# Income Volatility and Social Insurance in Latin America[1]
# (Background Paper 1)

*Income volatility can disrupt household consumption and investment, push them into poverty, and lead to social unrest. Aggregate income volatility in Latin America has declined in recent decades, partly reflecting better policies, although it remains higher than in peer economies. Moreover, income volatility at the individual level is high, with a significant share of the labor force experiencing large income fluctuations every year. Informal workers face particularly volatile income, which often push them into poverty. Informal—along younger and less educated—workers are also more sensitive to aggregate income fluctuations than other groups, making them more vulnerable to economic downturns. Social transfers contribute to alleviating poverty but play a very limited role in mitigating income volatility, including of vulnerable groups. With already high individual income volatility and increasing uncertainty about future income (including because of climate and global geopolitical shocks), governments in Latin America should revisit the design of social protection frameworks to make them more responsive to large income shifts.*

## 1. Introduction

Latin America has been historically volatile, displaying aggregate income volatility that is twice as large as that in advanced economies (AEs) and higher than that in other Emerging Markets (EMs) (Figure 1). Large swings in income can disrupt household consumption, affect investment decisions, and push individuals into poverty. This can lead to social discontent and unrest, which has been elevated in Latin America over the past few years (Figure 2). Moreover, there is a growing sense of economic uncertainty in the region (Figure 3), partly driven by recent global geopolitical developments and concerns about income instability going forward. This prospect of high uncertainty, and the potential for social unrest, underscores the importance of understanding the drivers of income volatility, its implications, and policies to mitigate it.

Against this backdrop, this chapter aims to shed light on the following questions: How has aggregate income and consumption volatility evolved in Latin America? How does it compare to other regions? What have the drivers of aggregate income volatility (external vs domestic factors) been? How high is income volatility at the individual level? How does it differ across demographic groups? How sensitive are individual incomes of different groups to macro-economic fluctuations? What role do social transfers play in mitigating individual income volatility?

## 2. Aggregate Income Volatility

*This section documents the evolution of aggregate income and consumption volatility in the region, in comparison to other regions, and the extent of aggregate insurance.*
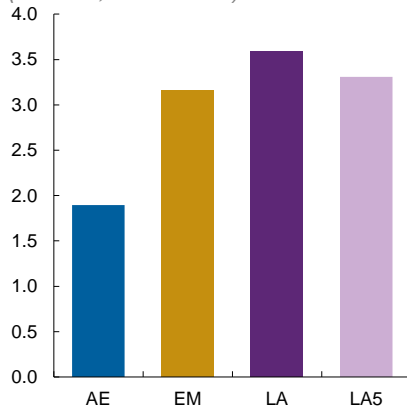
### The Evolution of Aggregate Income Volatility

**Latin America has experienced a decline in aggregate income volatility in recent decades** (Figure 4). At the macro level, income volatility declined across all country income groups, but the decline was more pronounced in Latin America and in other EMs. Still, Latin America continues to display higher volatility than other EMs and AEs. Importantly, the decline in volatility in Latin America was not accompanied by a decline in GDP growth (less

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dynamism).[2] In fact, growth has actually increased slightly in the past two decades, relative to the previous two (Figure 5).[3]

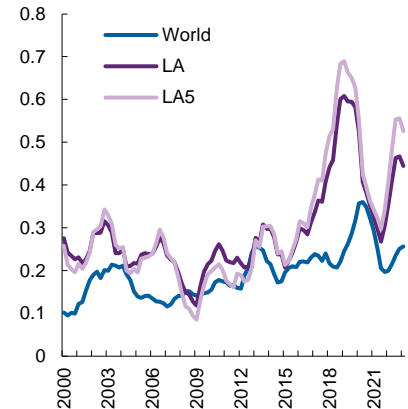**Figure 1. Aggregate Income Volatility**
*(Percent; 1980–2019)*

Sources: Haver Analytics; IMF, World Economic Outlook database; and IMF staff calculations.
Note: Income volatility denotes standard deviation of annual real GDP series (HP detrended). All groups are aggregated by PPP GDP weights. AE = advanced economies; EM = emerging markets; LA5 = Latin America 5 (Brazil, Chile, Colombia, Mexico, Peru); LA = Latin America.

**Figure 2. Fraction of Countries with Major Events of Social Unrest**
*(Percent; 12-month moving average)*
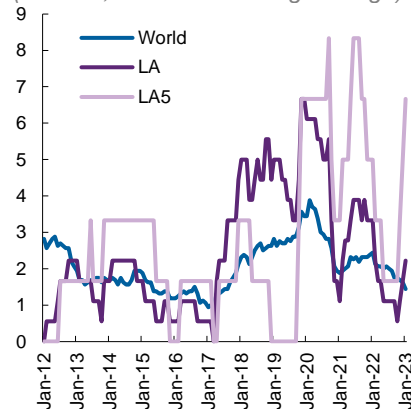
Sources: Barrett et al. (2020); and IMF staff calculations.
Note: Fraction of countries within a region experiencing major events of social unrest (including protests, riots, and major demonstrations). LA5 = Latin America 5 (Brazil, Chile, Colombia, Mexico, Peru); LA = Latin America.

**Figure 3. World Uncertainty Index**

Sources: World Uncertainty Index; and IMF staff calculations.
Notes: Six-quarter moving averages are reported. Uncertainty index computed by counting the frequency of the word uncertainty (or its variant) in Economist Intelligence Unit country reports. The indices are normalized by total number of words and rescaled by multiplying by 100,000. A higher number means higher uncertainty and vice versa. Aggregated by purchasing-power-parity GDP weights. LA5 = Latin America 5 (Brazil, Chile, Colombia, Mexico, Peru); LA = Latin America.

**Figure 4. Aggregate Income Volatility**
*(Percent)*
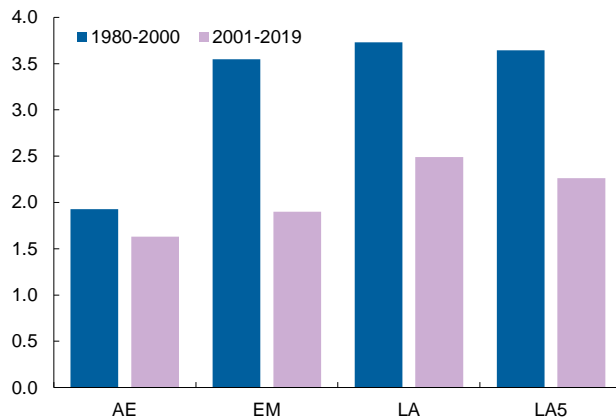
Sources: Haver Analytics; IMF databases; and IMF staff calculations.
Note: Income volatility denotes the sample standard deviation of annual real GDP series (HP detrended, lambda = 100). All groups are aggregated by PPP GDP weights. AE = advanced economies; EM = emerging markets; LA5 = Latin America 5 (Brazil, Chile, Colombia, Mexico, Peru); LA = Latin America.

**Figure 5. Aggregate Income Volatility as a fraction of Growth**
*(Percent)*
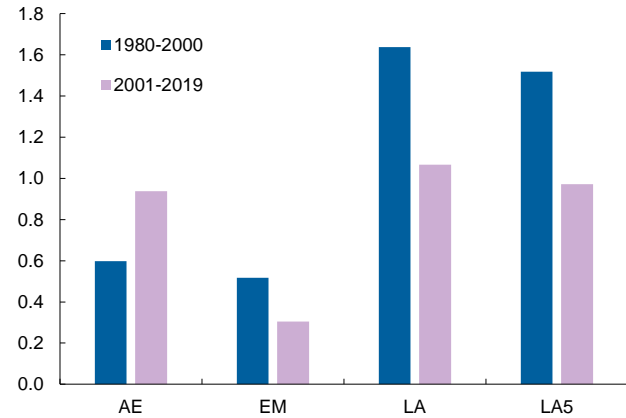
Sources: Haver Analytics; IMF databases; and IMF staff calculations.
Note: Each bar depicts the ratio of: (a) the sample standard deviations of annual real GDP HP detrended series; (b) average real GDP growth. AE = advanced economies; EM = emerging markets; LA5 = Latin America 5 (Brazil, Chile, Colombia, Mexico, Peru); LA = Latin America. Groupings for AEs, EMs, LA, and LA5 are in the Appendix.



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[2] Theoretically, there are channels by which higher volatility harms growth, and channels by which it fosters growth. For example, Bernanke (1988) underscores the role of fixed costs in investment and how an increase in volatility increases the option value of delaying the investment. For that reason, an increase in volatility reduces growth. On the other hand, Black (1987) argues that there should be a positive relationship between volatility and growth because higher volatility would result from an economy choosing risky projects with associated higher expected returns.

[3] Even though growth in the period 2001–19 has been marginally higher than 1980–2000, there has been a well-documented decline in growth in ten years before the pandemic, in line with the results of Advanced Economies. See IMF (2015).

**More stable domestic conditions explain the decline in aggregate volatility over the past 2 decades.** An analysis of the drivers of aggregate volatility, disentangling domestic and external factors (see Annex 2 for details on the methodology)[4] indicates that the drop in aggregate income volatility in Latin America over the past two decades was due to lower volatility of domestic factors, which more than offset the increase in volatility due to external factors (Figure 6).[5] As explained in Annex 2, the variance of output accounted for by each external factor is the product of its variance (e.g., the variance of the US real interest rate) and its regression coefficient (e.g., the coefficient of the US interest rate in the output regression). Results suggest that most of the changes in the variance of the external components are due to the changes in the coefficients, as opposed to changes in the volatility of factors themselves (Figures 7, 8, and 9). This is consistent with the fact that Latin America has become more trade and financially integrated with the rest of the world over time.

**Figure 6. Determinants of Income Volatility: Domestic vs External**
*(Percent)*
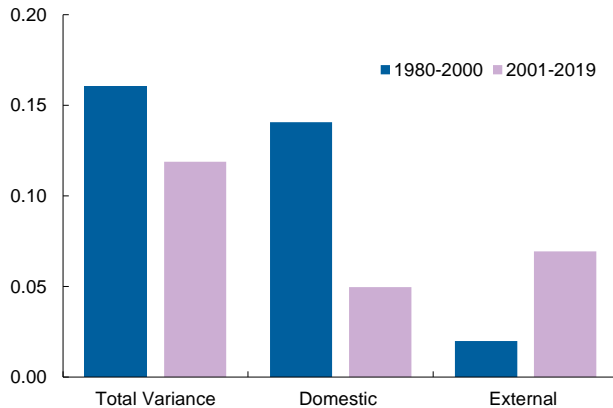


Sources: Haver Analytics; IMF databases; and IMF staff calculations.
Note: Decomposition of the variance of the HP detrended real GDP for LA9 in terms of domestic and external components. 1980–2000 and 2001–2019 are the estimation periods. See Annex 2 for details. LA9 = Latin America 9 (Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, and Uruguay).

**Figure 7. External Determinants of Income Volatility**
*(Percent)*
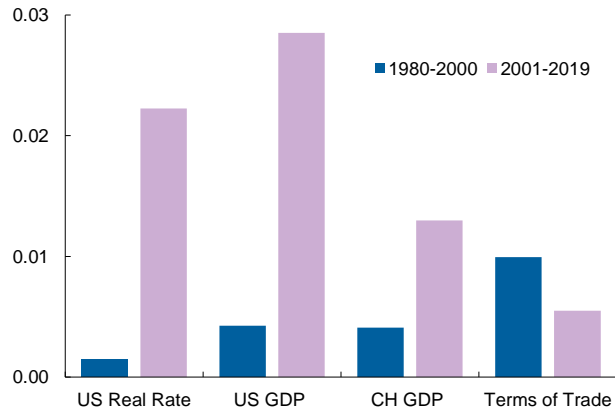


Sources: Haver Analytics; IMF databases; and IMF staff calculations.
Note: Decomposition of the external variance for LA9 into components for real interest rates (Federal funds rate minus inflation), US GDP, China's GDP, and terms of trade. 1980–2000 and 2001–19 are the estimation periods. See Annex 2 for details. LA9 = Latin America 9 (Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, and Uruguay).

**Figure 8. Regressions Coefficients**
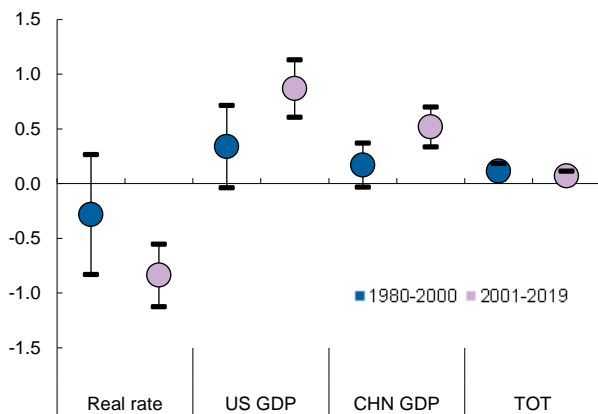


Source: IMF staff calculations.
Note: Regressions coefficients of external factors on real GDP for LA9. External factors: real interest rates (Federal funds rate minus inflation), US GDP, Chinese GDP, and terms of trade. 1980–2000 and 2001-2019 are the estimation periods. See Annex 2 for details. LA9 = Latin America 9 (Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, and Uruguay).

**Figure 9. Volatility of External Factors**
*(Percent)*
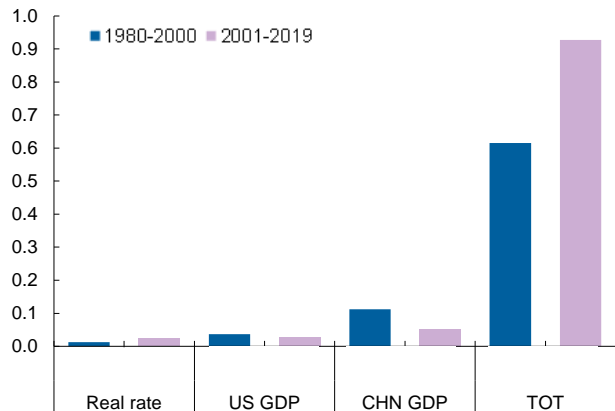


Source: IMF staff calculations.
Note: External factors: real interest rates (Federal funds rate minus inflation), US GDP, Chinese GDP, and terms of trade. 1980–2000 and 2001–19 are the estimation periods.

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[4] See similar analyses by Raddatz (2007), Fernandez Schmitt Grohe Uribe (2018) and Juvenal et al. (2023), among many others.

[5] External factors include the US real interest rate, GDP growth in AEs, and terms of trade. The large role for these factors found in the estimations is consistent with the literature findings. For example, Fernandez Schmitt Grohe Uribe (2018) and Juvenal et al. (2023) find that external factors explain a large fraction of business cycle fluctuations (ranging from 10 to 40 percent).

**The volatility of consumption and the response of consumption to income shocks have fallen over time, implying improved insurance.** Consumption volatility has also fallen in Latin America, in line with the observed drop in income volatility (Figure 10). As with output, there was a marked decrease in consumption volatility in LA5 countries, in line with the observed drop in volatility in EMDEs and, to a lesser extent, in AEs. Whether these lower fluctuations in consumption translate into higher welfare depends on the ability of individuals and firms to smooth income shocks using available insurance instruments and financing. The response of consumption to exogenous income fluctuations (Figure 11), suggests improved consumption smoothing or aggregate insurance (see Annex 3 for further details on the methodology).

**Figure 10. Volatility of Consumption**
*(Percent)*
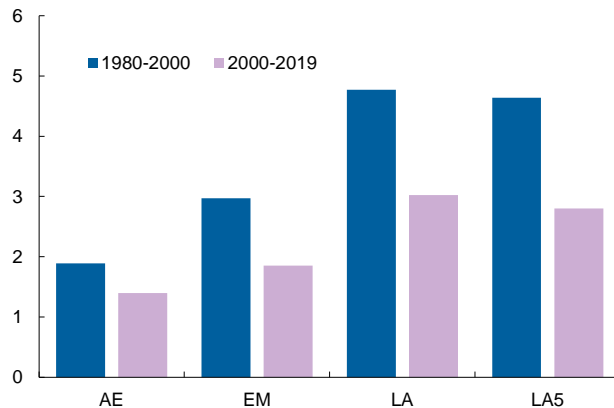
Sources: Haver Analytics; IMF databases; and IMF staff calculations.
Note: Consumption volatility denotes the sample standard deviations of annual real consumption series (HP detrended, lambda = 100). All groups aggregated by PPP GDP weights. AE = advanced economies; EM = emerging markets; LA5 = Latin America 5 (Brazil, Chile, Colombia, Mexico, Peru); LA = Latin America.

**Figure 11. Response of Consumption to Income**
*(Percent)*

Sources: Haver Analytics; IMF databases; and IMF staff calculations.
Note: Estimated IV coefficient from two stage least squares. See Annex 3 for details. GDP weighted regression (weights PPP GDP weights). EM = emerging markets; LA9 = Latin America 9 (Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, and Uruguay); LA5 = Latin America 5 (Brazil, Chile, Colombia, Mexico, Peru).
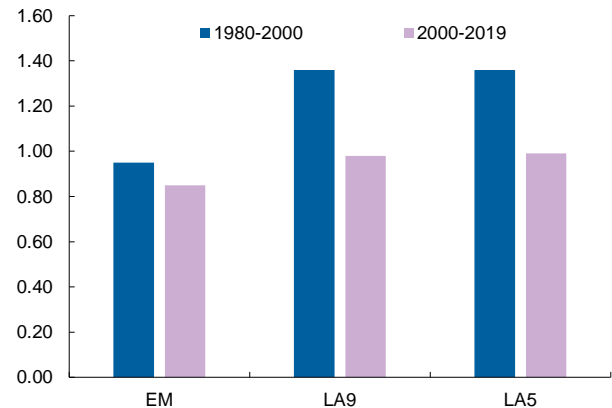
# 3. Individual Income Volatility

*Using micro level data from labor force and household surveys, this section documents patterns of income volatility at the individual level for the working-age population (age 14–64) who are in the labor force.[6]*

## Overall Income Volatility

**Income volatility for individuals in the labor force is high in Latin America.** On average, the probability of experiencing a large loss in real income (of 25 percent or more, compared to the same quarter in the previous year) has hovered around 22 percent over the past decade in Argentina, Brazil, Chile, Mexico, and Peru (Figure 12, panel 1).[7] These figures have been remarkably stable, without noticeable improvement, over the last 10 years (with the exception of the pandemic years). These results complement previous findings in the literature which document that, over the past ten years, the standard deviation of income growth in Argentina, Brazil, and Mexico was larger than that for the US (Blanco et al., 2022; Engbom et al., 2022; McKinney et al. 2022; Puggioni et al., 2022).[8] Within Latin America, the share of individuals experiencing large income losses ranges has been highest in Peru (averaging about 30 percent) and lowest in Brazil (20 percent) (Figure 12, panel 2).

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[6] The final dataset used in the analysis is mainly composed of short rotating panels, tracking the same individual and household over a period of five or six quarters.

[7] Research by the The Pew Charitable Trusts (2017) found that 15 percent of the US households experienced large income losses between 2014 and 2015. Bearing in mind the methodological differences (e.g., use of household data; setting a floor income to define the sample; use of total income instead; different time period), this evidence suggests that income volatility is considerably higher in Latin America than in the US.

[8] There is a large literature which characterizes the income process. See Meghir and Pistaferri (2011) for a review and Guvenen et al. (2022) for recent findings.

**Figure 12. Fraction of the Labor force with Large Income Changes**
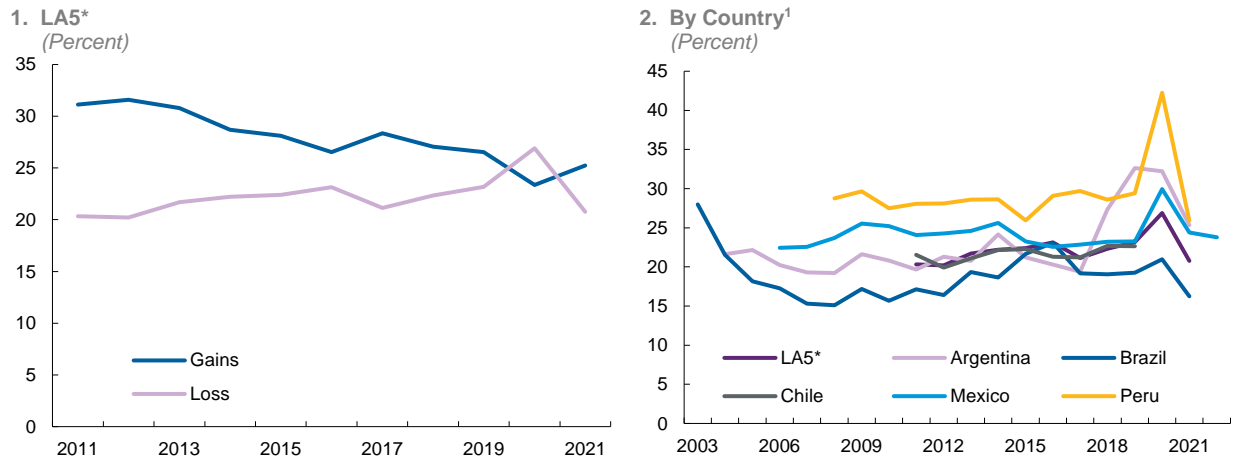
1. **LA5\***
*(Percent)*

2. **By Country[1]**
*(Percent)*

Sources: National authorities; and IMF staff calculations.
Note: Large income changes are defined as changes in real labor income greater than 25 percent in absolute value. Aggregates are 2019 purchasing-power-parity GDP weighted average. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru).
[1]Panel 2 reports the fraction of the labor force with large income losses.

**Some demographic groups are more likely to experience large income losses.** While the probability of facing large income losses is larger for male, older, and less educated workers,[9] the difference is particularly striking for informal versus formal workers. Indeed, 30 percent of informal workers face large labor income losses compared to 20 percent of formal workers (Figure 13, panel 1). Moreover, within the group of informal workers, those *self-employed* face the highest odds of large income swings (32 percent) while employed informal workers are somewhat more insulated (25 percent) suggesting that firms, even if informal, tend to provide some degree of insurance (income stability) to their workers, compared to self-employed (Figure 13, panel 2). This is consistent with evidence for AEs that employers play an important role as income insurance providers (e.g., Guiso et al, 2005 for Italy).

**Figure 13. Fraction of Each Group with Large Income Losses**
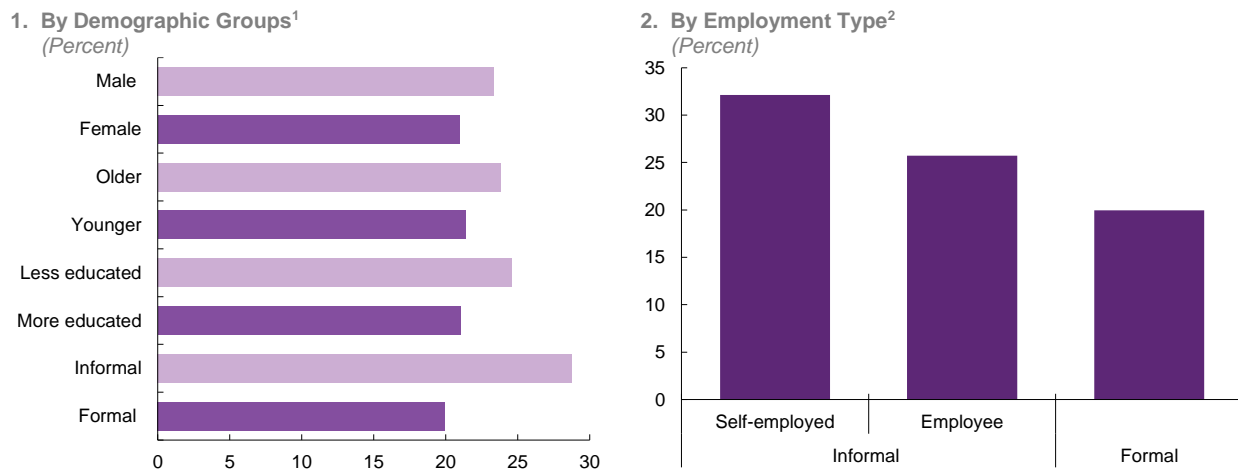
1. **By Demographic Groups[1]**
*(Percent)*

2. **By Employment Type[2]**
*(Percent)*

Sources: National authorities; and IMF staff calculations.
Note: Large income losses are defined as negative changes in real labor income greater than 25 percent. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru).
[1]"Younger" represents 14–39 years old, "older" accounts for 40–65 years old. "Less educated" are those who did not complete secondary education, while all others are considered "more educated". "Formal" workers are those who pay social security contributions, while the "informal" do not.
[2]"Formal" workers are those who pay social security contributions, while the "informal" (both self-employed and employed) do not.

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[9] Male, older, and less educated are typically more likely to be self-employed informal workers, which increases their income volatility.

**A sizable share of workers who experience large income losses do so while remaining employed.** Out of the 22 percent of the labor force that face large income losses, 19 percent are employed in both periods, while the unemployed and workers who become unemployed represent only 3 percent of the cases (Figure 14).[10] Most of the labor force undergoing large income losses are workers who have informal jobs in both years, whereas only a small fraction transitions from the formal to the informal sector (Figure 15, panel 1). Most of these workers that face large income losses either switch jobs—as indicated by changes in occupations or industries—and/or reduce the number of hours worked (Figure 15, panel 2).

**Figure 14. Fraction of the Labor Force with Large Income Losses**
*(Percent)*



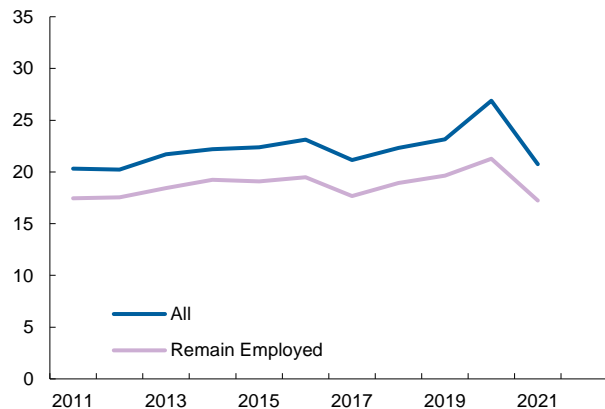Sources: National authorities; and IMF staff calculations.
Note: Large income losses are defined as negative changes in real labor income of at least 25 percent. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru). "All" stands for individuals who are in the labor force in both periods, while "Remain Employed" stands for individuals employed in both periods.

**Figure 15. Fraction of the Labor force with Large Income Losses**

**1. Transitions between Formal and Informal Sectors[1]**
*(Percent)*



- Remain informal
- Remain formal
- Formal → Informal
- Informal → Formal

**2. Reduction of Hours Worked and Changes in Industry or Occupation[2]**
*(Percent)*



- Change in Industry or Occupation
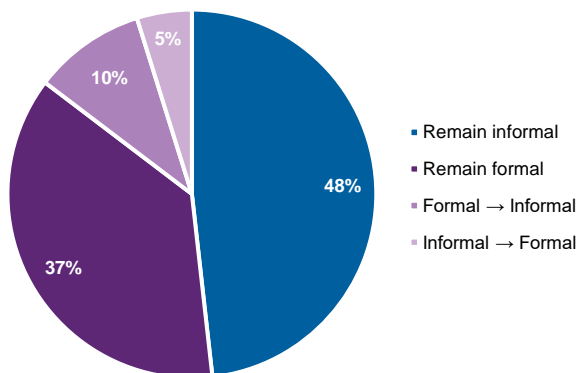- Reduction in hours worked
- Both
- Neither

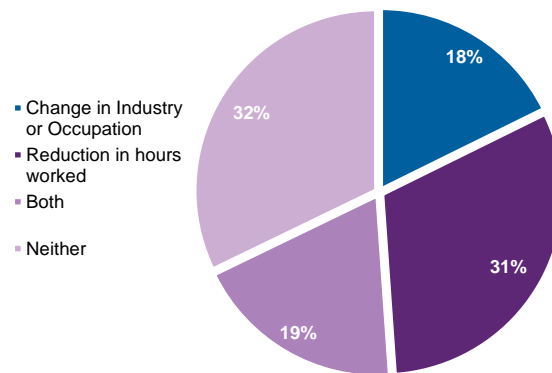Sources: National authorities, and IMF staff calculations.
Note: Large income losses are defined as negative changes in real labor income of at least 25 percent. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru). Sample includes only individuals employed in both periods who experience large labor income losses.
[1]Panel 1 decomposes workers with large income losses who remain employed into those who remain informal workers, remain formally employed, become informal, or become formal workers. Workers' employment status is compared in the same quarter of two consecutive years.
[2]Panel 2 decomposes workers with large income losses who remain employed into those who change industry or occupation; those whose work hours decrease; and those for which both or neither of these things happens. Workers' characteristics are compared in the same quarter of two consecutive years.

**Adverse events that result in large labor income losses pose a substantial risk of pushing workers into poverty.** On average, 4.5 percent of the labor force crosses the poverty line each year due to a large loss of individual labor income in the same period (Figure 16). Informal and less educated workers are more vulnerable to falling into poverty.

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[10] Even though workers are employed in both periods, they do not necessarily remain in the same job. The datasets do not provide information on job changes and given the different surveys' design, it is not possible to observe consistently if the worker has been unemployed between two periods analyzed.

**Intra-household insurance is limited.** Of the 22 percent of the labor force experiencing large individual labor income swings, 16 percent belong to a household whose total labor income also drops by at least 25 percent (Figure 17). Although data limitations do not allow to confirm whether individuals in the same household pool income together, the numbers mentioned above imply that only 7 percent of the labor force, having experienced a large income loss, has intra-household insurance through income pooling that is sufficient to mitigate large individual income shocks.
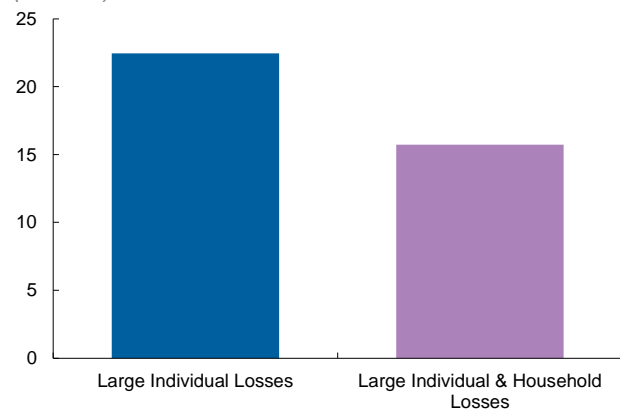
**Figure 16. Fraction of the Labor Force with Large Income Losses who Fall into Poverty**
*(Percent)*
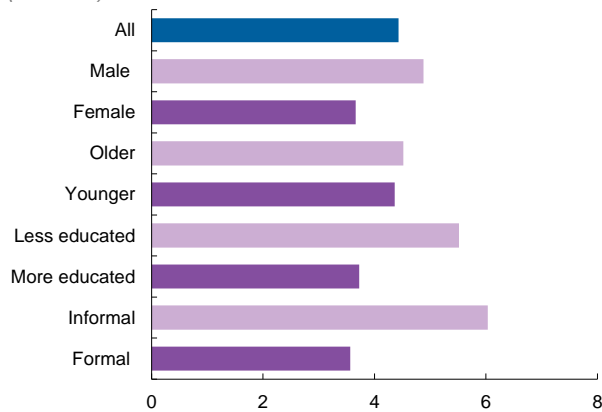


Sources: National authorities; and IMF staff calculations.
Note: Large income losses are defined as negative changes in real labor income of at least 25 percent. Falling into poverty is defined as the per capita household income being *above* the absolute poverty line (US$ 6.85 a day 2017 purchasing-power-parity) in the *first year* and *below* the poverty line in the *next year*. Fractions are conditional on demographic groups and individuals experiencing large income losses. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru). "Younger" refers to 14–39 years old and the "Older" refers to 40–65 years old. "Less educated" are those who did not complete secondary education, while all others are considered "More educated". "Formal" workers are those who pay Social Security Contributions, while the "informal" do not.
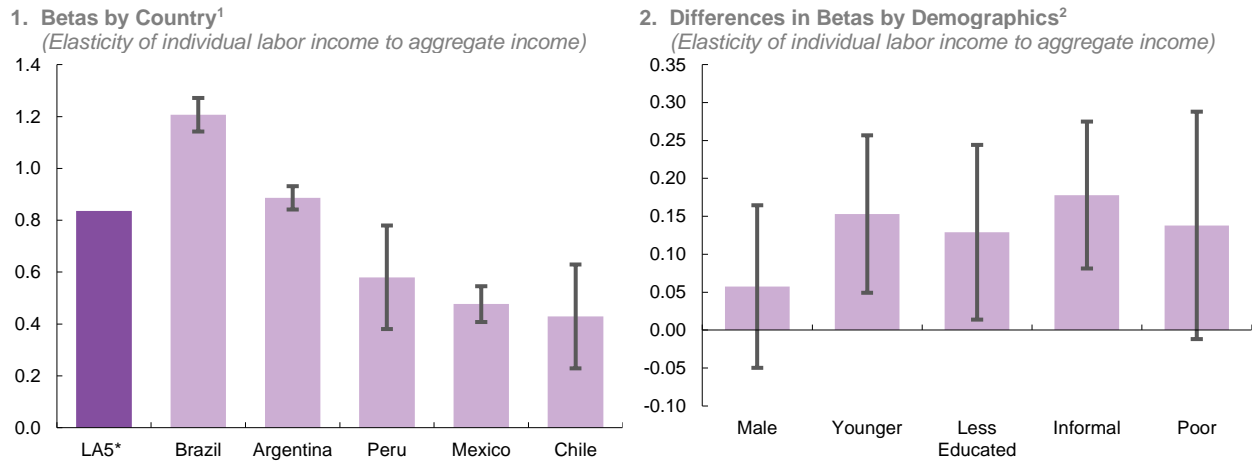
**Figure 17. Fraction of the Labor Force with Large Individual and Household Income Losses**
*(Percent)*



Sources: National authorities; and IMF staff calculations.
Note: Large income losses are defined as negative changes in real labor income of at least 25 percent, both at the individual and household levels. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru). The first bar refers to individuals with large individual income losses, while the second refers to those whose both individual and household income drop by at least 25 percent.

## From Aggregate to Individual Income Volatility

**Vulnerable groups are also more exposed to aggregate income fluctuations.** Estimates of the sensitivity of individual labor income to aggregate income fluctuations, so called "workers' betas"—following Guvenen et al. (2017)—point to an average elasticity for Latin America of about 0.8 (see details in Annex 2), although ranging from 0.4 for Chile to 1.2 for Brazil (Figure 18, panel 1) This implies that with a reduction of 1 percentage point in aggregate income, individual labor income falls on average by 0.8 percentage points. These values are comparable to the worker betas estimated for the US by Guvenen et al. (2017) who find betas of 1.09 and 0.69 for males and females respectively at the fiftieth percentile of the earnings distribution. Guvenen et al. (2017) also find larger betas for males—along all percentiles of the earnings distribution—and younger workers—for the bottom 90 percent. More importantly, in Latin America, the estimated sensitivity varies significantly with age, level of education, and type of employment. Informal, younger, and less educated workers are more sensitive to aggregate income volatility (Figure 18, panel 2). This heterogeneity could be explained by differences in sectoral composition across demographic groups. Evidence from the US (Guvenen et al., 2017) shows that the worker's betas are higher for groups whose workers are employed in sectors that are more cyclical, for example construction.

**Figure 18. Workers' Betas**

**1. Betas by Country[1]**
*(Elasticity of individual labor income to aggregate income)*

**2. Differences in Betas by Demographics[2]**
*(Elasticity of individual labor income to aggregate income)*

Sources: National authorities; and IMF staff calculations.
Note: LA5* denotes the pooled regression of Argentina, Brazil, Chile, Mexico, and Peru using 2019 purchasing-power-parity GDP weights.
[1]Panel 1 is the output of country level regressions.
[2]Panel 2 plots, for each demographic characteristic, the beta group differences relative to their counterpart, e.g., male with respect to female. Results are the output from country pooling regression. "Younger" refers to 14–39 years old and the "Older" refers to 40–65 years old. "Less educated" are those who did not complete secondary education. "Formal" workers are those who pay social security contributions. "Poor" refers to individuals whose daily per capita household income is lower than US$6.85 a day (2017 purchasing-power-parity).

## The Role of Social Transfers

**Social transfers, in its different forms, could cushion the impact of income shocks.** The analysis so far has focused on labor income fluctuations and the sensitivity of labor income to aggregate income fluctuations. A key question, given the sizable income volatility and the limited role of intra-household insurance, is to what extent individual income volatility–including the risk of falling into poverty—is mitigated by social transfers. Government social protection spending is usually divided into two categories. The first category is social insurance, which generally aims at protecting individuals from negative income shocks and is financed by contributions or payroll taxes (e.g., unemployment, pensions, and health insurance, as well as sickness and maternity leave). The second category is social assistance, which intends to provide subsistence minimum and is financed through general government revenues (e.g., universal and targeted transfers, child benefits, active labor market policies).[11] Since it is not possible to map labor survey data directly to social insurance or social assistance, this chapter analyzes *social transfers* which include (i) *unemployment protection*, whose primary objective is to alleviate income losses for workers who lost their jobs, and (ii) *other social transfers*, which are designed to protect households from poverty or from large income losses that are unrelated to unemployment. Unemployment protection[12] includes severance pay,[13] unemployment savings accounts, and unemployment insurance.[14] Other social transfers include payouts from social safety nets such as noncontributory transfer programs and noncontributory pensions.[15]

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[11] See IMF (2019).

[12] Contributory pension is excluded from the analysis because the sample for this chapter does not include retirement age population.

[13] Severance pay is included in unemployment protection whenever data is available (in this case of Argentina and Peru). Although severance pay is paid by employers, it is included because governments legislate and administrate labor laws that require employers to pay severance pay as a part of unemployment protection schemes. The amount of severance payments is converted to monthly equivalents.

[14] See Box 2 in IMF (2020) for details on the current design of unemployment insurance schemes in some LA countries.

[15] Examples of *other social transfers* are *Asignación Universal por Hijo* (Argentina), *Bolsa Familia* (Brazil), *Subsididio Único Familiar* (Chile), and *Programa Juntos* (Peru).

## What Do Social Transfers in Latin America Do?

**Most social transfers aim at mitigating poverty.** The probability of receiving unemployment protection is expectedly greater among the unemployed, but also higher for the formal workers[16] and those who are more educated (Figure 19, panel 1). In contrast, the share of the labor force receiving other social transfers is higher among poor, informal, and less educated workers (Figure 19, panel 2). Since, by design, other transfers have much larger coverage (7.2 percent of the labor force) than unemployment protection (1.2 percent of the labor force), social transfers tend to be allocated toward groups that are vulnerable to poverty such as less educated and informal workers.[17]

**Figure 19. Fraction of Each Group Reporting as Receiving Social Transfers**
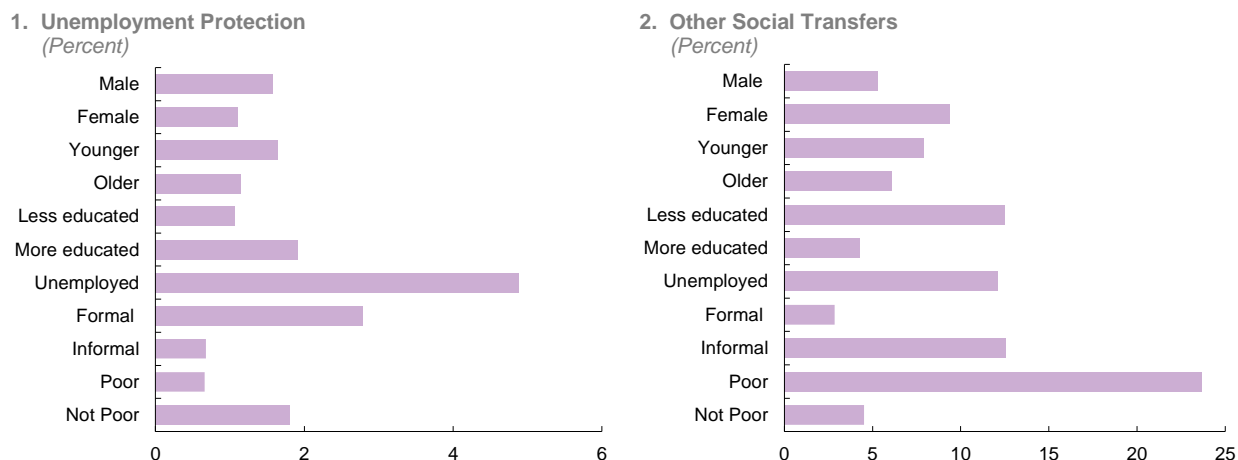


**1. Unemployment Protection**
*(Percent)*

**2. Other Social Transfers**
*(Percent)*

Sources: National authorities; and IMF staff calculations.
Note: Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru). Mexico is excluded due to data limitations on other income sources, including social transfers. "Younger" refers to 14–39 years old, "Older" refers to 40–65 years old. "Less educated" are those who did not complete secondary education. "Formal" workers are those who pay social security contributions. "Poor" refers to individuals whose daily per capita household income is lower than US$ 6.85 a day (2017 purchasing-power-parity).

**Social transfers, especially unemployment protection, are generous relative to workers' previous income, although only a small share of the labor force is covered.** Figure 20 depicts the replacement rate of transfers—the ratio of unemployment protection and other social transfers to total income in the previous year for those who receive these transfers—averaging over the whole labor force and over only the unemployed. While unemployment protection is only received by a small segment of the labor force (1.2 percent), for those who do, these transfers account on average for 70 percent of total previous labor income. In contrast, while other social transfers are received by a larger share of the labor force (7.2 percent), they account for about 42 percent of total previous income. For the unemployed, the replacement rate of unemployment protection and other social transfers are higher at 73 and 57, respectively.

**Social transfers reduce poverty.** After accounting for social transfers, the share of the population whose per-capita household income falls under the poverty threshold for upper-middle-income countries (US$6.85 per person per day in 2017 purchasing-power-parity) decreases by 3 percentage points on average (Figure 21). Importantly, when using the extreme poverty threshold (US$2.15 per person per day in 2017 purchasing-power-parity), the fraction of the population living in poverty decreases on average from 6 to 4 percent after social transfers.

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[16] In some cases, finding a job does not disqualify a worker from receiving some unemployment protection, e.g., severance pay.

[17] By design other social transfer have a larger coverage because a large share of the workforce, including the informal workers, are not entitled to any sort of unemployment protection.

**Figure 20. Replacement Rate of Social Transfers**
*(Percent)*
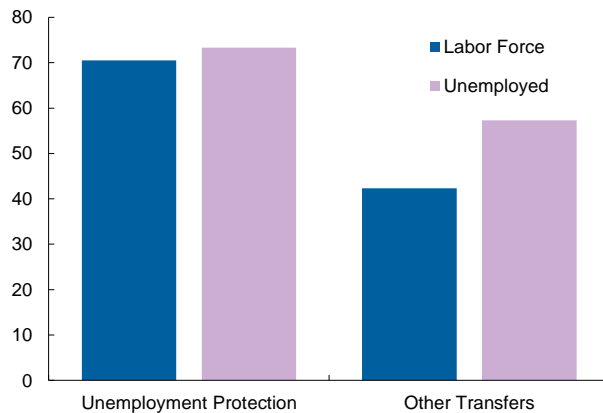


Sources: National authorities; and IMF staff calculations.
Note: Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru). Mexico is excluded due to data limitations on other income sources, including social transfers. Replacement rates are computed as the ratio between the transfers received and the total income received in the same quarter of the previous year, for both the labor force and the unemployed individuals who currently receive social transfers.

**Figure 21. Fraction of the Population Below the Poverty and Extreme Poverty Threshold**
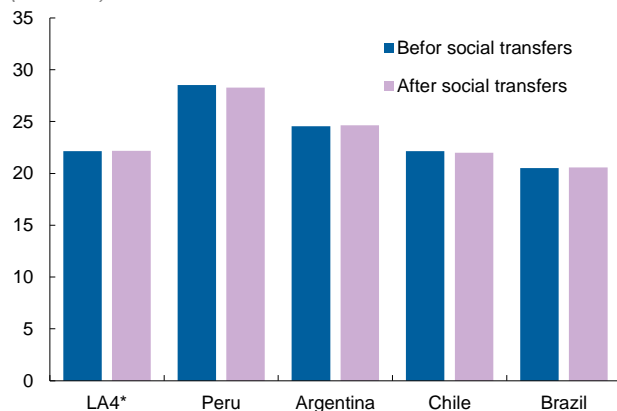*(Percent)*
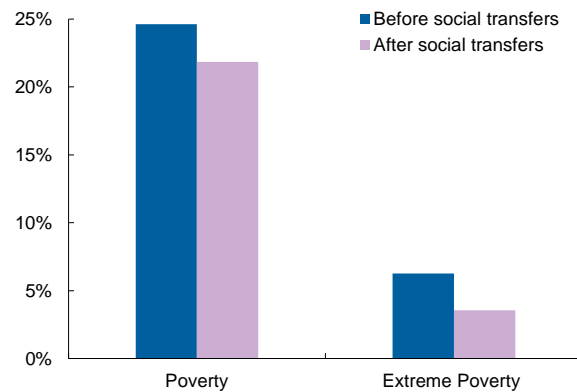


Sources: National authorities; and IMF staff calculations.
Note: Aggregates are 2019 purchasing-power-parity GDP weighted average for LA5*. LA5* = Latin America 5 star (Argentina, Brazil, Chile, Mexico, and Peru). Mexico is excluded due to data limitations on other income sources, including social transfers. Poverty threshold of US$6.85/person/day in 2017 purchasing-power-parity is compared to per-capita household income (before and after transfers) in 2019. Extreme poverty threshold of US$2.15/person/day in 2017 purchasing-power-parity is compared to per-capita household income (before and after transfers) in 2019.

## Social Transfers as a Tool to Mitigate Income Volatility

**Social transfers play a limited role in reducing individual income volatility in Latin America.** The share of the labor force experiencing large income losses does not decrease after adding social transfers to individual income. This is evident across all countries (Figure 22) and groups of the labor force with higher likelihood of experiencing large income losses (Figure 23). Moreover, the limited role of social transfers applies not just to informal workers but also to formal workers (Figure 24), indicating that current social insurance systems provide limited incentive for workers to become formal, at least in terms of providing protection against income volatility. Yet, for those who are covered, social transfers help mitigate large individual income losses (Figure 23). These results are consistent with the high replacement rate of social transfers (Figure 20) but also with the limited coverage of social insurance.

**Figure 22. Fraction of the Labor Force with Large Income Losses: Before vs After Social Transfers**
*(Percent)*



Sources: National authorities, and IMF staff calculations.
Note: Large income changes are defined as changes in real income greater than 25 percent in absolute value. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA4*. LA4* = Latin America 4 star (Argentina, Brazil, Chile, and Peru). Mexico is excluded due to data limitations on other income sources, including social transfers.

**Figure 23. Fraction of the Each Group with Large Income Losses: Before vs After Social Transfers**
*(Percent)*



**Figure 24. Fraction of Each Group with Large Income Losses: Before vs After Social Transfers**
*(Percent)*
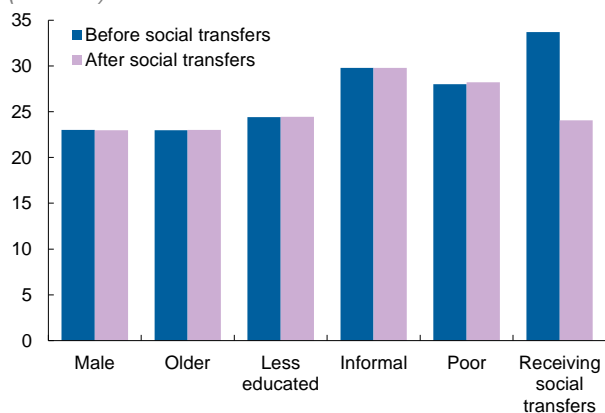


Sources: National authorities (labor market surveys); and IMF staff calculations.
Note: Large income changes are defined as changes in real income greater than 25 percent in absolute value. The sample is restricted to the labor force. "Older" refers to 40–65-year-olds. "Less educated" are those who did not complete secondary education. "Informal" workers are those who do not pay social security contributions. "Poor" refers to individuals whose daily per capita household income is lower than US$ 6.85 a day (2017 purchasing-power-parity). "Receiving social transfers" are the individuals who receive social transfers. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA4*. LA4* = Latin America 4 star (Argentina, Brazil, Chile, and Peru).

Sources: National authorities; and IMF staff calculations.
Note: Large income changes are defined as changes in real income greater than 25 percent in absolute value. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA4*. LA4* = Latin America 4 star (Argentina, Brazil, Chile, and Peru). Mexico is excluded due to data limitatio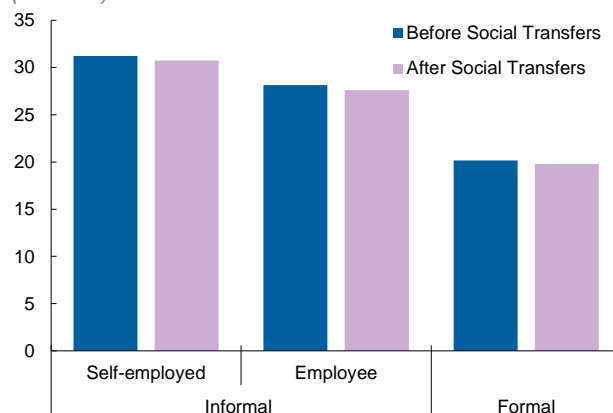ns on other income sources, including social transfers. "Formal" workers are those who pay social security contributions.

**Social transfers do not reduce income volatility at the household level either.** For some social transfers, eligibility is based on household rather than individual income.[18] Thus, it is also important to analyze whether social transfers can mitigate household income fluctuations, despite the limited role they play at the individual level. The data indicates that social transfers do not seem to play a major role at the household level either. While the share of households experiencing large income losses (14 percent) is naturally lower than the share of individuals facing such conditions (22 percent) both measures remain unchanged even after accounting for social transfers (Figure 25). This suggests that the current system of social transfers does not provide meaningful insurance at individual or household levels. Moreover, social transfers reduce only marginally the risk of households falling into poverty as a result of experiencing large income changes. Specifically, while before social transfers, 3.6 percent of the labor force falls below the poverty line following a large labor income loss, the probability decreases only slightly, to 3.5 percent after accounting for social transfers (Figure 26).

**Social transfers also play a marginal role in mitigating the sensitivity of individual income to aggregate income changes**. Worker's betas do not decrease significantly after adding social transfers to individual income (Figure 27). Consequently, individuals remained exposed to aggregate fluctuations even after receiving social transfers. This conclusion also holds for demographic groups whose income is more sensitive to aggregate fluctuations such as the younger, less educated, informal, and poor workers.

**Transfers deployed during the COVID-19 pandemic played a larger role than usual in mitigating income changes.** During 2020–21, governments temporarily raised social assistance spending to help households cope with the large negative shock[19]. The share of the labor force with large income losses decreased by 1.8 percentage points thanks to the social transfers, a considerably larger effect than the one observed pre-pandemic (Figure 28). However, the income losses caused by the pandemic remained large—with almost 25 percent of the labor force experiencing large income losses, 3 percentage points higher than the pre-pandemic level.

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[18] For example, means-tested transfers as minimum income programs typically base "means" on household income and assets (IMF, 2022).

[19] In addition, some countries (e.g., Chile, Peru) allowed workers to withdraw from their private pension funds.

**Figure 25. Fraction of the Labor Force with Large Individual and Household Income Losses: Before vs After Social Transfers**
*(Percent)*



Sources National authorities; and IMF staff calculations.
Note: Large income changes are defined as changes in real income greater than 25 percent in absolute value, both at the individual and household levels. Left bars refer to individuals, while right bars refer to cases where both individual and household income drop by at least 25 percent. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA4*. LA4* = Latin America 4 star (Argentina, Brazil, Chile, and Peru). Mexico is excluded due to data limitations on other income sources, including social transfers.

**Figure 26. Fraction of the Labor Force with Large Income Losses who Fall under the Poverty Line: Before vs After Social Transfers**
*(Percent)*
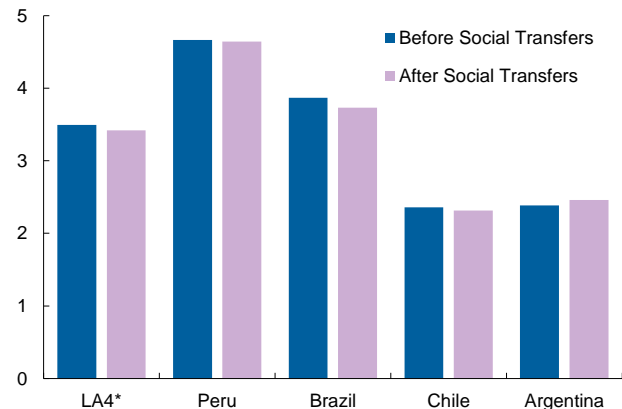


Sources: National authorities; and IMF staff calculations.
Note: Large income changes are defined as changes in real income greater than 25 percent in absolute value. Falling under the poverty line is defined as the worker's per-capita household income being above the absolute poverty line in the first year and below the poverty line in the next year. Aggregates are 2019 purchasing-power-parity GDP weighted average for LA4*. LA4* = Latin America 4 star (Argentina, Brazil, Chile, and Peru). Mexico is excluded due to data limitations on other income sources, including social transfers.

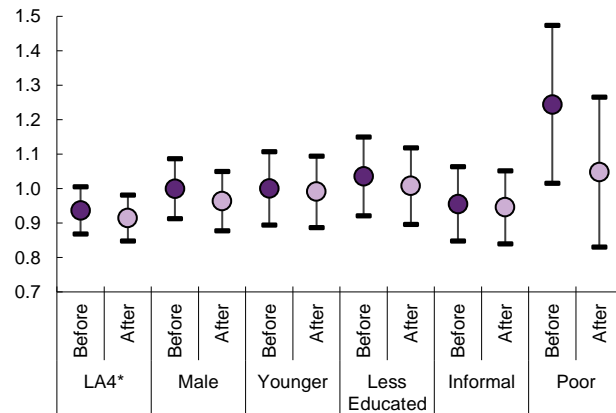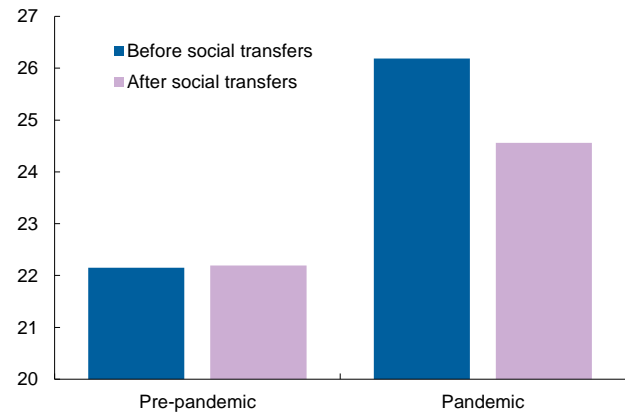**Figure 27. Worker Betas: Before vs After Social Transfers**
*(Percent)*



Sources National authorities; and IMF staff calculations.
Note: Large income changes are defined as changes in real income greater than 25 percent in absolute value. Pooled regression estimates for Argentina, Brazil, Chile, and Peru using 2019 purchasing-power-parity GDP weights are reported. Mexico is excluded due to data limitations on other income sources, including social transfers. "Younger" refers 14–39 years old, "Older" refers to 40–65 years old. "Less educated" are those who did complete secondary education, while all others are considered "more educated". "Formal" workers are those who pay Social Security Contributions, while the "informal" don not. "Poor" refers to individuals whose daily per capita household income is lower than US$ 6.85 a day (2017 purchasing-power-parity).

**Figure 28. Fraction of Labor Force with Large Income Losses: Before vs After Social Transfers**
*(Percent)*



Sources: National authorities; and IMF staff calculations.
Note: Large income losses are defined as negative changes in real income of at least 25 percent. Average for Argentina, Brazil, and Peru, using 2019 purchasing-power-parity GDP weights are reported. Mexico is excluded due to data limitations on other income sources, including social transfers. Pre-pandemic refers to the period 2012–2019 and Pandemic refers to 2020–2021.

**Limited unemployment protection coverage and lack of other social transfers designed to mitigate income fluctuations explain the low social insurance in Latin America.** First, the coverage of unemployment protection is very limited even for the formal sector (Figure 29, panels 1 and 2). Only 14 percent of the *formal* workers who become *unemployed* and experience large income losses receive an increase in transfers from unemployment protection. Most unemployed, especially those who have fragmented work histories and were informal workers, are not entitled to any sort of unemployment-related benefits as eligibility criteria require several months of formal

employment (UN 2016).[20] Second, although other social transfers have a higher coverage than unemployment protection (Figure 19) and therefore can potentially fill up the coverage gap, they do not respond promptly to large income losses. Only 4 percent of the labor force experiencing large labor income losses receives an increase in other social transfers (Figure 29, panel 1). Moreover, only 12 percent of the *informal* workers who become *unemployed* and experience large labor income losses receive an increase in other social transfers (Figure 29, panel 2), suggesting that other social transfers provide little protection against income volatility to workers who are not eligible for unemployment protection.

**Poor workers with large income losses seldom receive an increase in social transfers.** Among the *poor* who undergo large income losses, less than 2 percent benefit from a contemporaneous boost in unemployment protection and only 12 percent receive an increase of other social transfers (Figure 29, panel 3). Similarly, only few workers who *become poor* as a result of income losses are granted more generous social transfers. Transfers received seem to rarely adjust in periods of large income fluctuations, thus playing a limited role as social insurance even for the poor and workers who became poor after the income shocks.

**Figure 29. Fraction of Each Group with Large Income Losses Who Receive an Increase in Social Transfers**
*(Percent)*
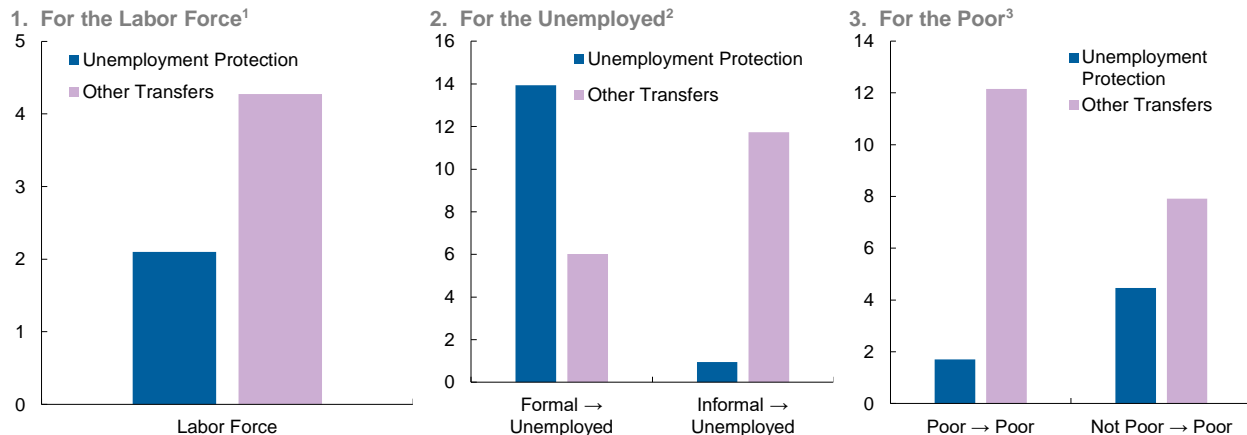


Sources: National authorities; and IMF staff calculations.
Note: Aggregates denote the average of Argentina, Brazil, Chile, and Peru in 2019 using purchasing-power-parity GDP weights. The charts depict, for each group, the share of individuals with large real labor income losses who receive an increase in social transfers. Mexico is excluded due to data limitations on other income sources, including social transfers.
[1]Panel 1 shows the fraction of labor force with large income losses who receive an increase in social transfers.
[2]Panel 2 shows the fractions for the unemployed who used to be formal workers (columns on the left) and unemployed who used to be informal workers (columns on the right).
[3]Panel 3 shows the fractions for the workers who were and are poor (columns on the left) and for workers who became poor (columns on the right).
"Poor" refers to people in poor households where daily per capita household income is lower than US$ 6.85 a day (2017 purchasing-power-parity).

# 4. Conclusion

Although Latin America has a long history of high aggregate volatility, macroeconomic volatility has decreased in recent decades, driven by lower volatility of domestic factors, partly reflecting better policies. The sensitivity of aggregate consumption to aggregate income shocks has also decreased, suggesting an improvement in aggregate insurance.

However, income volatility remains high at the individual level, especially for informal workers, and intra-household insurance is limited, implying there is room for social insurance to step in and protect the most vulnerable. Yet, despite the role of social transfers in reducing poverty, these transfers—including unemployment protection—play a limited role in mitigating individual income volatility, even for formal workers. Since unemployment protection has

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[20] See institutional details in Annex 5.

low coverage and other social transfers do not adjust sufficiently after large labor income losses, high labor income volatility poses a significant challenge especially to households that are in or at risk of poverty.

Latin American countries should revisit their social protection frameworks, seeking to mitigate income volatility for the labor force, especially for those who are in or at risk of falling into poverty, while being mindful of fiscal implications and incentive issues. In particular, the coverage of social insurance programs designed to mitigate income volatility such as unemployment savings accounts and unemployment insurance could be increased. For example, unemployment protection coverage is on average lower in LAC than in the rest of the world (ILO 2021).[21] In countries where the contribution period for unemployment insurance is long, the vesting period to be eligible could be shortened, so that more workers with fragmented formal employment histories could be insured. Governments can also rethink the design of social assistance programs so that they respond more quickly to income shocks. Moreover, the region would benefit from improving technical and administrative capacity to process social transfers (Brollo et al., forthcoming). For instance, boosting communication across government agencies would allow a better targeting of vulnerable households and a reduction in the overlap between various social transfer programs.

Social insurance schemes that protect not only the poor but also those who are at risk of falling into poverty will be crucial for maintaining social cohesion in a world of larger and more frequent shocks–such as those associated with climate change or geoeconomic fragmentation.

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[21] According to Figure 4.29 of ILO (2021), the effective coverage for unemployment protection is 12.5 percent in LAC, compared to 18.6 percent in the world.

# Annex 1. Data

## Aggregate Data Sources

We obtain data from the World Economic Outlook database on real GDP, nominal GDP, CPI, real consumption, and nominal consumption for Advanced Economies, LA, and EM's at an annual frequency. For the external variables, we use the WEO trade-weighted terms of trade from Gruss et al. (2020), the real interest rate defined as the difference between realized inflation and the fed fund rate, and the real GDP of Advanced Economies also from WEO. We detrend all the variables with a Hodrick-Prescott filter equal to 100.

Country groups are as follows. *Advanced Economies*: Australia, Austria, Belgium, Canada, Czech Republic, Germany, Spain, France, Israel, Italy, Japan, South Korea, Netherlands, Norway, Sweden, United States of America. *EM*: China, India, Indonesia, Thailand, Malaysian, Vietnam, Russia, Turkey, South Africa, Philippines. *LAC*: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Paraguay, El Salvador, Uruguay.

## Micro Data sources

The final dataset used in the analysis provides demographic, employment, and income data for short rotating panels. For most of the datasets used, individuals are followed only over five or six quarters, which is just enough to compute year-on-year monthly income changes, but insufficient to analyze the persistence or mean reversion patterns of income changes.

### Argentina

The dataset used for Argentina is the *Encuesta Permanente de Hogares* (EPH), which has interviewed households at quarterly frequency since 2003. The sample is constructed as a rotating panel with a scheme of 2-2-2, i.e., households are interviewed for two quarters in a row, they are then excluded for two consecutive quarters, returning to the sample for two more interviews. It provides demographic information, as well as monthly labor earnings and other income data, at both the household and the individual levels, allowing the computation of year-on-year monthly income changes. Unemployment protection in this case accounts for income from unemployment insurance and severance pay (*seguro de desempleo* and *indemnización por despido*).

### Brazil

For Brazil, two datasets are used: *Nova Pesquisa Mensal de Emprego* (NPME) and *Pesquisa Nacional por Amostra de Domicílios Contínua* (PNADC).[1] NPME is a sample survey conducted monthly since 2002 in six metropolitan areas: Belo Horizonte, Porto Alegre, Recife, Rio de Janeiro, Salvador and São Paulo. NPME is a panel survey, in which each household is interviewed 8 times over a 16-months period (the household is surveyed for 4 consecutive months, out for 8, and then returns for another 4 months of interviews). It provides data related to demographics, employment status, and monthly labor income for households and individuals, thus allowing to compute year-on-year monthly income changes.

PNADC is conducted at the national level since 2012 and interviews households in five consecutive quarters on topics relate to their employment and monthly labor income, thus allowing to compute year-on-year monthly income changes. Since 2016, approximately one third of the total sample is requested to provide information about other income sources on the first and last interviews. Data on severance pay and unemployment savings account is not available, thus unemployment protection accounts only for income from unemployment insurance (*seguro-desemprego* and *seguro-defeso*).

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[1] Both are provided by IBGE. Standardized cleaning procedure and the panel linkage method from Data Zoom by PUC-Rio.

### Chile

*Encuesta Suplementaria de Ingresos* (ESI) is collected every fourth quarter of each year as a complementary module of *Encuesta Nacional de Empleo* (ENE). Due to the rotating panel structure of ENE, a household is observed for two consecutive years in ESI, allowing us to observe year-on-year monthly income changes. It provides demographic information, as well as labor earnings and other income data at both the household and the individual levels. Data on severance pay is not available, so unemployment protection only includes *seguro de desempleo o cesantia*.

### Mexico

*Encuesta Nacional de Ocupación y Empleo* (ENOE) is a quarterly labor force survey with a rotating panel structure where one household is observed for 5 consecutive quarters, allowing us to observe year-on-year quarterly income changes. ENOE collects information on labor income from primary job, but no other income sources.

### Peru

We use the 2007–11, 2011–15, 2013–17, and 2017–21 panel samples of *Encuesta Nacional de Hogares* (ENAHO), which are collected annually. It provides demographic information, as well as labor earnings and other income data at both the household and the individual levels. Questions on income can refer to the previous month or the previous 12 months. We use the monthly equivalent income to calculate year-on-year monthly income change. Unemployment protection includes severance pay and *Compensacion por Tiempo de Servicios*.

## Main Variables and Sample

The main income variables used for analyzing individual income volatility are:

- Labor Income is computed as the sum of earnings from the primary occupation and secondary jobs, except for Mexico for which income from secondary occupations is not available.
- Income before social transfers includes labor income and other income sources like rents, investment income, capital gains, donations, and pensions.
- Income after social transfers is the sum of total income from labor, investment, rents, capital gains, pensions, and donations together with transfers. These include unemployment benefits, severance pay, and any other social transfers from the government. [2]

Annual real income growth is normalized by average income as follows:

$$\Delta y_{i,t} = \frac{y_{i,t} - y_{i,t-1}}{\frac{y_{i,t} + y_{i,t-1}}{2}}$$

where $y_{i,t}$ is the real income of individual $i$ in year $t$ and $\Delta y_{i,t}$ is bounded between -2 and 2. This approach allows including workers who did not have any income in period $t-1$. Income variables are deflated using national CPI.

Throughout the analysis we also focus on different demographic groups according to gender, age, education, type of employment, and household income level. We decompose workers into "female" and "male"; "younger" and "older" (14–39 years old and 40–65 years old); "more educated" and "less educated" (if hold a high school diploma or not); "formal" and "informal" workers (depending on whether workers pay social security contributions in $t-1$ or not); and "poor" and "not poor" households (if the average daily household income per capita is lower than US$6.85 a day (2017 PPP)).[3]

The sample used in the analysis consists of individuals who are in the labor force for two consecutive years, with age between 14 and 65 years old.

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[2] Income from other sources, including transfers, is not available for Mexico. Income from severance pay is not available for Brazil and Chile.

[3] To identify people living in poverty we use household income per capita, where the household income is computed as total income before transfers, expect for Brazil and Mexico where total labor income is used because the total income is available for a short time period or not at all.

## Annex 2. Decomposition of Aggregate Income Volatility

To decompose the variance of aggregate real income, we follow Raddatz (2007) and estimate the following data generating process:

$$y_{i,t} = \phi y_{i,t-1} + \beta Z_t + \epsilon_{i,t} \qquad (1)$$

$$Z_t = \rho Z_{t-1} + \epsilon_t^z \qquad (2)$$

where $y_{i,t}$ is the HP-filtered real income, $Z_t$ is a vector of world factors which are *exogenous to LAC economies:* US real rate, terms of trade, GDP US, Europe, and China; and $\epsilon_{i,t}$ is a domestic income innovation and $\epsilon_t^z$ is an innovation to the external variables. All variables are measured in deviations from the HP filtered long run trend.

Note that $y_{i,t}$ is the sum of two terms. First, an autoregressive component, $\phi y_{i,t-1}$, which we term as the *domestic component*. Second, a component driven by external variables $\beta Z_t$, which we term, the *external component*. Equations (1) and (2) constitute a reduced form Vector Autoregressive (VAR) model. The identifying assumption, which turns the reduced form VAR into a structural VAR, is that domestic shocks and external variables are uncorrelated, which is equivalent to: $\mathrm{E}(\epsilon_{i,t} \times \epsilon_t^z) = 0$. This assumption states that US GDP, Europe, China, US real rates and terms of trade, are determined outside of the 9 economies in LAC that we focus on and is an assumption that is commonly used in the literature.[1]

Computing the variance in both side of equations (1), given that the process for log deviations from trend is covariance stationary, and after rearranging terms, it yields a variance decomposition of $y_{i,t}$ into domestic and external factors, which is given by:

$$V(y_{i,t}) = \frac{\beta^2 \times V(\epsilon^z)}{(1-\phi^2)(1-\rho^2)} + \frac{V(\epsilon_i)}{(1-\phi^2)}.$$

The first term measures the external component of the variance of GDP and is the product of two terms: $\beta^2 \times V(\epsilon^z)/(1-\rho^2)$. $\beta$ is the regression coefficient, of $Z$, on the domestic's economy output $y_i$; $V(\epsilon^z)/(1-\rho^2)$ is the variance of the factor. For example, in the case of real interest rates, it will be the product of the factor loading for interest rates and the variance of interest rates. The variance of output can increase due to a higher component due to interest rates if either the factor loading increases, or the variance of the factor increases. The second term is the total variance of the domestic shock. Because output follows a persistence process, the impact on the variance of output is equal to the variance of the shock divided by the persistency.

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[1] See for example, Raddatz (2007), Fernandez Schmitt Grohe Uribe (2018), Fernandez Schmitt Grohe Uribe (2022),

## Annex 3. The Contemporaneous Response to Income Shocks

To quantify the response of consumption to income shocks, we follow the Instrumental Variables Approach from Campbell and Mankiw (1994). We estimate the following data generating process:

$$C_{i,t} = \beta Y_{i,t} + \epsilon_{i,t}^{C}$$

$$Y_{i,t} = \gamma Z_t + \epsilon_t^{Y}$$

where $C_{i,t}, Y_{i,t}$ are HP detrended log real consumption and income and $Z_t$ is a vector of world factors which are *exogenous to LAC economies:* US real rate, terms of trade, GDP US, Europe, and China. As in the variance decomposition the identifying assumption is that $\mathrm{E}\left(\epsilon_{i,t}^{C} \times Z_t\right) = 0$. In addition, the instrument needs to satisfy that $\gamma$ is different that zero, so that the instrument is relevant. Then, the objective is to consistently estimate the coefficient $\beta$ which is the contemporaneous response of consumption to income shocks.

In Figure 12, we present the results of the 2SLS estimation. First stage, log deviation of HP detrended (lambda 100) real output regressed on external variables (terms of trade, US and China log deviations from HP trend, real interest rate). $Y_{i,t} = \gamma Z_t + \epsilon_t^{z}$. Second stage, regression of consumption on predicted output. $C_{i,t} = \beta Y_{i,t} + \epsilon_{i,t}^{C}$. LA9 (BRA, MEX, CHL, COL, PER, URY, PRY, ECU, BOL). GDP weighted regression (weights purchasing-power-parity GDP weights).

## Annex 4. Worker Betas Methodology

Worker's betas ($\beta_Y$) à la Guvenen et al. (2017) measures the exposure of individual labor income to aggregate risk. Following the authors, the empirical approach is a pooled ordinary least squares (OLS) regression of individuals' real income growth on real GDP growth. First, for the country level regressions, our main regression specification is:

$$\Delta y_{i,t} = \alpha + \beta_Y \, \Delta Y_t + \epsilon_{i,t}$$

where $\Delta y_{i,t}$ is the yearly individual real labor income and $\Delta Y_t$ is the real GDP growth in year $t$.[1]

Next, the cross-country pooled specification is as follows:

$$\Delta y_{i,t,c} = \beta_Y \, \Delta Y_{t,c} + \gamma_c + \epsilon_{i,t,c}$$

where $\Delta y_{i,t,c}$ is the yearly individual labor income for individuals in country c, $\Delta Y_{t,c}$ is the GDP growth in year t for country c, and $\gamma_c$ are country fixed effects. Finally, to study which demographic groups are more exposed to aggregate risk, interaction terms are added to above mentioned regression.

When pooling countries together, for each country, the new individual weights are rescaled using the average total weights for each country and the 2019 purchasing-power-parity GDP value:

$$w_{it}^{New} = \frac{w_{it}}{\dfrac{\sum_{t=1}^{T} \sum_{i=1}^{N} w_{it}}{T}} * PPP \, GDP_{2019}$$

where $w_{it}$ are the individual weights for each worker $i$ and period $t$, provided by the labor force surveys.

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[1] These results are robust to using the growth rate of real aggregate labor income computed from the micro data instead of real GDP growth as the main regressor.

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