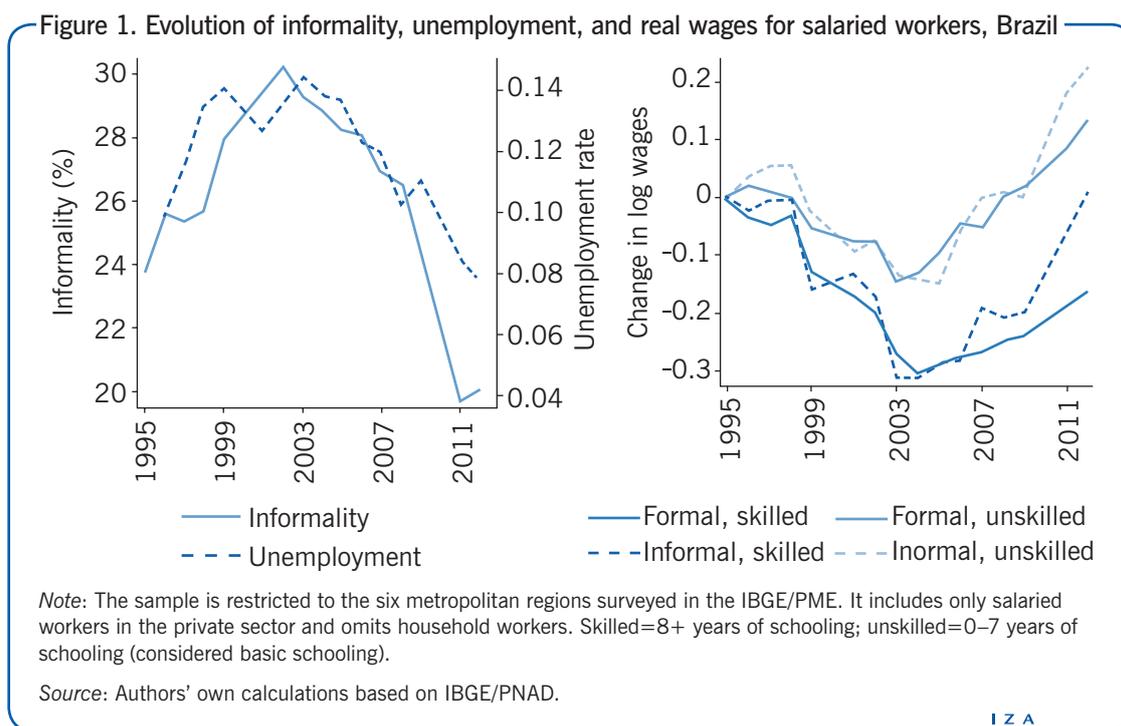
## DISCUSSION OF PROS AND CONS

### The Brazilian case: Why did labor informality fall?

Brazil experienced one of the sharpest declines in informality in Latin America during the 2000s, but the reasons behind this change remain elusive. Informality for salaried workers in Brazil is defined as not having a labor ID card (*carteira de trabalho*) signed by the employer. Registration of the employment relationship via signature of the labor ID card is required under Brazilian law, and it implies that a worker's employment status is recorded in the tax database and that the employer will pay labor taxes and contributions.

As the left panel of Figure 1 shows, the informality rate among salaried workers has fallen by more than ten percentage points since its peak in 2002, after having risen throughout the 1990s. Consistent with the idea that informality and unemployment are interrelated phenomena in developing economies [3], a similar pattern is seen in the unemployment rate, although the fall in informality seems more pronounced. Moreover, during the

period from 2002 to 2012, a substantial reduction in income inequality between wage earners with high and low educational levels occurred, as well as a reduction in the wage gap across formal and informal sectors. The right panel of Figure 1 shows changes in real wages according to basic schooling achievement and formality status. Overall, wages declined from 1995 through 2003 and recovered after that year. But the decline in the first period was less severe for unskilled workers, and the increase in the second period more pronounced for them. Within each education group, informal wages outpaced formal wages from 2003, reducing the wage penalty associated with the informal sector.



Labor regulation may have been a cause of the increase in informality in the 1990s, but it is unlikely to explain the decline after 2002. The Brazilian 1988 Constitution substantially increased labor protection and has been cited as an important factor behind the upward trend in informality observed in subsequent years [4]. In addition, the minimum wage increased steadily after the stabilization of the Brazilian economy in 1994. But there was no major reversion along these dimensions after 2002, so it cannot explain the reversal in the incidence of informality. Since then, there have been few changes to labor regulation: total payroll taxes, including all contributions, decreased only slightly, from 72.1% to 71.4% of each worker's wage. And, more importantly, the minimum wage continued to rise: from 2003 to 2012, it increased by 61% in real terms, more than twice the rate of growth of per capita gross domestic product (GDP).

Changes in overall productivity, aggregate demand shocks, or increases in enforcement could explain the decline in informality, but they are unlikely to account for the differential wage patterns seen in the data. There are many macroeconomic factors that could have affected the Brazilian labor market since 2003, such as improvements in productivity or

increases in aggregate demand following the expansion of government spending and cash transfer programs. In addition, there could have been shocks to specific sectors leading to lower unemployment and informality, such as changes in terms of trade. However, there are two reasons why these factors can only partially explain the Brazilian story. First, the increased formalization of the economy was widespread across sectors and regions, and thus localized shocks are unlikely to be an important cause. Second, it is not clear why shocks to productivity or aggregate demand would have decreased wage inequality across educational categories and between formal and informal sectors, as is seen in the data. Given that recent technological changes are usually thought to benefit more-skilled workers, this looks even more unlikely. A similar argument can be made in relation to the hypothesis that enforcement of regulation is the key factor behind the reduction in informality rates. Many different models predict that increased enforcement should depress informal wages (see, for example, [3]), contrasting with data from the Brazilian case.

Brazil has experienced a substantial increase in schooling over the last decades, but it is not clear how this has affected informality. From 2003 to 2012, the share of the Brazilian workforce with less than basic schooling (that is, less than eight years of education) declined from 33.8% to 20.9%. At the other extreme, the share with a college degree increased from 12.5% to 18.9%. The increased supply of skilled workers could explain the differential patterns in wages for skilled and unskilled workers, but it is not immediately obvious how it would affect informality. While it is clear that a worker's level of schooling is correlated with their formality status, this cross-sectional pattern need not imply a causal relationship at the aggregate level. If the supply of formal job vacancies is determined by structural reasons unrelated to education, one would still see a positive correlation between formality and education due to sorting. However, in such a case, an increase in average schooling for the whole workforce would not cause a reduction in informality. It is plausible, however, that an increase in the supply of skilled workers could provide incentives for firms to grow and formalize, thus leading to a decrease in informality.

### **A realistic model of the Brazilian labor market**

While there are many theoretical models of informality in the literature on development and labor economics, it is not easy to find one that would be suitable to guide the discussion here. In order to help address the policy question raised, a model must be both realistic, in the sense that it can reproduce the main features of the labor market, and sufficiently simple, in the sense that it can be effectively used to simulate specific policies. If one wants to analyze which of the many potential factors was the driving force behind the decline in informality in Brazil, then all such factors must be in the model in the first place, otherwise important alternatives are omitted by assumption. The model must also allow for the reproduction of all relevant outcomes: wages by skill level, unemployment, and informality.

A key aspect of such a model is that the modeling of firms' and workers' decisions must be well-grounded in the data. Some theoretical approaches to informality state that poor workers are trapped in the shadow sector: a structural barrier prevents them from reaching the legal part of the labor market, which is assumed to be intrinsically more productive. This view is not consistent with the fact that transitions into and out of informality are in fact very common. Other models restrict attention in the informal

sector to unskilled workers, because most informal employees fall into this category. While this may be a reasonable assumption for some research questions, it is not useful when considering the interplay between education and informality. In 2003, for example, more than 17% of Brazilian salaried workers with a college degree (not including self-employed professionals) were employed informally, and they were paid the same on average as their counterparts in the formal sector. This fact is extremely important because it shows that one cannot assume that well-educated workers are automatically employed in the formal sector. It also shows that firms hiring informally are not necessarily subsistence establishments with inferior technology. They may well be reasonably sophisticated, and simply find it more profitable to stay in the shadow economy.

Relying heavily on patterns observed in the data, a recent study develops a model of the Brazilian labor market where both firms and workers sort themselves into the formal and informal sectors based on incentives provided by regulatory restrictions (taxes, social benefits, and labor regulations) and labor market conditions [2]. The model allows for two types of workers—skilled and unskilled—and a large number of firms, which differ in productivity but are not intrinsically connected to any sector. Decisions related to formality status are the result of a labor market equilibrium where each agent is choosing optimally. Unemployment is included by assuming search frictions in the labor market: it takes time for firms to find the ideal unemployed worker for its vacancy, and this time depends on how tight the labor market is. The model incorporates many features of Brazilian labor law: payroll taxes, mandated benefits, and the minimum wage. Finally, it also includes an informality penalty that increases with firm size to account for the risk of being caught by labor inspectors and for the eventual punishment. The informality penalty can also capture lack of access to public goods, such as courts, and the inability to reach certain markets, such as exports.

The model is able to reproduce several patterns in the Brazilian labor market, especially those related to labor informality, even though it does not impose structural differences across sectors. Less productive firms self-select into the informal sector because it is easier for them to hide and because they are the ones that suffer the most (in relative terms) due to minimum wages, as they tend to select a higher proportion of unskilled workers. This leads to an informal sector that is characterized by lower productivity, small firms, lower wages, and less human capital, and is thus very similar to what is observed generally in developing economies [5].

Whether workers are indifferent between sectors or rationed out of formal jobs depends on their skill level. Skilled workers are just as well off in the informal as in the formal sector, which means that their wages are actually higher in the informal sector to compensate for the loss in mandated benefits. Unskilled workers, on the other hand, strictly prefer to work in formal firms if they can find a job. The reason is the binding minimum wage, which pushes formal compensation for low-skilled workers above that observed in the informal sector. Even so, low-skilled workers do accept informal jobs, as remaining in unemployment while searching for a formal job is costly. This heterogeneity within the informal sector is consistent with evidence showing that the informal sector is composed of distinct tiers [6], [7] and that the difference between formal and informal wages decreases as one moves along the wage distribution [8], [9].

A quantitative version of the model—where parameters are set to values that reproduce empirical patterns observed in the data—is used to analyze the changes in informality observed in Brazil between 2003 and 2012 [2]. First, the model is calibrated to replicate

the Brazilian economy around 2003. Then, observed changes in all potentially relevant factors between 2003 and 2012 are input, including minimum wages, payroll taxes and contributions, mandated benefits, enforcement of regulation, schooling, and overall productivity. From this exercise, the model generates predictions for 2012 for wage differentials, unemployment, and the informality rate. All of the model's predictions are found to be consistent with the data, and are reasonably accurate in quantitative terms.

### **The role of education as a determinant of informality**

The conclusion from the model outlined above is that increased schooling is the most important factor in explaining the decline in informality observed in Brazil between 2003 and 2012. If the schooling composition of the labor force had remained the same as in 2003, but all other factors had changed according to what was observed during the period, there would have been an increase in the informality rate instead of a large decrease. In the model, increased schooling alone is able to generate a large decline in informality rates, suggesting that education is a key determinant of formalization. In addition, education is also crucial to explaining why the wage gap between skilled and unskilled workers declined over the period. Though increased productivity also reduces informality, it is not able to generate the reduction in the wage gap between skilled and unskilled workers, or between the formal and informal sectors. In other words, without incorporating increased schooling, the model is unable to match all the observed labor market changes simultaneously.

Two main forces influence the relationship between skill composition and the skilled–unskilled wage gap. The first is a simple supply and demand story: as unskilled workers become scarcer relative to skilled workers, their wages rise and skilled wages fall. The second is related to productivity. On average, firms will hire a higher proportion of skilled workers after the shift in the composition of the workforce. This fact results in an increase in the productivity of unskilled workers, given that they are complementary to skilled labor. As the productivity of unskilled workers increases, they can demand higher wages in the bargaining process.

In a scenario with a binding minimum wage, the upward pressure on unskilled wages is one reason why increased schooling translates into less informality. Increased unskilled wages due to scarcity and increased productivity result in higher wages in the informal sector. However, if the minimum wage is high enough, then unskilled wages in the formal sector do not reflect bargaining or scarcity, but rather the regulatory constraint. Thus, unskilled wages in the formal sector do not increase due to a change in schooling, but do still increase for informal firms. Given that one important reason for firms deciding to operate in the informal sector is that they can pay lower wages to unskilled workers, this effect reduces the attractiveness of informality to some marginal firms. If the change in schooling is so large that minimum wages cease to be binding, then one may expect to see an increase in unskilled wages in the formal sector too. However, even in this case, wages will increase more for the informal sector, thus providing incentives toward formalization, albeit to a potentially lesser degree.

The second channel through which education affects informality is by stimulating increases in firm size. As the composition of the workforce changes, firms tend to hire more skilled workers, who become more abundant and relatively cheaper. This incentive

is stronger for larger firms, which have more capital, since capital is complementary to skilled labor. At the same time, firms also want to hire more unskilled workers, since they are also complementary to skilled labor and, therefore, these workers become more productive. As a result of the increased incentive to grow, formal firms hire more workers and, simultaneously, firms operating at the margin of informality find it profitable to move into the formal sector (since it is difficult to hide in the informal sector if a firm becomes too large).

Statistical evidence from Brazil supports the prediction of this line of argument and the quantitative implications of this model. One study uses a simple counterfactual simulation exercise with no explicit economic model to show that changes in the composition of the Brazilian labor force alone can account for a majority of the reductions in informality observed in recent years [10]. Further evidence shows that increases in education across micro-regions in Brazil are significantly correlated with reductions in informality [2]. In addition, this correlation is shown to go beyond the mechanical individual level correlation between schooling and formality status, meaning that individuals with a given level of schooling are more likely to be formal when the average educational level of the workforce in their local labor market is higher. This evidence provides further support to the arguments presented here.

### **Changes in informality elsewhere and their causes**

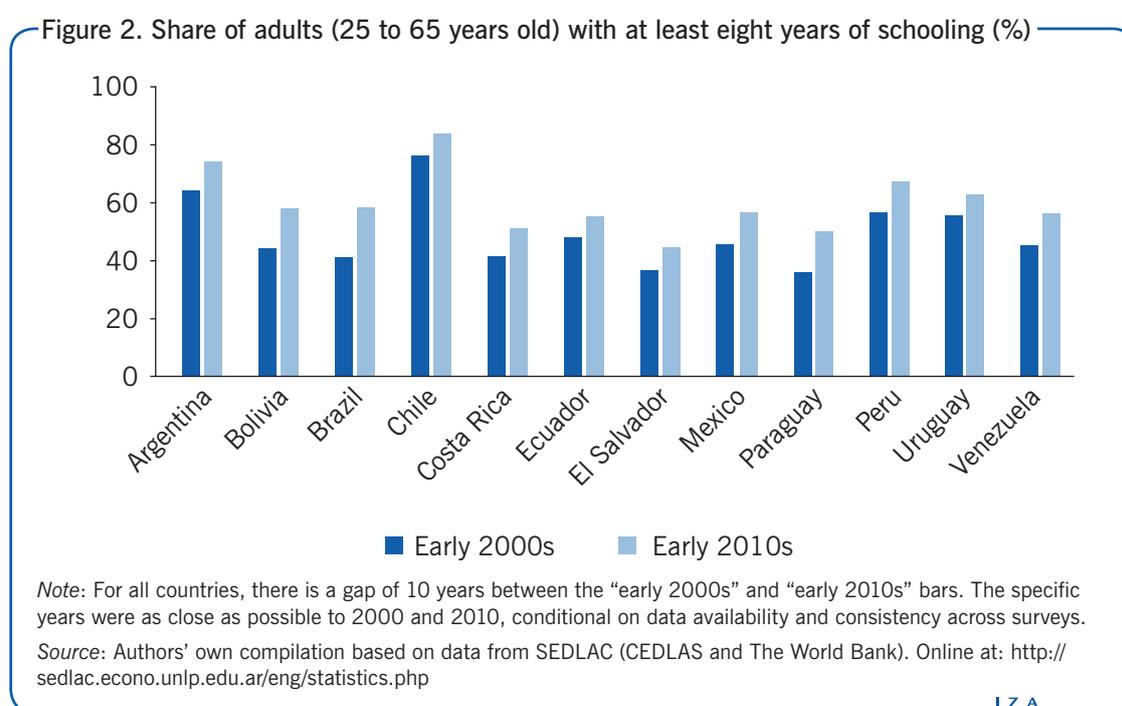
Brazil is not unique in having experienced formalization during the 2000s. As the illustration on page 1 shows, this pattern was also seen in most Latin American countries, though there were also cases where informality rose, with Mexico featuring prominently among the latter.

The hypothesis that formalization is an inescapable consequence of economic development is not warranted by the data. The link between growth and informality is investigated in a study from 2014 [11]. Using a sample of 68 countries during the period 1990–2012, the authors find that doubling per capita GDP is associated with a five percentage point decline in informality (in their case, including self-employment). Even if this panel regression reveals a causal effect, it is too small to bridge the formality gap between rich and poor countries. In other words, one cannot focus on growth and hope that informality will subside by itself once high levels of income per capita are achieved. In the particular case of Latin America, the hypothesis of economic development as the primary driver of formalization is further weakened by noting that informality was on the rise throughout the 1990s, at a time when most economies were also expanding. Economic theory also casts doubt on the notion that growth is enough to fight informality. For low-income countries, economic development leads to formalization as the labor force moves away from agriculture. But this is not the case for middle-income countries with a rising services sector.

Another possibility considered in the literature is that the ups and downs of informality in Latin America reflect business cycles. This channel is present in any theory where workers might resort to informal employment as an alternative to unemployment. One study explicitly investigates this issue for a sample of Latin American countries [1]. It finds some evidence of a counter-cyclical response of informality in most of the examined sample, but does not quantify its relative importance. Notably, informality is not found to be

counter-cyclical in Peru, the country with the most dramatic formalization episode in the recent past.

In principle, schooling may have played an important role in many of the Latin American experiences. It may not be a coincidence that the decrease in informality over recent decades in the region goes hand in hand with a steady progress toward universal schooling. Figure 2 shows the share of the adult population with at least basic schooling in the early 2000s and 2010s, for the same countries presented in the illustration on page 1. Even the smallest change is a positive 7.1 percentage points (for El Salvador). Brazil and Paraguay had the largest increases at 17.2% and 13.8 percentage points, respectively. Further work is needed on the link between schooling and informality in other countries, but there are informative correlations found in other studies. Using a sample of 1,090 regions from 71 countries, one such study shows that more-educated regions have more formal establishments and more formal employees per capita (in regressions with country fixed-effects) [11].



Mexico deserves special mention because it is an important counterpoint to the arguments above. It is the country with the largest increase in informality among those shown in the illustration on page 1. GDP per capita growth has been small in Mexico (averaging 0.4% per year in the 2000s), but still positive. There were recessions in the beginning and at the end of the 2000s, but the informality trend is essentially unchanged. Most importantly, the increase in primary schooling coverage was substantial, at 10.9 percentage points.

A complete discussion of the Mexican case is beyond the scope of this article, but there are potential explanations for its exceptionality. One candidate is *Seguro Popular*, a program that facilitated access to health insurance for people who are not formally employed. Implemented in 2002, it allowed Mexico to achieve near universal health coverage by 2010. One study of the program finds that it had deleterious effects on

formal employment [12]. Another study focused instead on regulations, arguing that Mexico imposes the highest costs on formal employers among a group of similar countries [13]. Finally, Mexico may have been particularly vulnerable to competition from Chinese exports due to its trade relationship with the US, facing displacement of workers from manufacturing jobs (which are more likely to be formal than the average job). According to data from SEDLAC, the share of the workforce employed in manufacturing in Mexico fell by 2.7 percentage points between 1998 and 2012, while it increased by 1.2 percentage points in Brazil and 1.6 percentage points in Peru over the same period.

## LIMITATIONS AND GAPS

The analysis discussed in this article concentrates on the status of the relationship between employees and employers. Another important dimension of labor markets in developing countries relates to self-employment. Self-employed workers are not employees, but at the same time, are not employers either. Though this category also includes highly educated professionals—such as lawyers, accountants, and medical doctors—in developing countries, the vast majority of self-employment refers to precarious labor conditions, typically associated with street vendors and other low-skilled service providers. It is therefore often argued that this should also be seen as a type of informality. The dynamics and determinants of self-employment differ compared to employees, and these would have to be explicitly taken into account when trying to understand the effect of schooling on informality. Though it is likely that education might also increase employment prospects for the typical low-skilled worker in self-employment, analyses focused on this specific context should be developed in order to clarify whether the types of effects discussed in this article would also be present in the new case.

Another important limitation that must be recognized is that the effect of schooling on informality is likely to operate only over a longer horizon. So, the types of forces discussed here do not help much when considering the formulation of policies to fight inequality in the short term. In the end, these short-term goals must resort to the use of labor market policies focused on more specific regulations, for which there is very little evidence regarding effectiveness.

Finally, the effectiveness of schooling as a tool against informality needs more study. Among theoretical research on informality, the potential effects of schooling are usually ruled out in favor of simpler models. On the empirical side, most of the research in the area focuses on the Brazilian case. Policymakers would benefit from more academic discussion of the effects of schooling on education, as well as from high-quality evidence from other countries.

## SUMMARY AND POLICY ADVICE

A long-term commitment to reducing inequality without imposing increased distortions on the economy should entail increased focus on educational policies. The link between the educational composition of the labor force and informality has gained increased theoretical and empirical support in recent years; however, this argument remains almost entirely absent from the public policy debate. Such structural determinants of informality seem to play a very important role and appear very difficult to counteract with short-term policies focused on particular features of labor market regulations.

A longer-term view of the subject should bring the discussion to investments in education, increased incentives for education in developing countries, and how to shape formal schooling to respond to skills that are demanded in the labor market.

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### **Competing Interests**

The IZA World of Labor project is committed to the *IZA Guiding Principles of Research Integrity*. The author declares to have observed these principles.

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### Further reading

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