Earnings Inequality in Latin America: A Three-Decade Retrospective

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Summary

Latin American countries have some of the highest levels of income inequality in the world. However, earnings inequality have significantly changed over time, increasing during the 1980s and 1990s, declining sharply in the 2000s, and stagnating or even increasing in some countries since 2015. Macroeconomic instability in the region in the 1980s and early 1990s, as well as the introduction of structural reforms like trade, capital, and financial liberalization, affected the patterns of relative demand and relative earnings across skill-demographic groups in the 1990s, increasing inequality. Significant gains in educational attainment, the demographic transition, and rising female labor force participation changed the skill-demographic composition of labor supply, pushing the education and experience premiums downward, but this was not enough to counteract demand-side trends. At the turn of the 21st century, improved external conditions, driven by China's massive increase in demand for commodities, boosted economies across Latin America, which began to grow rapidly. Growth was accompanied by a positive shift in the relative demand for less-educated workers, stronger labor institutions, rising minimum wages, and declining labor informality, a confluence of factors that reduced earnings inequality. In the aftermath of the global financial crisis, particularly after the end of the commodities price boom in 2014, economic growth decelerated, and the pace of inequality decline stagnated. There is extensive literature documenting and trying to explain the causes of recent earnings inequality dynamics in Latin America. This literature is examined in terms of themes, methodological approaches, and key findings. The focus is on earnings inequality and how developments in labor markets have shaped it.

Keywords: inequality, Latin America, education premium, experience premium, trade reforms, minimum wage, informality

Subjects: Economic Development, Economic History, International Economics, Labor and Demographic Economics

Introduction

Latin American countries have some of the highest levels of income inequality in the world. Of the 30 countries with the highest Gini coefficient, 17 belong to the region (World Bank, 2022b). However, income distributions in Latin America have significantly changed since the 1980s, with well-defined periods of expansion and contraction common across most countries. The magnitude of these changes, their commonality, and the fact that they sometimes contrast with the patterns observed in high-income economies have motivated extensive literature investigating its causes. This literature is examined in terms of themes, methodological approaches, and key findings. Although inequality in Latin America is pervasive, affecting every aspect of life, including access to education, health care, productive assets, and political voice,

this article focuses on earnings inequality and how developments in labor markets have shaped it. This is not overly restrictive. First, the correlation between earnings and total inequality is high, when measured with household surveys (Azevedo et al., 2013a; Tornarolli et al., 2018). Second, labor earnings are the largest income source for most households in Latin America, representing close to 80% of total income on average. Moreover, most studies of the region analyzing income inequality focus on determinants that operate through labor market dynamics.

The recent evolution of earnings inequality in Latin America can be divided into three periods: a period of increasing inequality during the 1980s and 1990s, a period of a sharp contraction of the earnings distribution during the 2000s and the first years of the 2010s, and a period after the end of the commodities price boom in 2014 when inequality decline decelerated and even increased in some countries, although some trace the deceleration to the aftermath of the global financial crisis (Cord et al., 2017). The two panels of Figure 1 show a subset of the years of expansion and contraction for which microdata are available.[1] Figure 1a shows the (unweighted) average across eight of the largest economies in the region (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay), along with three interdecile earnings ratios, capturing total inequality (P90/P10), inequality at the upper tail (P90/P50), or inequality at the lower tail (P50/P10). Figure 1b shows the respective average deciles (see figure notes for details about the construction of the series). These are countries for which it is possible to construct comparable long-term series, and they account for 88.2% of the region's gross domestic product (GDP) and 78.9% of its population.

Between 1992 and 2002, total inequality, as measured by the P90/P10 interdecile earnings ratio, increased by 14.2%, similar in magnitude to the increase observed in the United States during the same period (Acemoglu & Autor, 2011). This was a substantial expansion of the earnings distribution. Although Figure 1 reports an average across countries, the pattern was common: Except for Brazil, the only major Latin American economy where inequality had fallen since the early 1990s (Ferranti et al., 2004; Ferreira et al., 2008), all other countries in the sample saw total inequality increasing, with magnitudes varying in a range from 5.5% in Chile to 46.1% in Argentina, a country that saw a drastic deterioration leading up to its economic crisis at the turn of the 21st century.

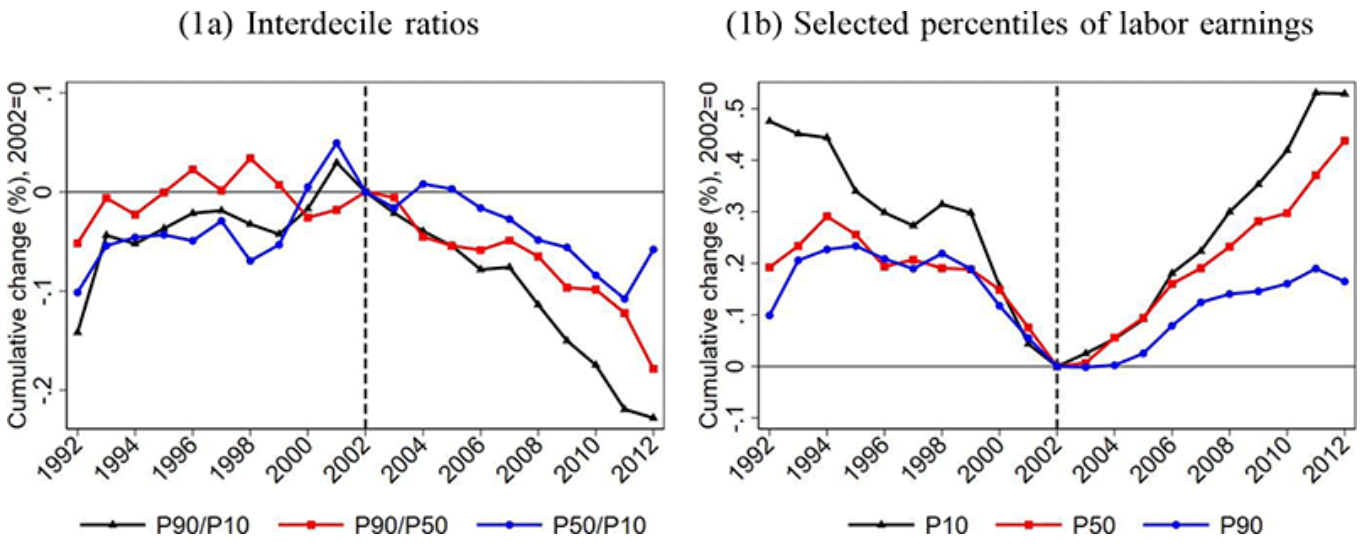

Figure 1. Earnings inequality in Latin America between 1992 and 2012: (a) interdecile ratios and (b) selected percentiles of labor earnings. Panel (a) shows three interdecile ratios of the monthly labor income distribution, averaged across eight Latin American countries: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. For each country and year, the respective ratios are first calculated and then normalized to take the value of zero in 2002. The reported series is an unweighted average across the eight countries. Panel (b) shows the respective average deciles, calculated using an analogous procedure but normalized so that they take the value of zero in 2002. All series are constructed using country-specific microdata on real monthly labor income of prime-age workers (between ages 25 and 55 years). The values are transformed to US dollars using a purchasing Power Parity (PPP) exchange rate. The microdata come from household surveys gathered and made consistent by the Center for Distributive, Labor and Social Studies (CEDLAS) and the World Bank (CEDLAS & World Bank, 2013). The eight selected economies account for 88.2% of the region's gross domestic product and 78.9% of its population.

The 1980s and early 1990s were characterized by significant macroeconomic instability in the region and the introduction of major market-oriented reforms, with both factors affecting income distribution. Between 1980 and 1995, GDP per capita at the regional level had zero real growth (World Bank, 2022a), but there were 40 episodes where per capita output fell by 4% or more (Lustig, 2000). Repeated crises resulted from macroeconomic imbalances that had been building during the 1960s and 1970s, which led to a growing dependence on foreign borrowing for capital accumulation, high levels of external debt, and inflationary financing of government expenditures (Edwards, 1995). When interest rates increased in the United States and the prices of primary resources, Latin America's largest export, fell sharply in the early 1980s, external financing halted, and sovereign debt crises ensued. The path to recovery and stabilization was disorderly and costly, with drastic declines in real income and adverse effects on inequality (Altimir, 2008; De Janvry & Sadoulet, 2000; Londoño & Székely, 2000; Lustig, 2000; Morley, 1995; Psacharopoulos et al., 1995). The crises affected inequality through three main channels: deteriorating labor market conditions in a context of little or no access to public social insurance (Altimir, 2008), attempts to control accelerating inflation by curtailing wage adjustments and the vulnerability of the poor to protect themselves from the inflation tax (Cardoso, 1992; Ferreira et al., 2008; Gasparini & Lustig, 2011; Ocampo, 2004), and cuts in social programs and public benefits at a time of fiscal retrenchment (Dornbusch & Edwards, 1990; Edwards, 1995; Ferranti et al., 2004; Morley, 2001).

In parallel with the efforts to recover from the crises, many countries introduced reforms to reduce state intervention and exploit the opportunities provided by international markets, changing the inward-oriented strategies for growth of the post–World War II era. The reforms included trade, capital, and financial liberalization; privatization of state-owned firms; and, to a lesser degree, deregulation of labor markets. This broad shift in policy and the fact that inequality continued to rise, even after regional GDP resumed positive growth in the 1990s, ignited extensive literature trying to understand the effects of the reforms on income distribution.

There is broad agreement that reforms led to sectoral reallocation of production and employment that favored more educated workers. Some of these reforms spurred investment in physical capital, which had been lagging for at least a decade, accelerating technological change and favoring the growth of sectors with higher demands for human capital (Attanasio et al., 2004;

Behrman et al., 2007; Feenstra & Hanson, 1997; Gasparini & Cruces, 2013; Sanchez-Paramo & Schady, 2003). The process of modernization of the economy then led to a sizable reduction in the relative demand for less-educated workers, which, in the absence of compensatory social protection programs and weak labor market institutions, resulted in falling living standards for this group (Bosch & Manacorda, 2010; Gasparini & Lustig, 2011; Green et al., 2001; Ocampo, 2004; Székely, 2003). Some authors also argue the reforms brought increasing dualism, with part of the labor force working in dynamic high-productivity firms that could take advantage of the new economic environment, while the majority worked in small low-productivity units, usually under informal conditions (Ocampo, 2004). Recent research has shown that this duality is vital to understanding earnings inequality in the region (Eslava et al., 2021). However, there is substantial variation across countries on the estimated impact of the reforms, and the topic is still subject to intense debate (Behrman et al., 2007; Gasparini & Cruces, 2013).

At the start of the 21st century, the economic outlook of Latin American economies took a turn for the better. Most countries had corrected some of the macroeconomic imbalances of the past, especially on the fiscal and inflation fronts, and China's massive increase in demand for commodities, on which the regional external sector relies heavily, was pushing commodity prices upward (Autor et al., 2013; Costa et al., 2016; Erten & Ocampo, 2013; Kaplinsky, 2006; Radetzki, 2006).

Between 2002 and 2014, the years of the commodity price boom, Latin America experienced uninterrupted growth of GDP per capita, with an accumulated increase of 30.7% at the regional level (World Bank, 2022a). The inequality trend also changed drastically. In the decade after 2002, total inequality fell by 22.8%, more than enough to recover the lost ground during the 1990s (Figure 1a). Again, this was a common phenomenon across Latin America: Of the 17 countries in the region that have consistent microdata, 16 saw inequality declining (Messina & Silva, 2021; Rodriguez Castelan et al., 2016). Within our sample, total inequality fell between 8.8% in Colombia and 33.4% in Ecuador. Earnings growth during this period was particularly strong at the bottom of the distribution, with the 10th percentile increasing by more than 55.9% on average (Figure 1b). The fact that earnings growth at the bottom (P10) was faster than at the middle (P50), which in turn was faster than at the top (P90), presents a sharp contrast with many developed economies, especially the United States, where the opposite happened (Acemoglu & Autor, 2011).

What explains this change in dynamics of income inequality? The literature has proposed at least four potential drivers, some of which complement and reinforce each other: (a) fast GDP growth and improved labor market conditions (Cornia, 2010; Gasparini & Cruces, 2013); (b) increases in education attainment and the fertility transition, which led to a larger relative supply of more educated and older workers, putting downward pressure on the education and experience premiums (Acosta et al., 2019; Campos-Vázquez, 2013; Fernández & Messina, 2018; Manacorda et al., 2010; Messina & Silva, 2021; Rodriguez Castelan et al., 2016); (c) stronger labor institutions, rising minimum wages, and declining labor informality (Amarante et al., 2016; Engbom & Moser, 2022; Engbom et al., 2021; Ferreira et al., 2017; Gasparini & Lustig, 2011; Maurizio, 2014); and (d) the arrival of governments that implemented a more progressive agenda, including increases in social assistance transfers targeted to the poor (Cornia, 2010; Ferreira et al., 2008; Gasparini & Lustig, 2011; Levy & Schady, 2013; Lustig et al., 2013).

Since the end of the commodities price boom, regional economic growth has stagnated. Between 2014 and 2019, average real GDP per capita growth was close to zero (World Bank, 2022a), and this negatively impacted inequality dynamics (Gasparini et al., 2016). However, there were already signs of a deceleration of inequality decline since the aftermath of the global financial crisis (Cord et al., 2017; Messina & Silva, 2018,2021). The evidence for the deceleration is limited, and the phenomenon could be transitory, but the arrival of the COVID-19 pandemic appears to have deteriorated an already worsening trend (Lustig et al., 2020).

Market-Based Drivers of Inequality

Supply-Side Factors

Earnings dynamics and inequality are strongly correlated in Latin America, a direct consequence of the large proportion of total income represented by labor income. Traditionally, regional high-earnings inequality has been attributed to supply-side factors such as the scarcity of well-educated labor (Behrman et al., 2007). Moreover, some authors argue that the rise in inequality in the 1980s was partly driven by increases in the population's educational attainment in a context of convex returns to schooling, which leads to higher wage dispersion among the more educated. In this scenario, inequality can potentially increase because of changes in the workforce's educational distribution, even without changing relative prices (Almeida dos Reis & Paes de Barros, 1991; Bourguignon et al., 2005; Ferreira et al., 2008; Reyes, 1988).

Latin America has had steady gains in educational attainment. The average number of years of schooling among the population aged 25 and over increased by 93%, from 4.7 in 1980 to 9.1 in 2015, while the fraction with at least some tertiary education tripled, from 5.6% in 1980 to 16.7% in 2015 (Barro & Lee, 2013). These gains effectively changed the skill composition of the workforce. Figure 2a presents two series showing the average log ratio of the number of prime-age workers by education groups, using the same sample of countries as in Figure 1. Figure 1b shows the respective average log earnings ratios, capturing the evolution of education premiums (see figure notes for details). It is clear from the plots that the relative supply of more educated workers in Latin America has increased continuously over time. Importantly, education premiums follow a similar pattern as that of income inequality discussed in the Introduction, growing during the 1990s and declining sharply after 2002. This is indicative that the recent evolution of inequality is strongly influenced by developments in labor markets.

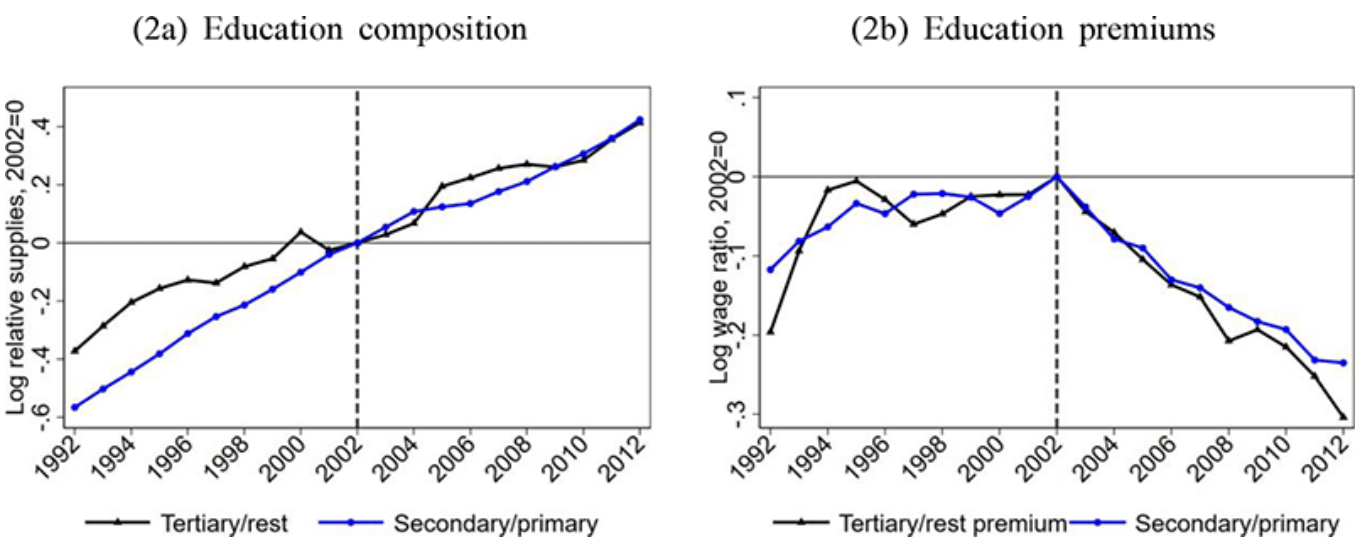

Figure 2. Education composition and education premiums in Latin America: (a) education composition and (b) education premiums. Panel (a) shows the average log ratio of the number of prime-age workers (between ages 25 and 55 years) by education groups. The black series corresponds to the log ratio between the number of workers with tertiary education completed and those with at most secondary education; the blue series corresponds to the log ratio between the number of workers with secondary education completed but no higher education and those with less than secondary education. The averages are across eight Latin American countries: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. For each country and year, the respective ratios are first calculated and then normalized to take the value of zero in 2002. The reported series is an unweighted average across the eight countries. Panel (b) shows the respective average log earnings ratios, calculated using an analogous procedure. All series are constructed using country-specific microdata on monthly labor income. The microdata come from household surveys gathered and made consistent by the Center for Distributive, Labor and Social Studies (CEDLAS) and the World Bank (CEDLAS & World Bank, 2013). The eight selected economies account for 88.2% of the region's gross domestic product and 78.9% of its population.

Several studies try to quantify the effect of changes in the education and demographic composition of the workforce on the wage structure (Acosta et al., 2019; Bhalotra et al., 2022; Fernández & Messina, 2018; Manacorda et al., 2010; Rojas, 2006; Sanchez-Paramo & Schady, 2003). These studies aim to test whether shifts in relative supply induce changes in relative returns that are consistent with the way inequality is evolving. The literature follows the canonical supply–demand framework that has been extensively applied to the U.S. labor market (Card & DiNardo, 2002; Card & Lemieux, 2001; Goldin & Katz, 2009; Katz & Autor, 1999; Katz & Murphy, 1992). In this framework, workers are divided into demographic-skill groups that can be imperfect substitutes in production, so changes in relative wages can arise in response to changes in relative supplies. The magnitude of the response is governed by the degree of substitutability between the groups, commonly parameterized using a nested Constant Elasticity of Substitution(CES) production function. One advantage of these models is that changes in relative earnings can be conveniently decomposed into a relative supply effect and a residual effect, where the latter is interpreted as capturing changes in relative demand coming from forces like skill-biased technological change (SBTC), automation, trade, offshoring, and labor market reforms. On the downside, the typical model assumes inelastic short-term relative supplies, which is unlikely

to hold in the context of rising female labor force participation in Latin America (Ñopo, 2012; World Bank, 2012), and the estimated elasticities of substitution can be very sensitive to model specification (Borjas et al., 2012).

Manacorda et al. (2010) studied trends in men's return to education in the five largest economies in Latin America between 1980 and 1999. The authors build on the model of Card and Lemieux (2001) but extend the number of skill groups to differentiate among primary-, secondary-, and tertiary-educated workers. In the U.S. literature, the typical approach is to divide workers by education into two groups: "skilled" (college) and "unskilled" (high school or less), which in practice implies assuming that people with at most secondary education completed are perfect substitutes to those with at most primary education. Given that the latter group still represents a large share of the population in Latin America and that the secondary-to-primary premium changed substantially (Figure 2b), omitting this separation can be misleading. The authors estimate an elasticity of substitution between workers with primary and secondary education of 2.3, implying that the 40 log points average increase in the secondary-to-primary relative supply since 2002 (Figure 2a) would translate, everything else equal, into a decline of the respective premium of 18.2 log points, almost 60% of the observed change. The main takeaway is that increases in secondary completion rates in the region reduced lower-tail earnings inequality. Like for the United States, the authors find that workers with tertiary education are imperfect substitutes to those with at most secondary education (elasticities between 2.6 and 5), again implying that growth in tertiary education acted to lower the college premium. Acosta et al. (2019) update and extend this analysis for 16 Latin American countries between 1991 and 2013, finding similar results.

The evolution of the experience premium has received considerably less attention, although the workforce in the region is also becoming older. Fernández and Messina (2018) show that experience premiums have fallen within the three education groups in Argentina, Brazil, and Chile since the turn of the 21st century, contributing to the fall in earnings inequality. To test if relative supply shifts can explain these patterns, the authors extend the models of Manacorda et al. (2010) and Card and Lemieux (2001) to allow for different degrees of substitution across experience groups, depending on their level of schooling. They find that the estimated elasticity of substitution is slightly higher among college graduates (elasticity of 5.5) than among less-educated workers (elasticity of 4.0). However, in both cases, the estimated elasticities suggest that changes in the age composition of workers exerted downward pressure on the experience premiums, reinforcing the argument that supply-side changes are affecting inequality dynamics. Ferreira et al. (2022) reach a similar conclusion for the case of Brazil. Using decomposition techniques, the authors find that a reduction in the returns to labor market experience was a significant force driving the decline in inequality, accounting for 53% of the observed fall in the Gini index between 1995 and 2012.

More recently, Bhalotra et al. (2022) extended the supply–demand model into an equilibrium framework, following the work of Johnson and Keane (2013). With this extension, they can analyze the effect of increasing female labor force participation on the wage structure, a significant demographic shift that has been mostly ignored in the literature. Labor force participation among women in Latin America has increased substantially since the end of the

1980s, changing the sex composition of labor supply. Using data from Mexico between 1989 and 2012, a country where the female participation rate doubled during the period, the authors find that the increase in participation of more educated women was a driver of the compression of male inequality (a decline in the college premium), a result that contrasts with the finding of Topel (1994) for the United States.

Most of the evidence from the application of the supply–demand framework in Latin America points to the same direction: Changes in the age, sex, and education composition of the workforce impacted the wage structure, reducing the experience and education premiums and hence lowering between-group inequality. However, there is general agreement that supply-side effects cannot be the whole story. During the 1980s and 1990s, increases in relative wages of more educated workers happened concurrently with increases in their relative abundance (Figure 2), a clear sign that the relative demand for more educated workers was growing. After the 2000s, the share of workers with secondary and tertiary education continued to increase at similar rates, but the education and experience premiums declined. This pattern strongly suggests a significant shift in the demand side of the labor market.

Demand-Side Factors

Trade, Foreign Direct Investment, and Technological Change

As discussed in the Introduction, most Latin American countries opened their trade and capital accounts during the 1980s and early 1990s. There is extensive evidence that this process led to a decline in the relative demand for less-educated workers, at least in the initial years after reform, although countries like Brazil appear to be an exception. This shift in relative demand can be puzzling because, given the region's relative abundance of low-skilled labor, Heckscher–Ohlin trade models would predict the opposite. However, premiums and inequality rose in a way that is not entirely consistent with Stopler–Samuelson effects (Attanasio et al., 2004; Galiani & Sanguinetti, 2003; Goldberg & Pavcnik, 2007; Hanson & Harrison, 1995). Authors like Wood (1997) argued that standard theory is not necessarily invalidated because some large East Asian countries, including China, also entered into world markets for labor-intensive manufacturing in the 1980s, shifting the comparative advantage of Latin America into goods of medium skill intensity, a point also made by Hanson and Harrison (1999). However, some initial expectations that the reforms would be equalizing were not fulfilled (Goldberg & Pavcnik, 2007; Pavcnik, 2017).

Tariffs

How did trade reforms affect relative labor demand and inequality in Latin America? The literature on this topic is vast, but there is no consensus. Studying the case of Mexico, Harrison and Hanson (1999) show that before the major trade reform of 1985, protection across sectors was not uniform but skewed toward sectors intensively using less-educated workers, a pattern observed in other countries in the region. It was in those more protected sectors where tariffs fell

the most. This observation could account for the discrepancy between the data and Stopler–Samuelson–type predictions. If protection is initially granted in sectors that use less-educated labor more intensively, then trade liberalization might cause their relative wages to decline, thus increasing inequality.

Galiani and Sanguinetti (2003) find some evidence for this argument in Argentina. The authors show that after the reforms, the manufacturing sector, which is more intensive in less-educated labor, faced intense competition from foreign markets, as reflected by significant increases in the import penetration ratios. They show that inequality increased the most in those sectors where import penetration deepened. Galiani and Porto (2010) find similar results. For Colombia, Attanasio et al. (2004) show evidence that trade liberalization was concentrated in labor-intensive sectors employing a high percentage of less-educated workers. They find that sectors associated with proportionately larger decreases in protection experienced a decrease in their sectoral wage premiums (i.e., premiums relative to the economy-wide average). The high concentration of less-educated workers and falling sectoral premiums increased inequality. However, in each of these studies, the effects on premiums are not large enough to fully explain inequality changes during the 1990s, so direct effects from tariff reductions are part but not the whole story, a conclusion that is shared more generally in the literature (Pavcnik, 2017).

Foreign Direct Investment

A more open economic environment could also lead to surges in foreign direct investment (FDI). Feenstra and Hanson (1997) argue that rising wage inequality in Mexico in the 1980s is linked to foreign capital inflows. The authors show that the flow of capital into Mexico, via outsourcing by U.S. firms, shifted an increasing portion of input production to the country. A large share of FDI in manufacturing went into the creation of assembly plants, known as maquiladoras. From the U.S. perspective, the activities outsourced were intensive in less-skilled labor, but from Mexico's perspective, it was the reverse. The authors measure state-level growth in FDI using data on the regional activities of maquiladoras, finding that growth in FDI can account for over 50% of the increase in the skilled labor wage share that occurred in the late 1980s. Behrman et al. (2007), using data from 18 Latin American countries between 1977 and 1998, show that the reduction of the price of capital goods, a result of the reforms, generated higher demand for both capital goods and skilled labor.

For Argentina, Acosta and Gasparini (2007) show that FDI in the country grew 11.2% annually between 1991 and 2000, while fixed gross investment in machinery and equipment increased 6.8% per year during the same period. The authors show that in sectors in which capital accumulation was more intense, the skill premium increased significantly. However, they cannot disentangle if this is because new machinery and equipment may incorporate skill-biased technological innovations or because capital goods tend to be skill complementary (Krusell et al., 2000).

Technological Change

Another alternative mechanism linking trade and inequality is technological change. Trade is an avenue through which new technologies enter most developing countries, so the relaxation of trade barriers could reduce the price of importing those technologies, causing firms to switch toward new production techniques. The vast literature in the United States and other developed countries suggests that technological change is skill biased, increasing the demand for more educated workers and hence pushing for an increase in the skill premium (Acemoglu, 2002; Berman et al., 1998; Katz & Autor, 1999). Via cheaper access to new technologies, trade reforms could have negatively affected less-educated labor demand.

Estimating the impact of technological change on the wage structure is difficult because there are no direct measures for it, so most studies rely on indirect arguments. For example, Sanchez-Paramo and Schady (2003) study the evolution of relative wages in five Latin American countries, Argentina, Brazil, Chile, Colombia, and Mexico, during the 1990s. They find that increases in the wage bill of skilled workers occurred largely within sectors and in the same sectors in different countries, consistent with SBTC. Attanasio et al. (2004) find that changes in skill premiums in Colombia were roughly the same across industries and not related to changes in tariffs across sectors. However, the proportion of skilled workers rose in every industry, again consistent with the hypothesis of skill-biased technological change. Moreover, employment changes were larger in sectors that experienced larger tariff reductions, suggesting that skill-biased technological change was partly an endogenous response to increased foreign competition.

Since the seminal work of Autor et al. (2003), the thinking about the relation between technology and inequality has shifted (Autor, 2022). Technologies in this framework can complement or substitute workers depending on the task content of occupations. This is important because recent technological developments have enabled information and communication technologies to either directly perform or permit the offshoring of a subset of the core job tasks previously performed by middle-skill workers in developed countries, thus causing a substantial change in the returns to certain types of skills (Acemoglu & Autor, 2011).

Studying automation in Latin America is particularly hard because there are no suitable measures of the task content of occupations in the region, and applying measures of the U.S. occupational structure can be misleading. However, the studies that have tried to quantify its effects find little evidence to support that it has played an important role in recent decades (Maloney & Molina, 2016; Messina & Silva, 2021). This is not to say that automation and developments in artificial intelligence will not affect the region, which is highly unlikely. However, there is still a large gap in our understanding of how these forces will shape labor markets in the future, given the particularities of Latin America.

Geography

More recently, a growing number of studies have looked at the effects of trade and import competition on workers in geographic regions with different patterns of industrial specialization. A key insight from this literature is that trade's costs and benefits are unevenly distributed

geographically within a country. Most of the evidence on this topic in Latin America comes from Brazil (Dix-Carneiro & Kovak, 2015,2017,2019; Kovak, 2013). One example is Dix-Carneiro and Kovak (2015), who study trade's differential effects on workers with different levels of education across local labor markets. They first develop a theoretically consistent approach to analyze the causal effect of trade liberalization on the skill premium at the local level. The model predicts that liberalization affects skill premiums through four channels: imperfect mobility across regions, differential tariff changes across sectors, regional specialization across sectors, and differences in sectoral intensities in the use of skilled and unskilled labor. In contrast to most previous work, they estimate that trade liberalization in Brazil drove small but statistically significant declines in skill premiums during the postliberalization period. Dix-Carneiro and Kovak (2017,2019) show that wage gaps, job loss, and transitions to informality are also key margins of adjustment to trade shocks.

Frictions that impede workers from moving across industries, firms, or locations shape trade's impact (Pavcnik, 2017). As older, less-educated, and female workers face substantially higher barriers to mobility across sectors and regions, they experience greater losses after trade liberalization (Dix-Carneiro, 2014). Moreover, Dix-Carneiro and Kovak (2019) show that trade effects are long-lasting and magnified through time: They are still present 20 years after the trade liberalization episode in Brazil.

Firms

Trade openness can also induce productivity upgrading of firms, either because of import competition or because trade shifts resources from nonexporters to exporters. In Latin America, exporting firms are almost exclusively large firms, which, even before liberalization, were more productive. Moreover, export-intensive sectors and exporting firms in the region tend to have greater relative demands for more educated workers and higher education premiums (Brambilla et al., 2012; Harrison & Hanson, 1999). Helpman et al. (2017), using employer–employee data from Brazil, show that a significant share of overall wage inequality arises within sector-occupations and for workers with similar characteristics. They find that wage dispersion across firms explains a large share of this inequality and is related to firm size and trade participation. There are also sizable effects of trade on inequality through the mechanism of firm selection into export markets. Consistent with this story, Frías et al. (2022) find that exports have a significant positive effect on plant-level wage premiums in Mexico. However, this might not be the full story. Dix-Carneiro et al. (2021) develop a general equilibrium framework to study the impact of trade on economic outcomes in the presence of informality. A key result is that the inclusion of the informal sector reverses predictions on the effects of trade on inequality driven by firm heterogeneity. Within the formal sector alone, trade liberalization contributes to a rise in wage inequality. However, the effect in the informal sector goes in the opposite direction, while the distance between average formal and informal wages decreases. This implies that trade liberalization reduces aggregate wage inequality driven by differences across firms.

Fieler et al. (2018) use data from a Colombian manufacturing survey about the 1991 trade liberalization to study the effects of international trade on quality upgrading and demand for skilled labor. They propose a model in which output quality is a latent variable that heterogeneous firms choose at a cost. Because the production of higher quality is intensive in high-quality inputs, upgrading among importers and exporters increases the domestic supply and demand for high-quality inputs. Results from counterfactual exercises using estimates of the model parameters show a selection of higher-quality, skill-intensive goods into importing and exporting. In particular, trade liberalization increases aggregate skill intensity by 33%.

In summary, the bulk of the evidence on the impact of the structural reforms of the 1980s and 1990s in Latin America indicates that they were unequalizing during the first years postreform, shifting the relative demand in favor of skilled workers and pushing skill premiums upward. Tariffs were skewed toward sectors intensively using less-educated workers, so trade reform differentially affected this group; FDI concentrated in activities more intensive in skilled labor, at least within the regional context; relaxation of trade barriers reduced the price of importing new technologies, causing firms to switch toward production techniques that tend to be skillbiased; and exporting firms, which tend to demand more educated workers, gained participation in the economies. The effects were accentuated because of barriers to mobility across sectors and regions that tend to be higher for older, less-educated, and female workers.

The Commodities Boom

Education and experience premiums began to decline at the turn of the 21st century while the relative supply of more educated workers grew (Figure 2), suggesting that additional demand-side forces acted to reverse the pattern of the 1990s. A strong candidate to explain this shift in demand is the commodities price boom that started around 2001 and ended in 2014, with a gap during the first 2 years of the global financial crisis. The boom was triggered to a large extent by China's rising demand for commodities, particularly energy and mineral resources, as a by-product of its transition to a market-oriented economy in the early 1990s and the impressive growth performance that followed (Autor et al., 2013; Autor, Dorn, & Hanson, 2016a; Costa et al., 2016; Erten & Ocampo, 2013; Kaplinsky, 2006; Radetzki, 2006).

The export sector of many countries in Latin America is highly dependent on commodities. In 2006, primary products represented around 55.1% of South America's total value of exports, but if one adds manufactured exports based on natural resources, the number goes up to 78.4% (Ocampo, 2008). The same numbers for Central America plus Mexico are 40.1% and 61.4%, respectively. The confluence of high prices of raw materials and exceptional external financing conditions generated a strong boost for economies in the region in the 2000s. During the years of the price boom, Latin America experienced an average growth of real gross domestic product (GDP) per capita of 2.5% per year, a number 2.4 times larger than the one observed for the Organisation for Economic Co-operation and Development (1.8 times larger, omitting the first 2 years of the global financial crisis; World Bank, 2022a).

Faster economic growth helped bring income inequality down. A good indication that the commodity boom was a factor behind the regional inequality declines was that countries that benefited from the boom experienced stronger growth and a greater reduction in inequality during the 2000s than the net commodity importers (Messina & Silva, 2018). Moreover, between 2014 and 2019, after commodity prices fell, the average real GDP per capita growth in the region stagnated, and the fall in inequality decelerated, even increasing in some cases.

Standard models of Dutch disease predict that an increase in income derived from natural resources, driven by an exogenous world price increase or a discovery, creates excess demand for nontraded products and generates a reallocation of factors and value added toward nontradable sectors (Corden, 1984; Corden & Neary, 1982; Sachs & Warner, 1995,2001). In this framework, the effect of a natural resource boom on the distribution of income depends on the relative factor intensity across sectors: Factors in which nontradable production is more intensive gain, while factors in which tradable production is more intensive lose. The tradable sector in general, and the exporting sector in particular, tends to use high-skilled labor more intensively in Latin America, so the expectation is that natural resource booms will be equalizing. Furthermore, wage disparity within the nontradable sector tends to be lower than in the tradable sector. As workers move toward the thriving sector, income inequality could be reduced as a result (Messina & Silva, 2018).

Goderis and Malone (2011) develop a two-sector growth model in which learning-by-doing drives growth to explain the time path of income inequality following natural resource booms. In line with the literature on Dutch disease, they predict that if nontradable sectors are more intensive in less-skilled labor vis-à-vis (nonresource) tradable sectors, a natural resource windfall will reduce the labor earnings Gini coefficient. Using data for 90 countries between 1965 and 1999, they find evidence that resource booms, especially oil and mineral booms, lower inequality. More recently, Dávila et al. (2021) studied how the factorial income distribution responded to the commodity price boom using data from 50 countries, including 10 countries from Latin America, between 1995 and 2010. They show that during the boom years, there was a redistribution of the aggregate labor income share in favor of less-educated workers.

For Brazil, Costa et al. (2016) show that, in 2000, the country received approximately 2.3% of its imports by value from China and sent 2.0% of its exports to China; by 2010, these shares were 14.5% and 15.1%, respectively. Importantly, Brazilian exports to China are increasingly products of the agricultural and extractive sectors, while Brazilian imports from China have remained concentrated in manufacturing, so there is a commodities-for-manufactures trade relationship that is also characteristic of many Latin American countries. The authors use data from the Brazilian censuses of 2000 and 2010, exploiting spatial variation in a differential exposure design to generate predictions about the effects of the China shock on wages across local labor markets. The empirical strategy follows closely the work of Autor et al. (2013) for the United States. The main finding is that local labor markets more affected by Chinese import competition experienced slower growth in manufacturing wages between 2000 and 2010, consistent with evidence found for the United States (Autor et al., 2013; Autor, Dorn, & Hanson, 2016a). However,

there was faster wage growth in locations benefiting from rising Chinese commodity demand during the same period. Interestingly, increased demand from China is associated with a rise in the share of employed workers in formal jobs, a factor also associated with declining inequality.

Adao (2015) shows that increases in the world prices of basic commodities were accompanied by reductions in Brazilian wage inequality between 1981 and 2010. They argue that the adjustment to changes in sector labor demand caused by global price shocks depends on three margins: changes in relative sector wages, the degree of mobility of workers across sectors, and within-sector earnings dispersion. They use data from the Brazilian censuses of 1991, 2000, and 2010 to quantify the effect of global shocks in commodity prices on aggregate movements in between- and within-group wage inequality, finding that variations in world commodity prices explain between 5% and 10% of the decline in log wage variance between 1991 and 2010. For Mexico, Verhoogen (2008) shows that an exchange rate devaluation leads more-productive plants to increase exports, upgrade quality, and raise wages relative to less-productive plants within the same industry, increasing within-industry wage dispersion. The results are consistent with decreasing earnings inequality as a response of the currency revaluation experienced by commodity producers that resulted from the boom.

The Role of Firm Heterogeneity

Even if working in the same sector, occupation, and region, equally skilled workers can have different earnings depending on the firms in which they are employed. Access to administrative linked employer–employee data in a few countries in Latin America has permitted the study of how firm characteristics and cross-firm pay differentials help determine the distribution of earnings. This article focuses on the work that follows Abowd et al. (1999) and Card et al. (2013) in decomposing the variance of earnings into worker and firm heterogeneity using high-dimensional worker and firm fixed-effects models. The method had been primarily applied to developed countries because reliable data on firms in Latin America are scarce, and firm and labor informality is pervasive.

Alvarez et al. (2018) study the case of Brazil between 1988 and 2012. The authors show significant variability in earnings within firms but an even greater amount of earnings inequality between firms, with a substantial share of the cross-sectional variation explained by more-productive and larger firms paying more. Importantly, when looking at changes in inequality across time, they find that firm effects account for 40% of the total decrease in inequality between 1996 and 2012, while worker effects account for 29%, with the remainder explained residually. A key result is that this decline is not explained by changes in the productivity dispersion across firms, which increased, or by changes in the skill composition of workers. What explains the fall in inequality is declining firm productivity premiums and declining returns to worker characteristics. Using a subsample of large firms in the manufacturing and mining sectors, they show that the fall in the productivity premium was driven by a weakening pass-through from firm characteristics to pay. This could be explained by changes in bargaining power between employers and employees or by substantial increases in minimum wages in the country during this period.

Messina and Silva (2021) use a similar methodology with data covering the formal sectors of Brazil, Costa Rica, and Ecuador. Similar to Alvarez et al. (2018), the authors find that changes in the variance of firm effects are a major contributor to changes in the variance of earnings. In Brazil and Ecuador, where wage inequality fell, the contribution of firm effects also dropped significantly, something that is in sharp contrast to what has been documented in other developed economies (Card et al., 2013; Cardoso, 1999; Song et al., 2019). In Costa Rica, the only country in which inequality rose, the contribution of firm effects increased.

Eslava et al. (2021) reinforce the importance of firm characteristics in understanding earnings inequality in the region. They do this by looking at the relationship between the firm size distribution and wage inequality. The firm size distribution in Latin America is characterized by a large concentration of low-productivity small businesses, many of which are self-employed individuals working under informal conditions, and a small share of large high-productivity firms. The authors show that this dualism maps very closely to the earnings distribution, a correlation that is not replicated in the United States. In Latin America, the proportion of workers in the bottom income quintile who work for or own a firm with more than 10 employees is only 5%, but it goes up to over 52% among workers in the top quintile. By contrast, in the United States, at least 70% of workers fall in this category in any quintile of the personal income distribution. The authors show that the excess mass of Latin American low-income workers in tiny productive units with precarious income levels deepens inequality. In particular, it explains 34% of the bottom-tail (P50/P10) earnings gap in the region relative to the United States. Although still limited, the available evidence from linked employer–employee data indicates that firm dynamics have played an essential role in the recent levels and evolution of earnings inequality in Latin America. This is an area where there is plenty of space for new research to broaden our understanding of the subject.

Labor Market Institutions

Minimum Wages

Real minimum wages have risen substantially in Latin America since 2002, coinciding with the moment when inequality began to decline. Figure 3 shows the average across eight Latin American countries of the cumulative change of the minimum wage, mean earnings, and median earnings relative to 2002 (see figure notes for details). On average, the growth of the minimum wage was faster than that of mean and median earnings, so it potentially contributed to declining inequality and the strong growth of earnings among less-educated workers (Figure 1b). In this case, however, average trends concealed substantial heterogeneity across countries. For example, between 2002 and 2012, the real minimum wage more than doubled in Argentina and Uruguay, while it slightly declined in Mexico.

Studying the impact of minimum wages on inequality in Latin America is difficult because most workers are informal, and noncompliance is pervasive, two factors that are not present in developed economies. The average informality rate in the region, defined narrowly as the share of workers who do not contribute to pension funds, is close to 68%, but it can go up to 80% for firms

with fewer than four employees and to 93% among the self-employed (Eslava et al., 2021). More generally defined, informality implies employment relations in which labor norms are not enforced, including mandates on minimum remuneration. Changes in the minimum wage not only affect the structure of wages and the level of employment but also can induce reallocations between the formal and informal sectors to avoid the regulation and even affect wages in the informal sector due to indexation (Broecke et al., 2017; Jales, 2018; Maloney & Nuñez, 2003; Maurizio, 2015; Meghir et al., 2015; Pérez, 2020). Analysis of the distributional effects of the minimum wage within the region must consider this interplay.

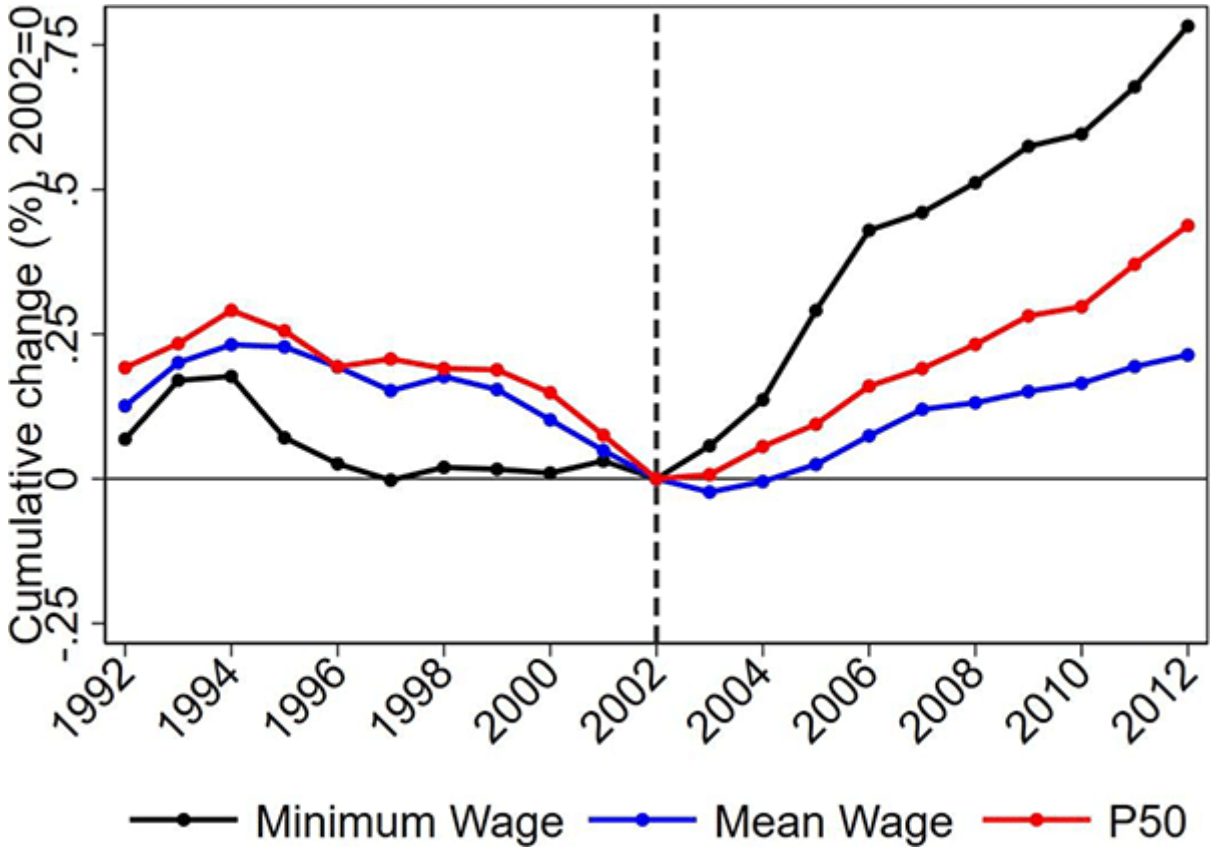

Figure 3. Minimum wage and average and medial real earnings. The figure depicts the average cumulative change of the minimum wage (black series), mean earnings (blue series), and median earnings (red series) relative to 2002. The averages are across eight Latin American countries: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. The respective series for each country and year is calculated and then normalized to take the value of zero in 2002. The reported series is an unweighted average across the eight countries. The minimum wage series is taken from official sources in each country. If the minimum wage changes within a year, the average is taken over the year. The wage series is constructed using country-specific microdata on monthly labor income of prime-age workers. The microdata come from household surveys gathered and made consistent by the Center for Distributive, Labor and Social Studies (CEDLAS) and the World Bank (CEDLAS & World Bank, 2013). The eight selected economies account for 88.2% of the region's gross domestic product and 78.9% of its population.

Noncompliance with the minimum wage, defined as the share of the workforce earning less than the minimum wage, tends to be high, but it is heterogeneous across the region. In countries like Mexico and Uruguay, where the minimum wage is low relative to each country's median wage, the noncompliance rate is below 10%. In countries like Colombia and Peru, where the minimum-to-median wage ratio is above 80%, the noncompliance rate is above 35% (Messina & Silva, 2018). How binding the minimum wage is can matter greatly for its distributional consequences. For example, Bell (1997), studying the cases of Colombia and Mexico in the 1980s, finds substantial disemployment effects of minimum wages among less-educated workers in Colombia, where the minimum wage "bite" is high, but no employment or wage effects in Mexico, where it is not. However, there is no consensus in the literature. Analyzing the case of Mexico between 1989 and 2001, Bosch and Manacorda (2010) find that a substantial part of the growth in inequality, and essentially all the growth in inequality at the lower tail of the distribution, was due to the steep decline in the real value of the minimum wage in that country.

Recent evidence specific to Brazil suggests that the contribution of the minimum wage to the decline of wage inequality was significant in that country. Engbom and Moser (2022) quantify the effects on inequality and unemployment of the more than doubling of the minimum wage in Brazil between 1996 and 2012. The authors follow the methodology of Lee (1999) and Autor, Manning, and Smith (2016b), exploiting variation in the effective "bindingness" of the federal minimum wage across states. They show that a higher minimum wage is associated with lower inequality, with little evidence of adverse effects on employment. In particular, rising minimum wages can account for one third of the fall in the variance of log earnings in Brazil since 1994. A key factor behind these large effects on inequality is that the rise in the minimum wage induces firms above the new minimum wage to raise pay to maintain their rank in the wage distribution, with spillover effects that can reach up to the 90th wage percentile. This mechanism can explain the weakening pass-through from firm characteristics to pay found in Alvarez et al. (2018). The authors further show that the magnitudes of the estimated effects of the minimum wage on inequality are driven by how binding the minimum wage is, together with the extent of firm productivity dispersion in Brazil.

Also for Brazil, Ferreira et al. (2017) use distributional decomposition methods based on recentered influence function regressions (Firpo et al., 2009; Fortin et al., 2011) to estimate the quantitative impact of alternative candidate explanatory factors on the changes in the earnings distribution, including the rise of the minimum wage. They find that the key contributor to falling inequality was the decline in the experience premium, accounting for close to 39% of the fall in the Gini coefficient, but that minimum wages also played a role, albeit conditional on the period. Rising minimum wages were equalizing from 2003 to 2012, but they had the opposite effects from 1995 to 2003 because of declining compliance. Over the entire period, the direct effect of minimum wages on inequality was muted. Finally, Jales (2018) proposes a framework that uses the discontinuity of the wage distribution around the minimum wage to identify noncompliance and estimate the distributional effects of the minimum wage in Brazil between 2001 and 2009. One novelty is that the method allows the author to identify the effects of minimum wages on the size of the informal sector, capturing the reallocation mechanism. The analysis shows that the size of the informal sector is increased by around 39%, compared to what would prevail in the

absence of the minimum wage. The effect is attributable to the unemployment effects of the minimum wage on the formal sector and movements of workers from the formal to the informal sector as a response to the policy.

Summarizing recent studies on minimum wage effects on inequality in Latin America since the 1990s, Messina and Silva (2018) conclude that results are highly sensitive to its level, how much it increases, the extent of noncompliance, and whether it is binding. However, studies focusing on the post-2000s period consistently show an equalizing effect of minimum wages (Campos-Vázquez & Esquivel, 2021; Ferreira et al., 2017; Jales, 2018; Maurizio & Vázquez, 2016). The solid economic growth in the region between 2002 and 2014 might explain this result because labor markets can afford minimum wage hikes in such favorable macroeconomic conditions. In a weak economy with sluggish labor demand, sharp rises in minimum wages can induce a reallocation of workers to the informal sector and exacerbate noncompliance, with negative distributional effects.

Informality

Having a sizable informal sector can enhance or dampen inequality. If workers with similar characteristics get paid different wages depending on if they work in the formal or informal sectors, within-group inequality increases. There is extensive evidence of a formality premium in the region, which persists even after controlling for several observable characteristics (Messina & Silva, 2018,2021; Ulyssea, 2020). There is also some evidence that inequality is higher within the informal sector (Binelli & Attanasio, 2010; Engbom et al., 2021), mainly because a large share of the self-employed are informal and tend to have higher earnings dispersion. However, the earnings and productivity distributions in the two sectors overlap, so informality is not restricted to low-pay workers or low-productivity firms (Meghir et al., 2015; Ulyssea, 2020).

A different argument that has been put forward is that the large concentration of employment in small informal firms, pervasive in Latin America (Eslava et al., 2021; Maloney, 2004; Perry et al., 2007), can potentially limit wage inequality because within-firm pay differentials in these firms are lower (Levy & López-Calva, 2016). This generates a misallocation problem because some high-skilled workers are matched with low-productivity informal firms, compressing skill premiums. The mechanism can be important in the region's context of increasing educational attainment. The role of firms in explaining the formality gap was also pointed out by Ulyssea (2018). Using matched employer–employee data on both formal and informal firms in Brazil, the author finds that when adding firm fixed effects in log wage regression, the wage gap between formal and informal workers vanishes. To the extent that there is assortative matching between firms and workers, this result suggests self-selection might be behind the wage gap.

The level of informality can be very sensitive to macroeconomic conditions, growing during recessions and declining in periods of expansion (Bosch & Esteban-Pretel, 2012; Bosch & Maloney, 2007, 2008; Perry et al., 2007). In a way, the informal sector can operate as a safety net,

absorbing workers who otherwise would end up in unemployment during bad times (Attanasio et al., 2004; Engbom et al., 2021). However, this view of the informal sector as a second, less desirable, option is contentious (Maloney, 2004).

The countercyclicality of informality has implications for inequality. As a bad shock hits, wages in the informal sector respond more than those in the formal sector: They are not bound by the minimum wage or set by collective agreements, and they are not protected by labor regulation. This exacerbates the formality premium while the informality share grows, so wage inequality increases. Binelli and Attanasio (2010), using microdata for Mexico, show that changes in the size of the informal sector closely follow changes in wage inequality. Attanasio et al. (2004) find that the tariff reductions in Colombia in the 1980s and 1990s led to stronger foreign competition and increased informality within the most exposed sectors. This compositional change contributed to rising inequality in the country in the 1990s.

To a greater or lesser extent, the informality rate declined during the years of strong economic growth in the 2000s in most countries in the region (Amarante et al., 2016; Engbom et al., 2021; Messina & Silva, 2018,2021). Available evidence suggests that this fall in informality had equalizing effects. For Brazil, Ferreira et al. (2017) found that the formal–informal wage gap declined between 1995 and 2012, and this factor contributed to about 18% of the reduction of the Gini coefficient. Maurizio (2014) and Amarante et al. (2016) find similar results in the cases of Argentina and Uruguay, respectively.

Engbom et al. (2021) study the interaction between informality and earnings inequality in Brazil using administrative and household survey data between 1985 and 2018. The combination of the two data sources allows the authors to compare earnings levels and earnings changes between workers in Brazil's formal and informal sectors and for workers switching sectors over time. The richness of the data implies they can provide a clear picture of how transitions between sectors impact individual earnings and overall inequality. They find that workers who switch between sectors have highly asymmetric earnings changes: Workers transitioning from the informal to the formal sector tend to make earnings gains, whereas workers making the opposite transition on average lose earnings. They show that the significant employment shift toward the less volatile formal sector in the 2000s resulted in a fall in earnings volatility, accounting for 50% of its total decline since 2002. Consistent with most of the evidence for the region, the process of labor market formalization in Brazil appears to have played an essential role in the decline in inequality.

Conclusions

Earnings inequality in Latin America increased in the 1980s and 1990s, declined sharply in the 2000s, and stagnated at the beginning of the 2010s. An extensive literature has tried to understand the drivers of this pattern, focusing on supply, demand, and institutional factors that shape developments in labor markets.

On the supply side, changes in the workforce's age, sex, and education composition impacted the wage structure, reducing the experience and education premiums and hence lowering between-group inequality. These compositional changes happened throughout the period, so they are unlikely to explain the shift in inequality at the turn of the 21st century. For that, alternative demand-side or institutional explanations are needed.

On the demand side, the bulk of the evidence on the impact of the structural reforms of the 1980s and 1990s in Latin America indicates that they were unequalizing during the first years postreform, shifting the relative demand in favor of skilled workers and pushing skill premiums upward. Tariffs were skewed toward sectors intensively using less-educated workers, so trade reform differentially affected this group; foreign direct investment concentrated in activities more intensive in skilled labor, at least within the regional context; relaxation of trade barriers reduced the price of importing new technologies, causing firms to switch toward production techniques that tend to be skill biased; and exporting firms, which tend to demand more educated workers, gained participation in the economies. The effects were accentuated because of barriers to mobility across sectors and regions that tend to be higher for older, less-educated, and female workers.

Improved external conditions due to the commodities price boom of the 2000s boosted economic growth in the region. Evidence suggests this shock had equalizing effects. Moreover, significant increases in minimum wages and a decline in labor informality reduced earnings dispersion across skill-demographic groups. Between 2015 and 2022, the inequality decline decelerated, reflecting the general deceleration of economic growth since the end of the commodities price boom, as well as the arrival of the COVID-19 pandemic.

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Notes

1. The different figures in the text are constructed using microdata from household surveys in Latin America gathered and homogenized by the Center for Distributive, Labor and Social Studies and the World Bank (CEDLAS & World Bank, 2013). This article focuses on eight of the largest economies in the region: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. However, a recognized shortcoming with household surveys is the underreporting of income, particularly by self-employed individuals (Hurst et al., 2014; Niizeki & Hamaaki, 2023), who represent a large share of the labor force in Latin America. The figures should be interpreted with this caveat in mind.

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