

Labor Market Dynamics and Informality over the Business Cycle in LAC¹

Labor markets in Latin America and the Caribbean (LAC) are characterized by high levels of informality, low female participation rates, and relatively rigid employment protection legislation. Our results show that informality plays an important role in the dynamics of labor markets in the region. Informality is countercyclical, and the formal/informal adjustment margin reduces the importance of the employment/unemployment margin, that is, informality dampens the usual Okun's coefficient relating unemployment to cyclical changes in GDP. However, evidence suggests that informality makes the adjustment to shocks slower, with negative impact on growth. We find that higher redundancy costs, cumbersome dismissal regulations and high minimum wages are associated with increased informality. Also, changes in aggregate participation rates are positively related to changes in GDP, but we find some evidence that the female participation rate is countercyclical in recessions in LAC.

Introduction

Labor markets in Latin America are characterized by high levels of informality, low female participation rates and rigid employment protection legislation. Informality has declined in LAC labor markets but continues to be a feature of roughly half the level of employment in the region (Kugler, 2019 and World Bank, 2019). Informality is driven by trends in income per capita and education of the labor force (La Porta and Shleifer, 2014), as well as by strict labor regulations and taxation, but it also serves as a buffer for cyclical fluctuations in activity (Lambert, Pescatori and Toscani, 2019, Perry et al., 2007 and references therein). It is then critical to understand the drivers of the performance of LAC labor markets, the economies' adjustment to shocks and productivity growth.

The chapter studies the role of informality in affecting the response of demand and supply forces in the labor market, in particular for fluctuations in employment and unemployment. This is done in a context where the strong trend decline in informality during the commodity price super-cycle seems to have been halted by the region's tepid recovery, highlighting the importance of measuring the relative contributions of trend and cyclical drivers of labor market forces. To this end, the chapter begins by describing some stylized trends on slow-moving factors to then explore the role of informality and its determinants on cyclical labor market dynamics.

The chapter finds that the limited cyclical fluctuations in unemployment are to a large extent explained by larger countercyclical variations in informality—and to a lesser extent, to variations in participation rates. Informality is associated with high and uncertain redundancy costs, as well as with high minimum wages relative to workers productivity. Moreover, high informality lowers the speed of adjustment of the economy to shocks, hampering labor productivity growth. The chapter concludes with some reflections on whether and how to go about reducing informality in labor markets.

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Some Stylized Trends

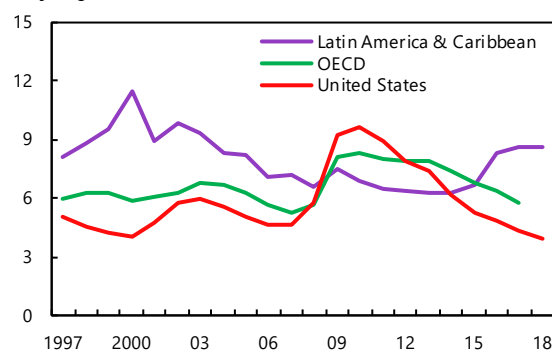
Unemployment

Unemployment has been on a downward trend since the turn of the century, reaching a trough with the commodity price bust and starting to creep up since then (Figure 1, panel 1). The regional variance is large, with Brazil's sharp recession of 2015–16 pushing the regional average up over the last three years. While Argentina and Uruguay saw increases in unemployment since the commodity price bust, most other countries experienced almost no changes in unemployment—with Mexico reaching historical lows (Figure 1, panel 2).

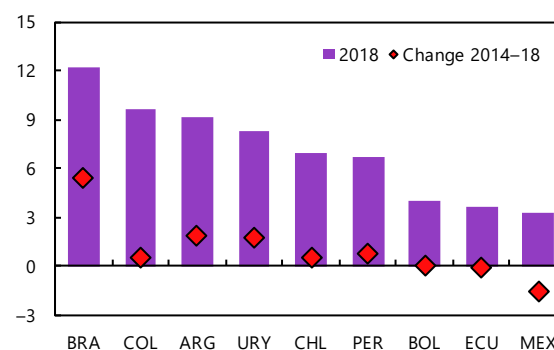
Figure 1. Unemployment Rate

(Percent)

1. By Region



2. Selected LAC Economies



Sources: IMF, World Economic Outlook database; World Bank, World Development Indicators database; and IMF staff calculations.

Note: Data labels use International Organization for Standardization (ISO) country codes. LAC = Latin America and the Caribbean; OECD = Organization for Economic Cooperation and Development.

Informality

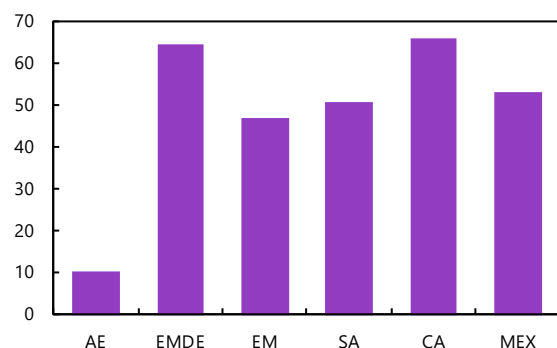
Informality in Latin America accounts for over 50 percent of total employment (Figure 2, panel 1), in line with the levels observed in emerging and developing economies, but it is significantly higher than in advanced economies (AEs).² Even within Latin America, the degree of heterogeneity is large, with labor informality ranging from around 30 to 70 percent among the largest economies.

Figure 2, panel 2 shows that labor informality has generally decreased as countries' income levels rose (see also de la Torre, Messina and Pienknagura, 2015, and Messina and Silva, 2018). Mexico is a notable exception, where despite higher GDP per capita informality has actually increased (Levy, 2018). But even for the same level of income, there are important differences in labor informality between countries, suggesting that other factors are also at play. Specifically, Peru and Mexico, but also Argentina, do worse than other countries solely based on their level of development.

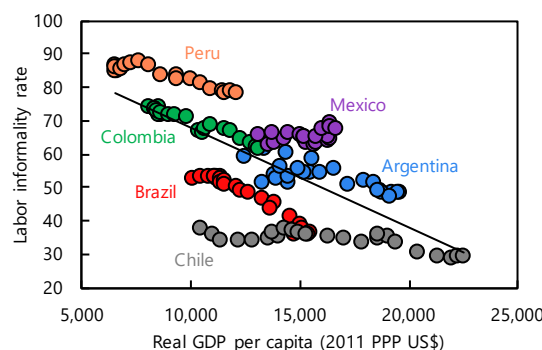
²The definition of informality used in the chapter varies by data source. Cross-sectional labor informality data comes from the ILO (with focus on the share of informal employment in total non-agricultural employment). Time-series labor informality data for Latin American countries comes from the IDB's SIMS database, which uses pension contributions as the criterion for formality. In the ILO dataset, the informal employment status of the job is determined by among other criteria the informal sector nature of the enterprise (ILO, 2018). Informal firms are unregistered and/or small-scale private unincorporated enterprises.

Figure 2. Labor Informality
(Percent)

1. By Country Group



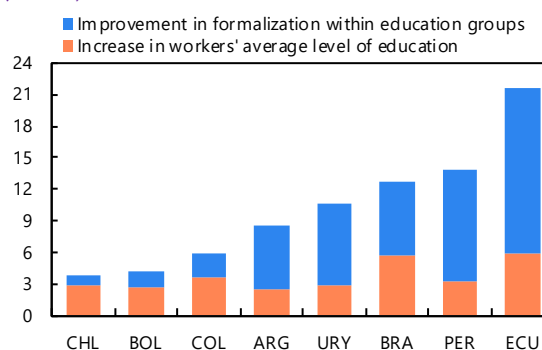
2. By Country



Sources: International Labour Organization (ILOSTAT) database; Inter-American Development Bank, Labor Markets and Social Security Information System (SIMS) database; and World Bank, World Development Indicators database.

Informality has also decreased as a result of an increase in the level of skills of the labor force. Informality is lower for workers with higher—say, tertiary—education levels, and as the overall skill level of the population grows, more jobs are filled by workers with higher skills in the formal sector. A simple counterfactual exercise, keeping the initial shares of employment by skill level constant over time, suggest two distinct pattern of formalization gains (Figure 3): (i) countries such as Bolivia, Chile and Colombia, where formality increased largely as a result of improvements in education, i.e. increases in the share of skilled workers; and (ii) others such as Peru and Ecuador where larger formalization gains occurred within education/skill levels.

Figure 3. Decomposing Formalization Gains
(Percent)



Sources: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank); and IMF staff calculations.
Note: The period used are as follows: Argentina, Ecuador, Uruguay (2006–17); Bolivia (2007–17); Brazil, Chile (2006–15); Colombia (2008–17); Peru (2006–16).

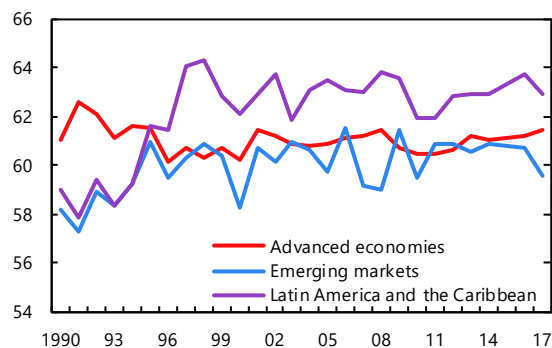
Labor Force Participation

The labor force participation rate has increased in LAC since the 1990s, despite a noticeable reduction in recent years linked to the downturn in several economies in the region. Since the early 2000s, the participation rate in LAC tends to be somewhat higher than what is observed for the typical emerging market or advanced economy (Figure 4, panel 1). Perhaps more striking is the gap between female and male participation (Figure 4, panel 2). Despite a steady increase in female participation rates over the last three decades, the differences remain large (and much larger than in AE) and closing this gap could be an important avenue to boost potential growth in the region (Novta and Wong, 2017).

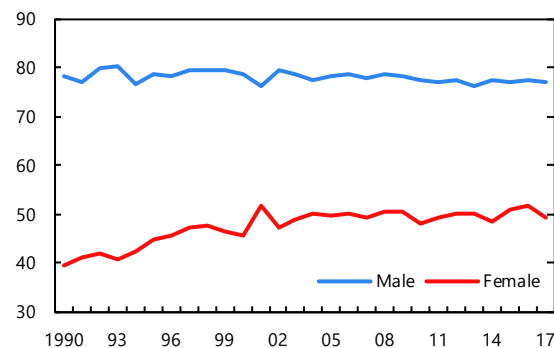
When considering labor force participation by age groups, it is interesting to note that participation for the median country has increased in the 25–64-year segment from about 71 percent to about 79 percent over the period going from the mid-1990s to 2017. In contrast, labor participation for younger population (15–24), dropped by 6 percentage points over the same period. This might be explained by a higher proportion of young people attending school and goes in line with the increase in the education level of the labor force that contributed to the decline in informality in some countries.

Figure 4. Labor Force Participation Rates
(Percent; median)

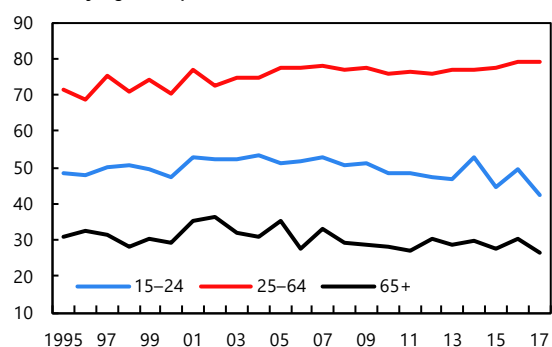
1. By Country Group



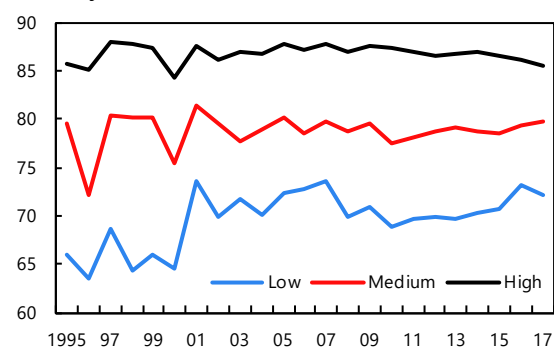
2. LAC: By Gender



3. LAC: By Age Group



4. LAC: By Education Level



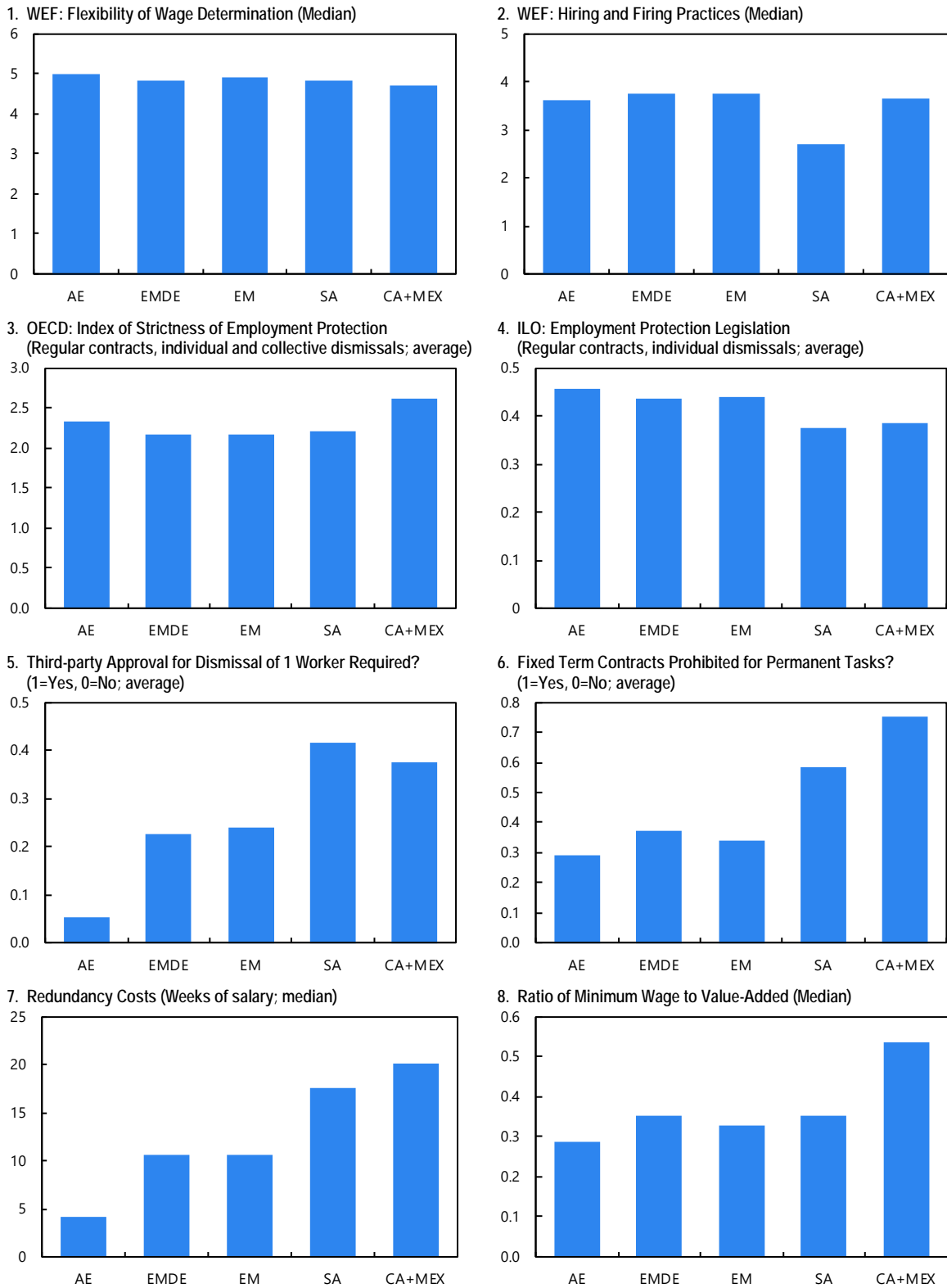
Sources: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank); World Bank, World Development Indicators based on national estimates; and IMF staff calculations.
Note: LAC = Latin America and the Caribbean.

A finer look at adults in the 25–64-year segment across education groups suggests that further increases in participation rates in LAC are likely in coming years. Participation among adults with low educational attainment increased approximately 6 percentage points in the last 20 years, (from 66 percent in 1995 to 72 percent in 2017) while that among adults with medium and high educational attainment was virtually unchanged over the same period. At approximately 87 percent, adults with high educational attainment display the largest participation rates of all education groups, suggesting that further education gains may provide an extra boost to participation.

Labor Market Institutions

Labor market institutions are multidimensional and not easily described by any set of indicators. Nevertheless, to provide an overview, we focus on a few key perceptions-based indicators (PBIs) and indicators aiming to quantify laws and regulations (L&Rs). Figure 5, panels 1 and 2 show two PBIs from the World Economic Forum’s executive survey on labor markets (WEF, 2018). While the *flexibility of wages* is evaluated to be very similar in the whole of Latin America compared to other country groups, *hiring and firing* practices in South America are perceived to be substantially more rigid than everywhere else.

Figure 5. Labor Market Rigidity Across Country Groups



Sources: World Economic Forum, Global Competitiveness Index; World Bank, Doing Business Indicators; Organization for Economic Co-operation and Development, Employment Protection; and International Labour Organization, EPLex.
 Note: All values are for 2017, except for EPLex data (values are for 2010) and OECD EPL (values are for 2013).

Figure 5, panels 3 and 4 show summary indicators of employment protection laws and regulations. Perhaps surprisingly, they do not show that South America has stronger employment protection legislation (EPL) than elsewhere. Nevertheless, Latin American labor markets do exhibit noticeable rigidities in *some* key dimensions. Redundancy costs, measured in number of weeks of salaries, are higher than in AEs or other EMDEs (see Lambert and Toscani, 2018), dismissal of even one worker often requires third-part approval, and permanent contracts are mandatory for permanent tasks in many countries. These indicators suggest a high level of *de facto* job protection for formal, permanent jobs.

Figure 5, panel 8 shows the ratio of the minimum wage to value added to gauge how binding the minimum wage is. The cross-country comparison provides little evidence that the minimum wage is more binding in South America than in other regions, but Central America stands out as having a very high ratio.

Decomposing Unemployment Dynamics

Unemployment in the region has been relatively stable over the commodity price super-cycle, as fluctuations in the demand for labor have been met to a large extent by fluctuations in participation and formalization. This section uses a simple approach to decompose changes in unemployment for the largest countries in Latin America into different margins of adjustment on the supply and demand side.³ More specifically, changes in unemployment relative to a reference period can be decomposed as follows (for details see David, Lambert, and Toscani, 2019):

$$u - u^* \approx -(l_F - l_F^*) + (f - f^*) + (part - part^*) + (wap - wap^*) \quad (1)$$

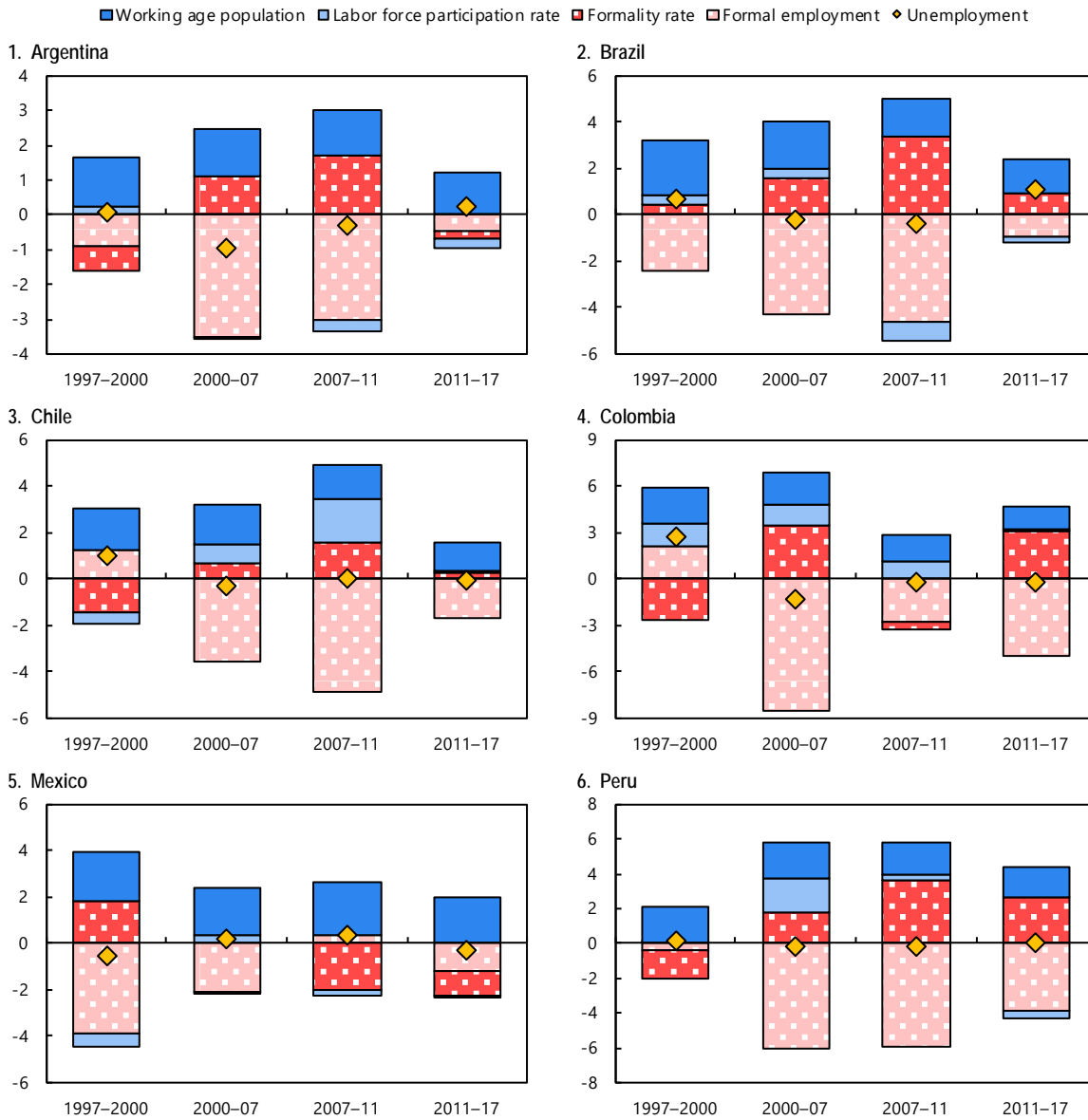
where u denotes the unemployment rate; $part$ is the labor force participation rate; wap working-age population; l_F is the logarithm of formal employment and f is the logarithm of the ratio of formal to total employment (* indicates the value of a variable at the beginning of the period). In this set-up, changes in labor supply are captured by changes in the participation rate and working age population.

The labor participation rate has been an active margin of adjustment, mitigating fluctuations in unemployment, while working age population growth has been largely stable across countries and time-periods (Figure 6). In Chile, Colombia and Peru, in particular, the participation rate increased strongly during the boom years, but has stopped growing in the most recent period, with substantially weaker output growth, cushioning the rise in unemployment.

Labor formalization has also played a crucial role in limiting movements in unemployment in Latin America. Figure 6 illustrates that for most countries in the region during the commodity price boom (2000–11), formal employment increased substantially (the pink bars), but rather than lowering unemployment this led to the formalization of jobs (the red bars)—with the exception of Mexico. Consider the case of Colombia, for example. During the boom of the early 2000s, informality fell sharply, only to resume its role as a shock absorber during the Global Financial Crisis (GFC). In the years since 2011 informality has continued to fall, implying that the unemployment rate did not fall as much as it would have otherwise. Similar counter-cyclical properties of informality, a feature that will be discussed in more detail in the next section, can be observed in Argentina, Chile and Peru. In particular, Chile in 2007–11 shows how a strong increase in formal labor demand was met, in roughly equal shares, with increased participation and a reduction in informality for a stable unemployment rate.

³Labor force, working age population, employment and unemployment data from the ILO. Output data is from the IMF's World Economic Outlook database and informality data from the IDB.

Figure 6. Decomposing Changes in Unemployment



Source: David, Lambert, and Toscani (2019).

The more recent period, that coincides with the bust in commodity prices, shows a somewhat more uneven pattern. The largest countries, Brazil and Mexico, show a lack of adjustment along the informality margin—in Brazil, informality continued to fall over 2012–17 even as unemployment increased strongly, while in Mexico informality has increased since the early 2000s, even though the unemployment rate was low and even fell in recent years. Peru and Colombia continued with strong formalization trends—in the latter aided by an important reduction in payroll taxes (see the Symposium on Colombia’s Tax Reform in the Fall 2017 issue of *Economía*⁴)

⁴The papers include Kugler, Kugler, and Herrera-Prada (2017), Bernal et al. (2017), Morales and Medina (2017), and Fernandez and Villar (2017).

Labor Market Dynamics over the Cycle

The previous section highlights the limited average annual fluctuations in unemployment over the various phases of the business cycle, as well as the larger fluctuations in informality and participation, stressing the need to look at a broader set of labor market outcomes to assess labor market performance when studying Latin American countries. In this section we use heterogeneous panel regressions to assess how unemployment, employment informality and labor force participation move over the business cycle in LAC countries. This approach allows slope coefficients to vary across countries and deals with possible cross-sectional dependency through the inclusion of common factors in the estimation. The sample includes both emerging and advanced economies. The empirical specification can be summarized in equation 2 for $i = 1, \dots, N$ countries; and $t = 1, \dots, T$ time periods.

$$\begin{aligned}\Delta Z_{i,t} &= \beta_i \Delta y_{i,t} + \gamma_i \Delta y_{i,t-1} + \theta_i \Delta y_{i,t-2} + \mathcal{G}_{i,t} \\ \mathcal{G}_{i,t} &= \alpha_i + \sum_{m=1}^p \lambda_{i,m} f_{m,t} + \varepsilon_{i,t}\end{aligned}\quad (2)$$

where ΔZ is either the change in the unemployment rate, the informality rate, or the participation rate between periods $t-1$ and t depending of the application of interest; $\Delta y_{i,t}$ is the change in the log of output (real GDP) between periods $t-1$ and t , α_i are country-specific fixed-effects capturing country characteristics that do not change over time; and $f_{m,t}$ are common factors that affect all countries and change over time. These common factors are not directly observable and their factor loadings (λ_i) can be country-specific. One reason why accounting for such factors may be important is the possibility that for example, technological changes or movements in global financial conditions, which are common across countries, could affect the relationship between unemployment and output. ε_{it} is the error term, which is assumed to be white noise.

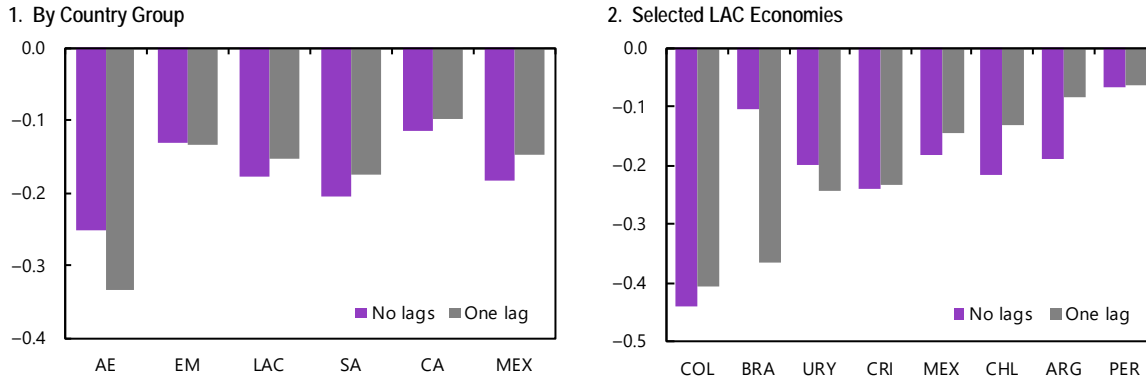
Standard panel estimators usually treat the slope coefficients (β, γ, θ) as homogeneous across countries. In addition, estimators traditionally used in panel data analysis require the assumption of cross-sectional independence across panel members. In the presence of cross-sectionally correlated error terms, these methods do not produce consistent estimates of the parameters of interest and can lead to incorrect inference (Kapetanios, Pesaran and Yamagata, 2011). In order to address these potential problems, we use the common correlated effects (CCE) estimator proposed by Pesaran (2006). This estimator uses cross-sectional averages of the dependent and independent variables as proxies for unobserved common factors in the regressions.

Okun's Law

Okun's law relates changes in output to short-term changes in unemployment. To compare how the observed fluctuations in unemployment vary over the business cycle in LAC with other EMs and AEs, this section presents estimates of Okun's law for a broad panel of countries and subsequently explores the cross-country variation of estimated coefficients to gain insights on how key structural characteristics or labor market policies affect the responsiveness of unemployment to output growth.

Unemployment responds less to output fluctuations in developing countries than in advanced economies, and LAC countries confirm this pattern. Figure 7 presents the results obtained when estimating different versions of Okun's law using the CCE estimator described above with annual data for 127 countries over the period 1990 to 2017 (the panel is unbalanced, and data availability varies by country). Coefficients for LAC are somewhat larger than for EMs, except for Central American economies but are smaller than in advanced economies (see Ball, Leigh, and Loungani, 2017 for evidence on AEs).

Figure 7. Unemployment's Responsiveness to GDP Changes
(Okun's coefficient; average)



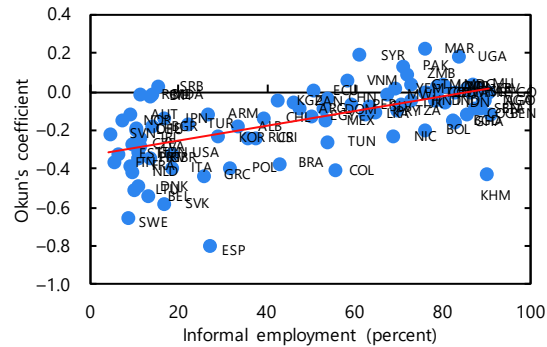
Source: IMF staff calculations.
Note: Data labels use International Organization for Standardization (ISO) country codes. AE = advanced economies; CA = Central America; EM = emerging markets; LAC = Latin America and the Caribbean.; SA = South America.

The high level of informality is the main factor behind smaller Okun Law coefficients in EMs and in particular in LAC countries. Figure 8 shows the strong and clear link between the Okun's coefficient and the level of informality in the labor market (measured by the share of informal employment on total non-agricultural employment).⁵ The response of unemployment to cyclical variations in output is weaker when levels of informality are higher (with informality accounting for 36 percent of the cross-country variation). This result suggests that entry and exit into the informal sector acts as a margin of adjustment to cyclical fluctuations in line with the findings of David, Lambert and Toscani (2019).

As these authors show, other institutional characteristics of the labor market do not seem to affect the response of unemployment to output—except perhaps for perceptions regarding the flexibility of wages indicator from the World Economic Forum's Global Competitiveness Report.

Note that the above results say nothing about the desirability or not of a greater sensitivity of unemployment to the cycle. As highlighted by Ahn et al. (2019), in the absence of unemployment insurance or an adequate social safety, a greater unemployment responsiveness to growth could indeed reduce rather than increase welfare. In the same vein, Loayza (2018) argues that a low elasticity of unemployment to GDP growth, which appears to be tightly associated with informality, can mitigate the adverse social impacts of recessions (increased poverty and crime).

Figure 8. Informal Employment versus Okun's Coefficient



Source: International Labour Organization (ILOSTAT) database; and IMF staff calculations.

⁵The measure of informality used is based on the latest available year for a given country of the indicator presented in ILO (2018). This source was chosen because of the availability of cross-country data for this indicator, which far exceeded alternative sources.

Informality over the Cycle

Informality exhibits a clear countercyclical behavior across the sample of LAC countries. In this section we confirm with econometric analysis what was suggested by the decompositions exercise above and by the literature (e.g., Loayza and Rigolini, 2011). Table 1 presents the results for specifications using the CCE estimator and including lags of GDP growth.⁶ Moreover, it is interesting to note that the cyclical behavior of informality is quantitatively larger than the one of unemployment: for every additional percentage point of GDP growth, the unemployment rate falls on average by around 0.17 points (Figure 7) while the informality rate falls by 0.3 percentage points.

Table 1. Responsiveness of Informality to Output Fluctuations

	(1)	(2)	(3)
	Δ Informality	Δ Informality	Δ Informality
Δ GDP _t	-0.209*** (0.0543)	-0.266*** (0.0743)	-0.261*** (0.0757)
Δ GDP _{t-1}		-0.0607* (0.0325)	-0.0553 (0.0419)
Δ GDP _{t-2}			0.00315 (0.0547)
Constant	0.178 (0.247)	0.283 (0.388)	0.215 (0.587)
Observations	356	356	356
Countries	17	17	17

Source: IMF staff calculations.

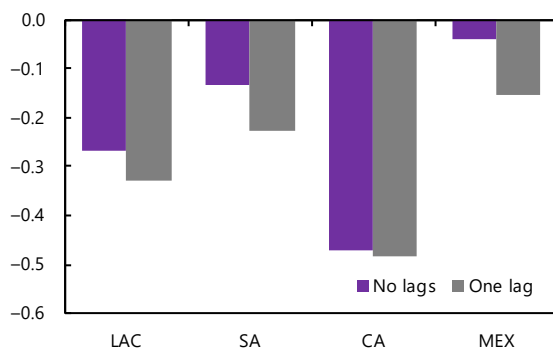
Note: Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

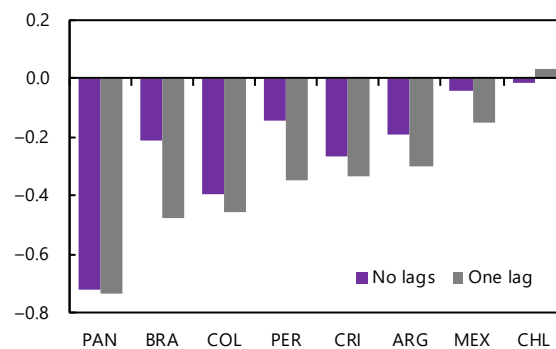
Figure 9 illustrates the heterogeneity of estimated coefficients across sub-regions and countries. Informality rates tend to vary more with the cycle in Central American countries and in Mexico compared to South America. The case of Chile is noteworthy, as informality does not seem to vary much with the cycle, in contrast to other countries in the region.

Figure 9. Informality's Responsiveness to GDP Changes
(Average country coefficient)

1. By Country Groups



2. Selected LAC Economies



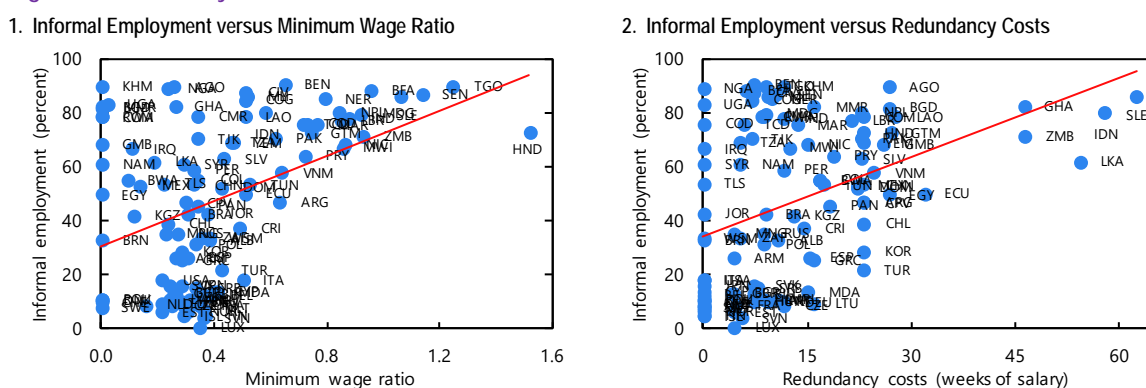
Source: IMF staff calculations.

Note: Data labels use International Organization for Standardization (ISO) country codes. CA = Central America; LAC = Latin America and the Caribbean.; SA = South America.

⁶Throughout this chapter, the tables presenting the results of CCE estimations show the average coefficients and standard deviations. Because of data availability constraints, especially in the time dimension, we focus exclusively on LAC countries for these specifications.

Although informality seems to be a sufficient statistic for the labor market features that mitigate the responses of unemployment to cyclical fluctuations in output, labor market regulations and taxes do determine the level of informality. David, Lambert, and Toscani (2019) study this issue in a multivariate regression setting that controls for the level of real GDP per capita and the level of education, variables that are deemed to be important determinants of informality in the literature, as well as other indicators of labor market institutions. These authors find that redundancy costs and a variable capturing whether a third-party approval is required to dismiss workers are significant correlated with informality levels. Figure 10 presents the links between informality measured as the ratio of informal employment over total non-agricultural employment⁷ and two indicators of labor market institutions, namely: redundancy costs (in weeks of salary) and the ratio of the minimum wage to value added per worker.⁸

Figure 10. Informality and Labor Market Characteristics



Sources: World Bank, Doing Business Indicators database; and IMF staff calculations.
 Note: Data labels use International Organization for Standardization (ISO) country codes.

Informality is also affected by the extent to which labor market regulations are enforced in practice. Put simply, similar (stringent) labor market regulations may be less binding in countries with weak government enforcement than in countries with strong enforcement. To explore the impact of the strength of a government’s enforcement capacity on informality we follow a similar approach as Caballero et al. (2013), who distinguish between *de jure* and *de facto* labor market regulations by interacting regulations with a proxy of government enforcement. We study the effects of regulations affecting job security and minimum wages. The results confirm the positive correlation between regulations that increase job security and the minimum wage with informality rates (Table 2), especially when these regulations are more strictly enforced.⁹

⁷As before, the measure of informality is based on the latest available year for a given country of the indicator presented in ILO (2018) for a large cross-section of countries.

⁸As in previous sections, we rely on data from the World Economic Forum’s Global Competitiveness Report and the Doing Business indicators databases for these variables. We use values for 2016. The results do not change substantially if average values of the indicators over the sample period are used.

⁹The link between informality rates and *de facto* regulation is also studied in Finkelstein Shapiro (2015). Importantly, the results on Table 2 highlight the complex interaction between institutional quality and informality. As highlighted by Finkelstein Shapiro (2015) and Loayza et al. (2005), to the extent that they increase GDP and formal job growth, stronger institutions can lead to lower informality. This is captured by the positive coefficient of the government effectiveness proxy, which is correlated with other measures of institutional quality. On the other hand, improvements in government effectiveness can exacerbate the effects of regulation on informality, as shown by the interaction term in the table.

Table 2. Informality and de facto Labor Market Regulations

	(1)	(2)	(3)	(4)	(5)
Job security	0.148*** (0.0347)		0.154*** (0.0356)	0.0123 (0.0331)	
Job security*Government effectiveness				0.102** (0.0481)	
Government effectiveness				-0.547*** (0.0648)	-0.557*** (0.0606)
Minimum wage/Labor productivity		0.0704* (0.0417)	0.0961** (0.0398)		0.0390 (0.0281)
Minimum wage/Labor productivity * Government effectiveness					0.392** (0.154)
Constant	0.307*** (0.0468)	0.112 (0.205)	-0.185 (0.206)	0.703*** (0.0511)	0.502*** (0.143)
Observations	108	104	102	105	101
R-squared	0.146	0.027	0.179	0.620	0.574

Source: IMF staff calculations.

Note: Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Labor Force Participation over the Cycle

As noted in earlier, labor force participation (aggregate and by gender) also moves pro-cyclically. Table 3 presents the results of regressions of changes in the labor force participation rate (total participation as well as male and female participation considered separately) on changes in GDP using the CCE estimator.¹⁰

Table 3. Labor Force Participation Responsiveness to GDP Changes

	(1) Total	(2) Total	(3) Male	(4) Male	(5) Female	(6) Female
ΔGDP_t	0.0287** (0.0134)	0.0222* (0.0125)	0.0355*** (0.0117)	0.0246** (0.0113)	0.0114 (0.0149)	-0.00360 (0.0142)
ΔGDP_{t-1}		0.0123 (0.0121)		0.00111 (0.0111)		0.00298 (0.0123)
Constant	0.0905 (0.118)	0.0351 (0.146)	-0.197* (0.110)	-0.286* (0.154)	0.144 (0.102)	0.185 (0.138)
Observations	3,103	3,084	3,093	3,074	3,093	3,074
Countries	122	122	122	122	122	122

Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).

Note: Standard errors in parentheses. Coefficient averages computed as outlier-robust means.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

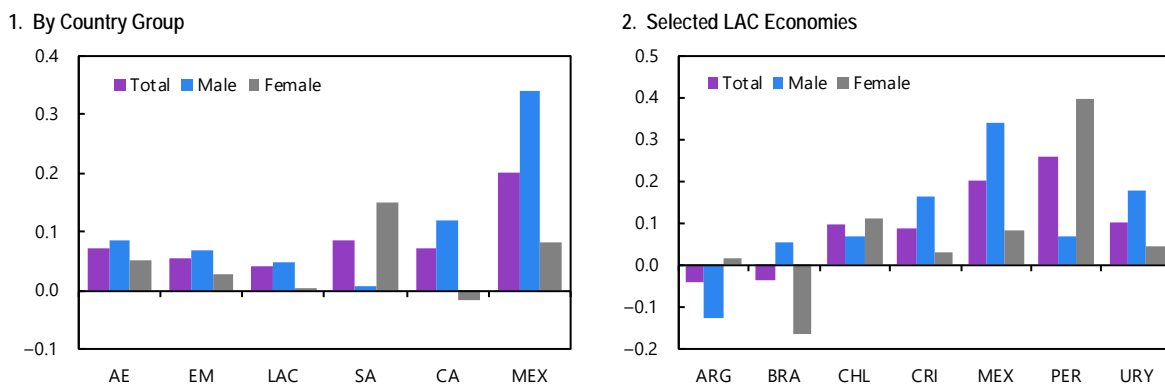
Aggregate participation rates are also procyclical, as illustrated in the decompositions discussed in previous sections and in line with the evidence presented for advanced economies in Grigoli, Koczan, and Topalova (2018) and IMF (2018) (see Table 3). The sensitivity of participation rates to changes in output tends to be somewhat smaller than what is typically observed for the unemployment rate or the informality rate, indicating that this margin of adjustment tends to play a more limited role. In Annex 1

¹⁰We study these fluctuations following the same heterogenous panel approach used to analyze Okun's law and informality rates. The regressions were estimated using annual data from the World Bank's World Development Indicators database for 122 countries over the period 1990 to 2017 (the panel is unbalanced, and data availability varies by country).

we also present results of regressions using information from the IDB’s SIMS database for the share of active population on total working age population for countries in LAC (in this case, the breakdown by gender is not available). The results also point to procyclical participation rates in the region, but estimated coefficients tend to be larger when compared to the broader sample of countries reported in Table 3.

Moreover, the regressions suggest that the responsiveness of participation rates to cyclical fluctuations seems to be mainly due to changes in male participation rates, whereas female participation rates tend to be less elastic. Nevertheless, as illustrated in Figure 11, there is significant heterogeneity across countries. Female participation rates seem to be less responsive to GDP fluctuations in LAC countries when compared to AEs or other EMs. Within the region, female participation rates in Chile and Peru seem to be more responsive to the cycle than elsewhere, and they are less responsive in Caribbean countries.

Figure 11. Labor Force Participation’s Responsiveness to GDP Changes
(Coefficient; average)



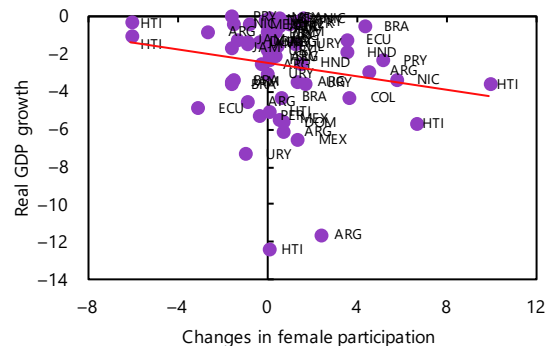
Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).
Note: Data labels use International Organization for Standardization (ISO) country codes. AE = advanced economies; CA = Central America; EM = emerging markets; LAC = Latin America and the Caribbean.; SA = South America.

Novta and Wong (2017) have noted that while female participation rates tend to move slowly over time, they may respond countercyclically to large short-term changes in GDP, especially during deep recessions. In this case, participation would typically increase as an insurance mechanism to income lost by other household members. A survey of the empirical literature by these authors indicates that female participation increased in Argentina, Mexico, and Peru during past crises in the 1980s and 1990s.

Figure 12 presents a simple scatter plot of changes in GDP and changes in female participation rates in LAC countries since 1990 focusing exclusively on periods in which GDP growth has been negative. The figure suggests a negative association between these variables, indicating that female participation tends to increase in a countercyclical way during crisis times.

We find that while the response of female participation to changes in GDP is not significant for the full sample of countries, for the sample of LAC economies the coefficient is negative and statistically significant. This indicates that as GDP

Figure 12. Changes in Female Participation in LAC during Downturns



Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).

downturns are more severe (more negative numbers), the female participation rate increases i.e. it moves in a countercyclical way.¹¹

To further assess the countercyclicality of female labor force participation during difficult times, we estimate standard fixed-effects panel regressions of changes in female participation on changes in GDP focusing exclusively on periods of economic downturns, simply defined as periods in which GDP growth is negative. The results are presented in Table 4. We report results for the full sample of countries and also focusing on LAC economies exclusively.

Table 4. Female Labor Force Participation Responsiveness to GDP Changes During Downturns

	(1)	(2)
	Full Sample	LAC Only
	Δ Female Participation	Δ Female Participation
Δ GDP _t	-0.0121 (0.00896)	-0.355** (0.139)
Constant	0.0366 (0.362)	-0.323 (1.013)
Country fixed-effects	Yes	Yes
Time fixed-effects	Yes	Yes
Observations	423	63
Countries	103	16

Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).

Note: Driscoll-Kraay standard errors in parentheses. Coefficient averages computed as outlier-robust means.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Previous research has also shown that participation rates are also responsive to labor market institutions and policies (Grigoli, Koczan, and Topalova, 2018). In particular, higher labor tax wedges and more generous unemployment benefits are linked to lower participation in labor markets. In addition, female participation is significantly affected by policies that help balance work with household tasks, such as better access to childcare, maternity leave, and flexible work arrangements.

Labor Market Flexibility, Adjustment, and Growth

A flexible labor market is critical for the adjustment of the aggregate economy to shocks and thus for growth. The economic and social costs of shocks depend on a country's ability to (i) mitigate their immediate impacts and (ii) to revert swiftly to its potential in the aftermath. The former is typically associated with the use of macroeconomic stabilization tools. The latter depends on the use of macro instruments and on the presence of microeconomic frictions that cause shocks to have protracted economic effects that amplify their welfare costs.¹² Thus, understanding the factors underpinning a country's speed of adjustment to shocks is crucial to assessing its macroeconomic performance.

This section, based on David, Pienknagura and Roldos (2019), expands the analysis by studying the response of employment growth to shocks that lead to deviations from *equilibrium* employment levels.

¹¹Gasparini and Marchionni (2017) find a countercyclical female participation using microdata for a sample until 2012.

¹²Blanchard and others (2014) argue that labor institutions are critical for an efficient and equitable adjustment process. The key institutions for macro-flexibility are minimum wages and collective bargaining, while EPL and unemployment insurance are key for micro-flexibility—the ability of the economy to reallocate workers across sectors.

The focus will be on the speed of adjustment of employment, its determinants and relation to productivity growth.

Macro-Flexibility and the Speed of Adjustment

Assuming that the equilibrium level of employment is related to GDP, the speed of adjustment can be estimated using an error-correction model (ECM) that, as previous sections, employs the heterogeneous panel approach proposed by Pesaran (2006). The empirical specification can be summarized in equation 3 for $i = 1, \dots, N$ countries; and $t = 1, \dots, T$ time periods.

$$\begin{aligned} \Delta e_{i,t} &= \beta_i \Delta y_{i,t} + \alpha_i (e_{i,t-1} - \theta_i y_{i,t-1}) + \vartheta_{i,t} \\ \vartheta_{i,t} &= \alpha_i + \sum_{m=1}^p \lambda_{i,m} f_{m,t} + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where Δ is the difference operator, e_{it} is log employment and y_{it} is log GDP. The parameter β_i captures the response of employment growth in country i to GDP shocks, the parameter θ_i is the long-run elasticity of employment to GDP, and α_i is the speed of adjustment parameter.¹³ The unobserved parameters $f_{m,t}$ and $\lambda_{i,m}$ capture common factors and their loadings, respectively.

As expected, employment growth is positively correlated with contemporaneous GDP growth (the coefficient for GDP growth) and it is negatively correlated with “excess” employment (defined as employment levels above those predicted by GDP levels), evidence of reversion to the long-run employment-GDP relationship. Table 5 shows the results of the estimation of equation 3 for 127 countries over the period 1990 to 2017.¹⁴

Table 5. Common Correlated Effect Error-Correction Model of Employment

	(1)	(2)	(3)
	Number of lags of the cross-sectional averages		
	No lags	1 lag	2 lags
Lagged log employment	-0.205*** (0.021)	-0.208*** (0.025)	-0.216*** (0.027)
Lagged log GDP	0.078*** (0.015)	0.085*** (0.016)	0.089*** (0.020)
GDP growth	0.122*** (0.022)	0.112*** (0.020)	0.121*** (0.023)
Implied long-run elasticity	0.3818*** (0.0842)	0.4064*** 0.0922	0.4138*** 0.1051
Observations	3320	3201	3081
Number of countries	129	129	129

Sources: International Labour Organization (ILOSTAT) database; World Bank, World Development Indicators database; and IMF staff calculations based on David, Pienknagura, and Roldos (2019).

Note: Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

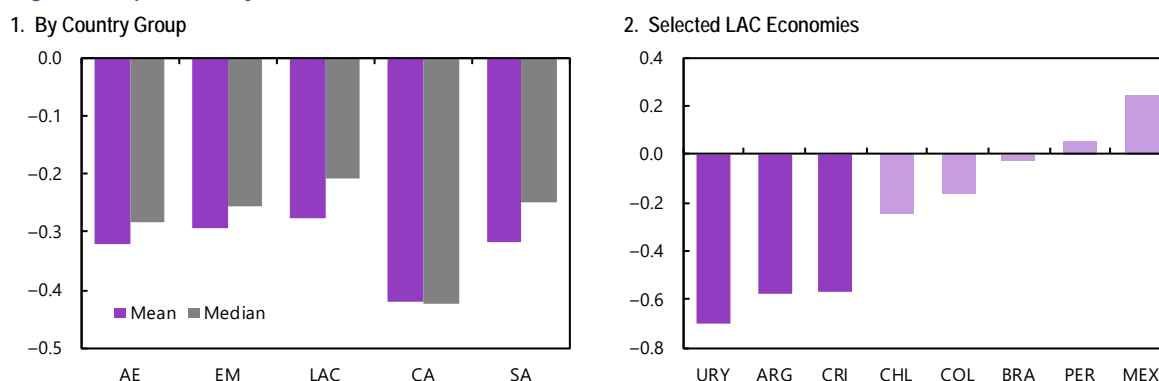
¹³A similar methodology was used by Eberhardt and Presbitero (2015) in the context of the relationship between public debt, GDP and capital.

¹⁴Table 5 presents the point estimate and the standard deviation for the average coefficient. Following Pesaran (2006) and Eberhardt and Presbitero (2015), the methodology uses cross-sectional averages of all variables to capture unobservable variables and omitted elements of the relationship. The maximum number of lags presented in the exercise ($p=2$) is chosen according to the “rule of thumb” in Chaudik and Pesaran (2015) for the CCE estimator to perform well in a dynamic model with weakly exogenous regressors.

The estimated coefficients suggest that the speed at which employment reverts to its long-run level is relatively slow on average, but there is a large degree of heterogeneity across countries. The average estimated speed of adjustment coefficient is -0.21, which implies that it takes the average country 3 years to close half the employment gap (the half-life). There are, however, close to 50 percent of countries in the sample for which the speed of adjustment is higher than the average. For reference, a country located in the 75th percentile of the distribution has a speed of adjustment of -0.41 (approximately the estimated coefficient for Nicaragua and El Salvador), which implies a half-life of 1.3 years.

Heterogeneity in the estimated speed of adjustment is also evident across income groups and regions. The median country in LAC has an estimated speed of adjustment coefficient of -0.2, which is lower than both the median advanced economy country (-0.28) and emerging market country (-0.26) (Figure 13). Within LAC, countries in South America have a median speed of adjustment that is lower than the one observed for countries in Central America. Similar results hold for group averages.

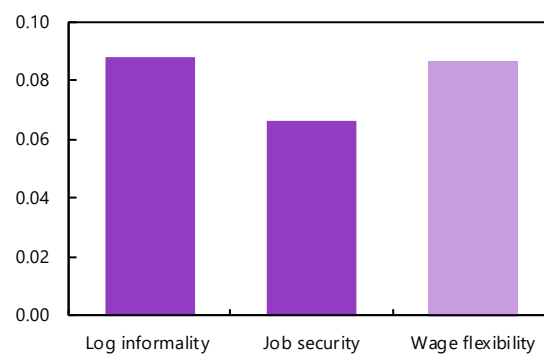
Figure 13. Speed of Adjustment Coefficient



Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).
 Note: Light purple bars are not significant at the 10 percent confidence level. Data labels use International Organization for Standardization (ISO) country codes. AE = advanced economies; CA = Central America; EM = emerging markets; LAC = Latin America and the Caribbean.; SA = South America.

Differences in the coefficients of speed of adjustment of employment may be related to the characteristics of each country’s labor market and the institutions and regulations governing them. A simple regression analysis shows that higher informality rates and regulations that increase job security decrease the speed of adjustment of employment (Figure 14). The estimated coefficient for informality implies that if LAC decreased its informality rate by 10 percentage points—roughly the difference between the region’s average and the average for EMs in our sample of 110 countries—the region’s speed of adjustment would be roughly the same as the EM average. Similarly, if the region decreased its average job security composite index by 1 (for example, by eliminating third party dismissal notification), the speed of adjustment of employment would roughly increase to the estimated average for AEs.

Figure 14. Correlates of Speed of Adjustment



Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).
 Note: Solid bars are significant at the 95 percent confidence level. Light purple bars are not significant.

The estimated relationship between the speed of adjustment and informality highlights the nuanced interactions between different labor market outcomes. For example, higher informality appears to

attenuate the impact of shocks to GDP on unemployment, but it also makes the adjustment process more protracted.

The results may seem counterintuitive, as informality is often perceived to increase labor market flexibility. In fact, Finkelstein Shapiro (2014) finds that higher informality increases the speed of adjustment to shocks in the context of a DSGE model with capital and labor market frictions. These differences may be related to the fact that not all informal employment is equal. This is illustrated by Ulyssea (2018) for the case of Brazil, who classifies informal establishments into three distinct types. The first are “survival” firms, a type that is not productive enough to become formal regardless of the costs of formalization. The second type are opportunistic informal establishments, a type that takes advantage of low enforcement to save on the costs associated with formalization (and will avoid them if they can regardless of their levels). Finally, there are productive establishments that are informal but would formalize if the costs are low enough. The author finds that roughly half of informal firms in Brazil are “survival” establishments and close to 40 percent are opportunistic.

The findings in Ulyssea (2018) are indicative of labor market segmentation, which implies that a big share of informal employment is not available for formal firms to tap into during harsh times. The segmentation between formal and informal employment is also supported in the work of Arias et al. (2018) who find large costs of switching from an informal job to a formal job in the same industry in Mexico and Brazil. These costs are comparable to switching jobs across sectors. To explore these channels, we have to move to samples with more disaggregated sectoral or firm-level data.

Microeconomic Flexibility and the Speed of Adjustment

Microeconomic flexibility has to do with the ability of the economy to reallocate workers across activities, facilitating the process of creative-destruction that is central to productivity growth in market economies (Caballero, Cowan, Engel, and Micco, CCEM, 2013). In this section we follow these authors’ approach to estimate the speed of adjustment in a micro-economic model of the labor market and study empirically the impact of labor market regulations on a country’s speed of adjustment. To do so, we estimate the following equation:

$$\Delta e_{i,t} = \alpha + \lambda_i (e_{i,t}^* - e_{i,t-1}) + \varepsilon_{i,t} = \alpha + \lambda_i * gap_{i,t} + \varepsilon_{i,t} \quad (4)$$

where Δ is the first difference operator, e_t is the natural logarithm of employment, e^* is the (log) equilibrium level of employment, $(e^* - e_{t-1})$ is the employment gap in t-1, and λ_i is the speed of adjustment.¹⁵

To estimate equation 4 we need to construct a proxy of the employment gap. We do so by following the methodology proposed by CCEM, who present a micro-founded model of labor markets and propose a two-step econometric approach. In the first stage we construct an approximation of the employment gap by estimating key variables of the micro-founded model. In the second stage we estimate equation 4 using the employment gap proxy from the first stage. Annex 3 presents the technical details of the model proposed by CCEM and describes the data used in the analysis.

The empirical exercise presented in this section expands the work of CCEM on three fronts. First, we change the period of analysis from 1980–2000 to 2000–2017.¹⁶ Throughout this period countries in Latin America experienced important changes to their macro and microeconomic policy frameworks that affected their ability to cope with shocks. This also makes the timing of the analysis comparable with

¹⁵In general, the relationship between employment growth and the employment gap can be non-linear. The linear form presented in (1) can be rationalized in the context of a model with quadratic adjustment costs (see CCEM 2013 and references therein).

¹⁶Prior to 1996 there is no information for the governance indicators used in the analysis.

other sections of the chapter. The second difference is that, in addition to studying the effect of labor market regulations on a country's speed of adjustment, we also assess the role played by informality and policies governing worker compensation. And third, the analysis compares the speed of adjustment obtained using data for manufacturing sectors (UNIDO) with that obtained using manufacturing, services and construction.

As a reference point, we start by ignoring the effect of employment protection on the speed of adjustment and assume that λ_i is constant across countries. We study the average effect for two different samples: one that only includes the manufacturing sectors (UNIDO sample) and one that includes manufacturing, services and construction) (UNIDO + data from Timmers, de Vries and de Vries (2015) 10-sector dataset + data from the OECD's STAN dataset).

The results point to a slower adjustment coefficient when we include services and construction. On average, manufacturing sectors close 50 percent of the employment gap in each period (Table 6, Column (1)). The coefficient drops to approximately 45 percent in each period when we include services and construction (Column (2)). The results are consistent with the findings of Annex 2, which estimates a CCE Error-Correction Model using less granular sectoral data and finds larger speed of adjustment estimates for industry compared to Services (and Agriculture). However, there are two concerns regarding the use of the combined dataset. First, differences in country and time coverage across datasets makes the interpretation of the results difficult. In addition, services subsectors and construction are at a higher level of aggregation compared to 2-digit manufacturing sectors presented in UNIDO. The inclusion of more aggregated sectors may attenuate the speed of adjustment coefficient. For this reason, the rest of the analysis focuses on the UNIDO dataset exclusively.

Table 6. Microeconomic Flexibility, Informality, and Labor Market Regulations

Dependent variable	Employment growth							
	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO
Sample		10S+OECD						
	(1)	(4)	(3)	(4)	(5)	(6)	(7)	(8)
Employment gap	0.501*** (0.0427)	0.459*** (0.0410)	0.502*** (0.0405)	0.514*** (0.0467)	0.536*** (0.0434)	0.525*** (0.0438)	0.541*** (0.0145)	0.518*** (0.0201)
Employment gap * LAC			-0.0255* (0.0143)					
Employment gap * Informality				-0.0596*** (0.0216)				
Employment gap * Job security					-0.0374*** (0.00561)	-0.0223*** (0.00654)		
Employment gap * Job security * High government effectiveness						-0.0678*** (0.0134)		
Employment gap * (Minimum wage/Labor productivity)							-0.131*** (0.0175)	-0.0542*** (0.0185)
Employment gap * (Minimum wage/Labor productivity) * High government effectiveness								-0.335*** (0.0532)
Employment gap * High government effectiveness						0.0469*** (0.0157)		0.0973 (0.121)
Constant	0.00173*** (0.000611)	0.00460*** (0.000675)	0.00186*** (0.000618)	0.000832 (0.000688)	0.00148** (0.000616)	0.00144** (0.000617)	0.00200*** (0.000604)	0.00188*** (0.000706)
Year-country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	27988	30895	27647	20123	27056	26694	27647	27585
Number of groups	1604	1693	1586	1141	1553	1549	1586	1582

Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).

Note: Murphy-Topel robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

LAC countries exhibit slower speed of adjustment and this is likely related to the somewhat higher levels of informality. Column (3) shows that the speed of adjustment for the average country in LAC is approximately 2.5 percentage points lower compared to countries outside the region. As documented in the previous section, Column (4) suggests that higher informality levels are also associated to slower adjustment of employment.¹⁷

One possible explanation for LAC's relatively slow employment adjustment and for the negative impact of informality is the role played by labor market policies in shaping microeconomic flexibility. LAC has stricter EPLs compared to other countries and previous sections documented that informality is associated with stricter EPLs. As documented in CCEM, strict EPLs tend to hamper an economy's reaction to economic shocks. Moreover, the stiffening effect of EPLs increases as countries increase their government effectiveness and these regulations become more binding. The same applies for the minimum wage relative to labor productivity.

To study the effect of EPLs and the minimum wage, we estimate equation 4 and we assume that the speed of adjustment depends on a country's EPL and wage flexibility (both de jure and de facto). More concretely, we assume four functional forms:

$$\lambda_i^1 = \lambda_1 + \lambda_2 * EPL_i$$

$$\lambda_i^2 = \lambda_1 + \lambda_2 * EPL_i + \lambda_3 * enforcement_{it} * EPL_i + \lambda_4 * enforcement_{it}$$

$$\lambda_i^3 = \lambda_1 + \lambda_2 * \left(\frac{\text{min wage}}{\text{lab.prod.}} \right)_i$$

$$\lambda_i^4 = \lambda_1 + \lambda_2 * \left(\frac{\text{min wage}}{\text{lab.prod.}} \right)_i + \lambda_3 * enforcement_{it} * \left(\frac{\text{min wage}}{\text{lab.prod.}} \right)_i + \lambda_4 * enforcement_{it}$$

In the empirical exercise that follows we proxy enforcement with a dummy variable that takes value one if a country's estimate of government effectiveness is larger than the global median and we use the sample that includes the largest number of sectors and countries.

As in CCEM, we find that job security decreases a country's speed of adjustment to shocks (Table 6, Column (5)).¹⁸ Similarly, the results suggest that high minimum wages (relative to labor productivity) erode a country's microeconomic flexibility. Both these effects are amplified when countries have a higher ability to enforce labor market regulations (Columns (7) and (8)). The findings are consistent with Chapter 3 of the October 2019 *World Economic Outlook* (IMF, 2019), which finds that a major easing of labor market regulations leads to increases in employment and investment in the average country.

To get a sense of the economic relevance of the parameters estimated above, Table 7 quantifies the implied speed of adjustment coefficient and the associated half-life¹⁹ for countries with different levels of informality, job security, relative minimum wages, and government effectiveness. Other things equal, the estimated speed of adjustment of a country with high informality (80th percentile of the informality distribution) is approximately 4 percentage points lower compared to a country with low informality

¹⁷Annex 2 suggests that the economy-wide impact of informality may be larger, given that the elasticity for industry is lower than for other sectors.

¹⁸The results in Table 6 do not appear to be driven by the omission of other variables that may be correlated with government effectiveness. For example, the inclusion of the interaction between GDP per capita and the employment gap does not change qualitatively the results. Similarly, the results are robust to the inclusion of sectoral fixed effects and sector-time fixed effects.

¹⁹The half-life is the time (in months) it takes a country to close 50 percent of its employment gap, according to the estimated speed of adjustment. It is calculated as $12 * (\log(0.5) / \log(1 - \text{speed of adjustment}))$.

(20th percentile of the distribution). This implies that it takes the former 1.5 additional months to close the employment gap in half compared to the latter.

Turning to regulations, the results suggest that the difference in speed of adjustment between countries with low and high employment protection is 10 percentage points when government effectiveness is high. This translates into approximately 4 additional months to close the employment gap in half. The differences are relatively smaller when enforcement is weak. The effect of differences in minimum wages on the speed of adjustment appears to be even larger. The difference in the speed of adjustment parameter between countries with low and high relative minimum wages is 16 percentage points when enforcement is high. This implies six additional months to close half the employment gap and restore equilibrium in the labor market.

Table 7. Speed of Adjustment and Labor Market Characteristics

		Estimated Speed of Adjustment	Implied half life (in months)	Implied growth differential (low-high)
Average		0.50	12.00	-
LAC		0.48	12.91	-
Informality	Low	0.51	11.79	
	High	0.47	13.26	0.17pp
Job security	Low, High government effectiveness	0.54	10.56	
	High, High government effectiveness	0.43	14.61	0.47pp
	Low, Low government effectiveness	0.52	11.39	
	High, Low government effectiveness	0.49	12.32	0.11pp
Minimum wage/Labor productivity	Low, High government effectiveness	0.55	10.56	
	High, High government effectiveness	0.39	16.85	0.74pp
	Low, Low government effectiveness	0.51	11.72	
	High, Low government effectiveness	0.49	12.48	0.09pp

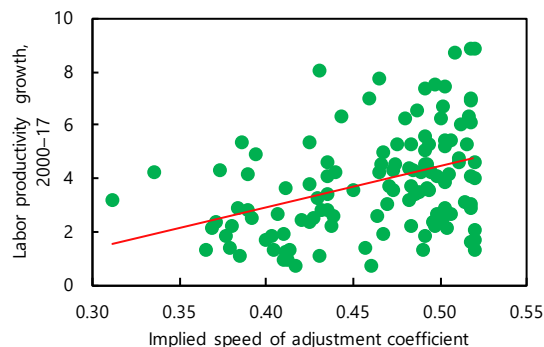
Source: IMF staff calculations.

Note: In the case of informality, job security, and minimum wages, "Low" stands for levels at the 20th percentile of the distribution and "High" stands for levels at the 80th percentile. In the case of government effectiveness, "High" is a dummy variable taking value 1 if the estimated government effectiveness is higher than the global median. For details on implied growth differential, see Annex 3.

Labor Market Regulation and Growth

By slowing a country’s responsiveness to shocks, labor market regulations lower growth.²⁰ For example, labor market regulations hamper the reallocation of factors of production across sectors and firms. Through labor market regulations, one could thus expect to find a link between a country’s medium-term growth and its microeconomic flexibility. In fact, a simple plot of GDP per worker growth and a country’s speed of adjustment shows a positive correlation between the two (Figure 15). Similarly, a simple back-of-the-envelope calculation, like the one presented in CCEM (2013), shows that changes in employment protection regulations that move a country from

Figure 15. Speed of Adjustment and Growth



Source: IMF staff calculations.

Note: The coefficient is calculated a regression like the one in Table 6 but controlling for sectoral fixed effects for the speed of adjustment is statistically significant at the 95 percent confidence level.

²⁰The literature has identified several channels through which employment protection can affect growth. For example, Autor, Kerr, and Kugler (2007) find evidence that stricter employment protection in the US is associated with reduced employment

the 80th percentile of the speed of adjustment distribution to the 20th percentile is associated with an increase in medium-term labor productivity growth of 0.5 percentage points (pp) per annum (Table 7, last column). Similarly, changing the minimum wage from the 80th to the 20th percentile of the distribution when government effectiveness is high can increase growth by approximately 0.75 pp per annum.

The challenge of studying the relationship between labor market regulations and growth in a more empirically rigorous way stems from the potential endogeneity of the two variables. For example, a country experiencing low growth may introduce stiffer employment protection laws to reduce layoffs.

To tackle this concern, we employ an identification strategy similar to the one proposed by Rajan and Zingales (1998). In particular, the prior is that labor market regulations affect disproportionately sectors that, because of global technological factors, are more labor-intensive.²¹ With this idea in mind, we estimate the following equation:

$$g_{ijt} = \beta\alpha_{jt-1} + \gamma\alpha_{jt-1} * reg_i + \theta X_{ijt} + \varepsilon_{ijt} \quad (5)$$

where g_{ijt} is the growth of sector j 's labor productivity, in country i , at time t , α_{jt} is the labor share of sector j at time t , which we calculate as the median labor share across countries, reg_i is either the proxy for employment protection legislations or the minimum wage over labor productivity ratio, and X_{ijt} are additional controls (which include the sector's capital share, the sector's initial share in total value added, and country-year fixed effects).

As conjectured, the results in Table 8 suggest that the growth-hampering effects of labor market regulations are larger in labor-intensive sectors. Higher EPL and minimum wages lower labor productivity growth. This result is robust to the inclusion of the initial share of the sector in total value added, the capital share of the sector, and fixed effects that capture time varying country and sectoral characteristics. Note that the effect of EPL does not seem to consistently affect capital-intensive sectors.

Should informality be reduced and how?

The high degree of informality in LAC labor markets poses some difficult trade-offs. On the one hand, informal jobs are relatively less productive than formal ones, they have no safety net and lower tax revenues. On the other hand, informal jobs are in many instances the only source of income for low-skilled workers especially during downturns. As noted above, increases in education and growth can go a long way to reduce informality, and structural reforms can contribute to lower informality as well in the medium to long run (IMF 2019, Chapter 3).

Informality provides a buffer in bad times, but it also lowers the speed of adjustment to aggregate and sectoral shocks that require a reallocation of labor. While informality lowers the fluctuations in unemployment this chapter provides evidence it also lowers the speed of adjustment to shocks and hampers growth. Although macroeconomic policies should be the first line of defense in bad times, microeconomic flexibility is also necessary to reduce the time and frictions associated with sectoral employment shifts.

flows, lower firm entry rates, and lower total factor productivity (TFP). Strict EP can also lower FDI inflows, decreasing the potential for knowledge transfers and the growth effects associated with the presence of foreign firms (Javorcik and Spatareanu, 2005).

²¹The underlying assumption is that, although there may be differences across countries in the use of production technologies, the ranking of sectors in terms of their labor intensity will be relatively similar across countries.

Table 8. Labor Market Regulations and Labor Productivity Growth

Dependent variable	Labor productivity growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Sector's share in country's total value added, $t-1$	-0.156*** (0.0174)	-0.175*** (0.0180)	-0.176*** (0.0183)	-0.174*** (0.0180)	-0.154*** (0.0178)	-0.153*** (0.0174)
Sectoral labor share, $t-1$		-0.132*** (0.0327)	-0.0466 (0.0519)	-0.0366 (0.0546)		
Country's job security * Sectoral labor share, $t-1$			-0.0884** (0.0423)			
Country's rel. minimum wage * Sectoral labor share, $t-1$				-0.267** (0.122)		
Country's job security * Sectoral capital share, $t-1$					0.0249 (0.119)	
Country's rel. minimum wage * Sectoral capital share, $t-1$						0.00348 (0.377)
Constant	0.0455*** (0.00159)	0.0628*** (0.00459)	0.0629*** (0.00462)	0.0624*** (0.00459)	0.0568*** (0.00359)	0.0564*** (0.00350)
Country-Year Fixed Effects	YES	YES	YES	YES	YES	YES
Sectoral Capital Share control	NO	NO	NO	NO	YES	YES
Observations	26,552	26,539	25,977	26,539	25,856	26,418
R-squared	0.196	0.197	0.199	0.197	0.199	0.197

Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).

Note: Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Stricter enforcement of EPL reduces labor market flexibility but it is unclear whether this is the best way to lower informality. The results in the previous section confirm and expand those in CCEM (2013) suggesting that stronger enforcement lowers the speed of adjustment to economic shocks. While increasing enforcement of EPL would certainly lower the extensive margin of informality (workers that are hired without benefits), Ulyssea (2010) shows that it would also increase unemployment and have adverse effects on welfare. In contrast, Meghir et al. (2015) show that tightening enforcement does not increase unemployment and has beneficial impacts on wages, output and welfare by inducing a better allocation of workers to higher productivity jobs and improved competition in the formal labor market.

A general message from the micro literature is that it is better to lower entry costs to formality (including for firms) than to increase costs to informality. Informal workers could be hired by informal firms (i.e., that do not register or pay entry fees to achieve a formal status) or by formal firms (that are registered but nevertheless hire a fraction of their labor force through informal or non-salaried contracts; see Box 1 on Mexico, Ulyssea, 2018, on Brazil, and Vargas, 2015, on Paraguay). Lowering entry costs would induce a number of firms to become formal leading to increases in GDP, wages and productivity, though the impact on employment formality may not be large (Ulyssea, 2018). The same study finds that increasing enforcement is very effective in reducing informality but may reduce welfare if a large number of workers do not have the skills to be hired by formal firms.

High relative minimum wages increase informality and lower the speed of adjustment to shocks but lowering them could also have a significant negative impact on equity. As noted in Duval and Loungani (2018) and Kugler (2019), reductions in minimum wages have to be well-calibrated to address a number of trade-offs. On the one hand minimum wages could alleviate a firm's monopsony power and their inability to observe workers' productivity, but on the other hand they could reduce employment—

especially among the low-skilled, young and immigrants. The impact on unemployment may be low but a better strategy would be to embark on structural reforms that increase labor productivity (IMF, 2019).²²

Reductions in payroll taxes contribute to lower informality but they should be combined with other structural reforms that increase total factor productivity (see Box 2). Colombia's experience with a 13 percentage point reduction in payroll taxes shows that informality can be lowered this way, but simulations in Pescatori, Lambert and Toscani (2019) demonstrate that it may be more effective to combine reductions in payroll taxes with reductions in entry barriers and hiring/firing costs—as well as with reforms that increase TFP (see also Alvarez and Ruane, 2019 for the case of Mexico; and Canales-Krijlenko, Munkacsi, and Dudine, 2017 for the case of Argentina).

All this points to the fact that informality is a multifaceted phenomenon that is the outcome of policies, institutions and cultural norms that force some individuals (workers and firms) into informality, but also leads others to choose this status as part of a cost-benefit analysis (Perry et al., 2007). Moreover, the underlying causes of informality are closely associated with other development challenges that are evident in LAC. In this sense, tackling informality should be part of a comprehensive policy agenda that creates a virtuous cycle of growth and better jobs (World Bank, 2019). In fact, a piece-meal approach to deal with individual problems can undermine efforts to fight other challenges. For example, Dabla-Norris et al. (2018) study micro-level data for Peru and show that policies to support small firms can increase informality. Vargas (2015) studies the effects of various policy tools on informal production, informal employment and tax evasion through the lenses of a dynamic model calibrated for the average LAC country and finds that policies like penalties for tax evasion by formal firms can increase informality.

Conclusion

Informality plays a crucial role in the dynamics of labor markets in Latin America. The response of informality to GDP cycles is estimated to be stronger than that of unemployment. Moreover, our estimates of Okun's law show that the formal/informal adjustment margin reduces the importance of the employment/unemployment margin. Informality does however dampen the speed of adjustment of labor markets and thus have a negative impact on productivity growth.

The results imply that, in economies with a high level of informality, reporting only the unemployment rate and job creation (such as is standard in advanced economies) may not be a sufficient statistic to assess labor market performance. To gauge the cyclical position of Latin American labor markets it is important to also focus on the informality rate.

We also show that certain dimensions of stricter employment protection legislation increase informality, most notably higher redundancy costs and cumbersome dismissal regulations. In Latin America, for instance, Peru and Mexico are two of the countries which have the highest informality relative to their level of development, and also have among the strictest employment protection measures in the dimensions which we show matter for informality (requiring third party approval for dismissal of even one worker, for example). Moreover, the institutional factors that are correlated with informality appear to hamper growth.

The evidence of the role of certain EPLs in determining the level of informality supports the recommendation in Duval and Loungani (2019) that reducing the expected cost of firing procedures, making them more transparent, predictable, and less administratively burdensome, is likely to be an important way to tackle informality and ultimately further improve the functioning of Latin American

²²Duval and Loungani (2019) discuss a number of ways to address the potential adverse employment effects of too high minimum wages, including differentiation across population groups, regions or industries, as well providing flexibility to adjust them according to business cycle conditions.

labor markets. Duval and Loungani (2019) also highlight the importance of building up unemployment insurance and other benefits at the same time to guarantee adequate protection of workers. The exact impact of these recommendations, however, will depend on the nature of informality in each country.

The chapter also finds that high minimum wages relative to labor productivity increase informality and lower the speed of adjustment to shocks. As suggested in IMF (2019), embarking on structural reforms that increase labor productivity would be the best way to address this determinant of informality.

Finally, our results show that changes in aggregate labor force participation rates are positively related to changes in GDP (i.e., they tend to be procyclical), but we also discuss some evidence that the female participation rate is countercyclical during recessions in LAC countries. Hence, female labor force participation can function as “insurance” against income shocks in bad times in the region. Regarding policy recommendations to close the gender gap, the results discussed in Novta and Wong (2017) suggest that policies involving the provision of childcare and maternity/paternity leave can have significant effects on female labor force participation even in the short term.

Box 1. Informality and Productivity: The Case of Mexico

Regulatory distortions create a dual labor market and firm structure in Mexico.

Formalization costs and size-specific taxation and regulatory enforcement regimes favor small informal firms. Even within formal firms, regulation favors informal arrangements. Formal contracts imply significant social security contributions, payroll taxes, income tax withholding requirements, firing costs, and minimum wage restrictions that can be avoided by informal non-salaried contracting.

This regulatory system leads to high informality along both extensive (more informal firms) and intensive (more informal workers) margins.

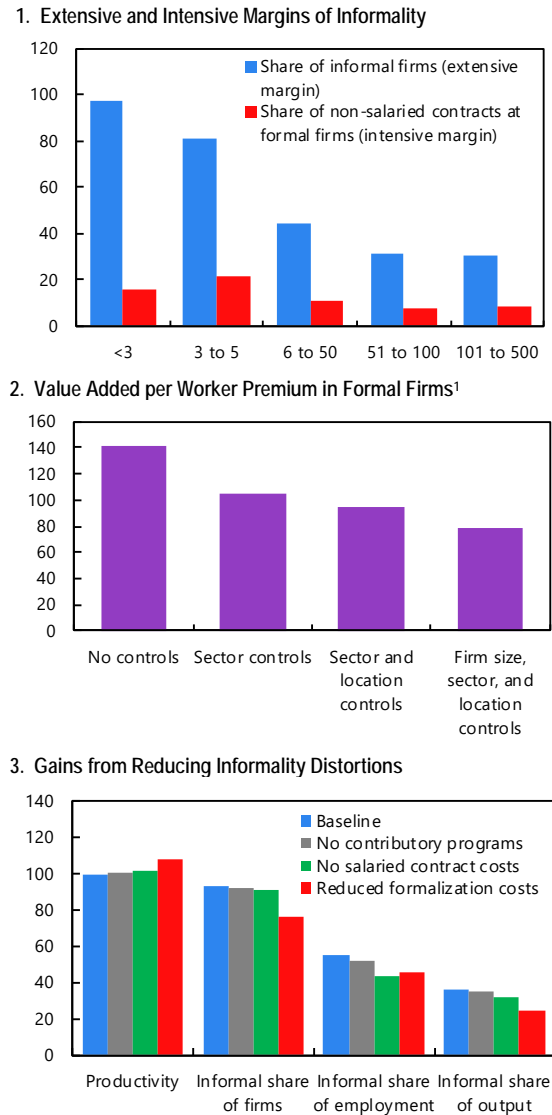
Along the extensive margin, around 90 percent of firms operate informally in Mexico. They comprise mostly small and relatively less productive firms that employ over half of the labor force. Along the intensive margin, formal firms employ significant shares of the workforce in informal non-salaried contracts without access to full benefits or protections. This intensive margin provides contractual flexibility to firms—small ones in particular—at the expense of an equal treatment of workers in terms of benefits and tax obligations.

Formal firms tend to be larger and more productive. Formal firms are on average about twice as productive as informal firms, in terms of value added per worker. This is in part due to their larger operational and sectoral composition. Nonetheless, productivity premiums from formality remain after accounting for differences in sector, location and firm size. The informal sector also exhibits evidence of greater resource misallocation.¹

Staff analysis suggests significant gains from reducing formalization costs. Using a model of endogenous informality, the role of different policies inducing informality in Mexico are assessed.² The analysis suggests that reducing payroll taxes, social security contributions and firing costs associated to salaried contracts can lead to significant gains in formal employment, albeit only producing moderate gains in aggregate productivity. In contrast, reducing firm formalization costs can lead to much larger productivity gains. This is because entry costs affect the extensive margin of informality and increase the volume of productive formal firms. These regulatory distortions, however, can only account for a small share of total resource misallocation in Mexico. In addition to reducing formalization costs, authorities should also focus on structural shortcomings preventing the development of larger productive firms regardless of their formality status.

This box was prepared by Jorge A. Alvarez.
¹See Misch and Saborowski (2018).
²See Alvarez and Ruane (2019).

Figure 1.1. Informality, Productivity and Employment (Percent)



Sources: Mexican Economic Census 2013; and IMF staff calculations.
¹Regression coefficient on formal sector dummy reported. All coefficients are significant at the 95 percent significance level.

Box 2. A Model of Labor Market Informality

As illustrated empirically in the main text of the chapter, labor informality falls with income, both at business cycle frequency and in a cross-section of countries. Lambert, Pescatori, and Toscani (2019) build a small open-economy dynamic stochastic general equilibrium model with two sectors, formal and informal, which can replicate these key stylized facts.¹ The steady-state of the model is calibrated to replicate the macroeconomic and labor market features (including informality) of the Colombian economy. We use the simulated method of moments to set the persistence and volatility of the key shocks in the model (aggregate total factor productivity (TFP), consumer preferences, firing probabilities, and commodity prices) to match key business cycle moments. We then use the model to evaluate how labor market rigidities and informality influence the economy's response to shocks.

First, to test whether the model successfully replicates the effect of structural reforms on the labor market, we compare the model steady state for Colombia before and after the 2012 reduction in the payroll tax rate from 29.5 to 16 percent. The simulations predict a fall in the informality rate of around 3 percentage points, close to the empirically-calculated impact of about 2 percentage points (Fernandez and Villar, 2017).

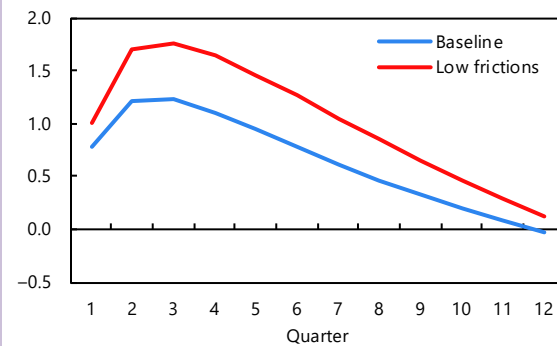
Second, we simulate the steady-state impact of a 50-percent reduction in firm entry costs and hiring costs in the formal sector, combined with a further reduction in payroll taxes by 4 percentage points. The results suggest that this would reduce labor informality by 7 percentage points and have a meaningful but modest impact on the real economy, increasing GDP per capita as well as private consumption (which could be viewed as a welfare proxy) by about 3 percent. As a comparison, increasing TFP by 50 percent without changing rigidities also reduces informality by 7 percentage points but increases consumption and GDP by almost 30 percent. These results show the important role that labor market flexibility can play, but they also highlight that flexibility must complement efforts to boost TFP which is ultimately the key driver of development.

Finally, we look at how rigidities impact the cyclical properties of the labor market. In line with the empirical results in the chapter, high labor market rigidities imply a more muted reaction of unemployment to a temporary commodity price shock, as informality buffers part of the shock. A negative commodity price shock essentially acts as a negative income shock for the economy with both the government and household budget constraints being tightened. In a less flexible and more informal labor market, the unemployment rate reacts less as informality acts as an additional margin of adjustment...

This box was prepared by Frederic Lambert and Frederik Toscani.

¹The model includes a representative household that consumes formal and informal goods and supplies labor, perfectly competitive intermediate good producers, monopolistic competitive wholesale final good producers, retailers, capital producers, and a public sector (government and a monetary authority). Formal and informal firms (which produce formal and informal goods, respectively) face different frictions in terms of entry costs, hiring costs and payroll taxes and while informal goods can only be consumed by domestic households, formal goods can also be exported and consumed by the government. The utility function is such that there is a zero-income effect on the consumption of the informal good. The model builds on work of Anand and Khera (2016) and Munkacsi and Saxegaard (2017). TFP is an exogenous parameter in the model.

Figure 2.1. Reaction of Unemployment Rate to Temporary Negative Commodity Price Shock (Percent)



Source: IMF staff calculations.

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Annex 1

Annex Table 1.1: Regressions for Active Population as a Share of Working Age Population

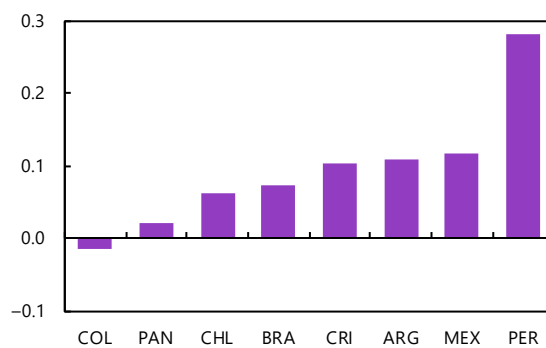
	(1) Δ Participation	(2) Δ Participation
Δ GDP _t	0.0610** (0.0272)	0.0698*** (0.0269)
Δ GDP _{t-1}		-0.0324 (0.0448)
Constant	0.142 (0.264)	-0.0423 (0.319)
Observations	439	439
Countries	18	18

Source: IMF staff calculations.

Note: Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Annex Figure 1.1. Share of Active Population Responsiveness to GDP Changes



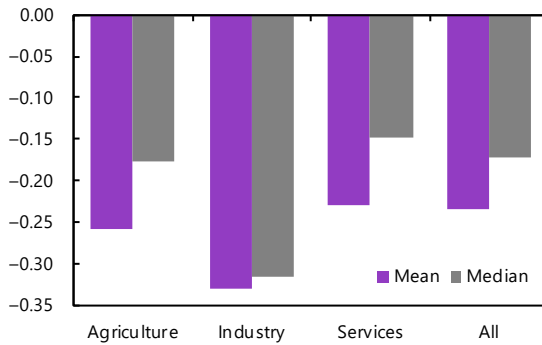
Source: IMF staff calculations.

Annex 2

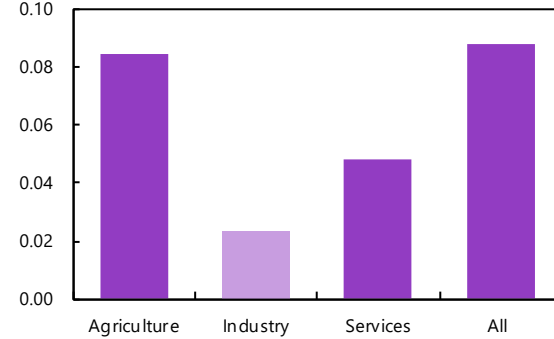
This section documents the results of the estimation of a Common Correlated Effect Error-Correction Model described in equation 3 for three broad sectors (agriculture, industry and services). The results, presented in Annex Figure 2.1, panel 1, show that there are large differences in the speed of adjustment across sectors. Industry has the highest average estimated coefficient of the speed of adjustment parameter and services has the lowest average estimated coefficient. Interestingly, there are also noticeable differences in the correlation between informality at the country level and the estimated sectoral speed of adjustment parameters. Informality appears to reduce the speed of adjustment parameter for services and agriculture but not for industry.

Annex Figure 2.1. Common Correlated Effect Error-Correction Model by Sector

1. Speed of Adjustment Coefficients



2. Elasticity of Speed of Adjustment Coefficient with Respect to (Log) Informality



Source: IMF staff calculations based on David, Pienknagura, and Roldos (2019).

Note: Solid bars are significant at the 95 percent confidence level. Light purple bars are not significant.

Annex 3

Caballero, Cowan, Engel, and Micco (2013) Methodology

Assume a sector's representative firm faces the following isoelastic demand and has access to a Cobb-Douglas production function in labor and hours per worker:

$$y = a + \alpha e + \beta h$$

$$p = d - \frac{1}{\eta} y$$

where variables (in lower case) are expressed in logs. Firms are competitive in the labor market but pay wages that increase with hours worked according to a wage schedule $w(h)$, with w' and w'' strictly positive. This simple framework implies that the following equilibrium equation holds:

$$\bar{e} - e = \frac{\phi}{1 - \alpha\gamma} (v - \bar{w})$$

with $\phi = \frac{\mu - \beta\gamma}{\mu}$, $\mu = 1 + \frac{w''(\bar{h})\bar{h}}{w'(\bar{h})}$, $\gamma = \frac{\eta - 1}{\eta}$, and $v = y - e$.

The employment gap ($\bar{e} - e$) presented above is the difference between employment and the firm's employment target. To introduce employment dynamics, CCEM (2013) assume that the combination of supply and demand shocks ($d + \gamma a$) follows a random walk. In that case, employment potential in country i , sector j , at time t (e_{ijt}^*) is equal to the static equilibrium (\bar{e}_{ijt}) plus a constant equal to the random walk drift. Allowing for a country-specific stochastic drift and for sector-specific differences in α and γ , leads to:

$$e_{ijt}^* - e_{ijt-1} = \frac{\phi}{1 - \alpha_j\gamma_j} (v_{ijt} - w_{ijt}^0) + \Delta e_{ijt} + \delta_{ct} = gap_{ijt} + \delta_{ct} \quad (A1)$$

To estimate (A1), we proceed in two steps. First, taking first difference we can write the employment equation as:

$$\Delta e_{ijt} = -\frac{\phi}{1 - \alpha_j\gamma_j} (\Delta v_{ijt} - \Delta w_{ijt}^0) + \Delta e_{ijt}^* - \Delta \delta_{ct} = -\phi z_{ijt} + \kappa_{ct} + \varepsilon_{ijt}$$

We estimate the parameter ϕ by constructing the variable $z_{ijt} = \frac{(\Delta v_{ijt} - \Delta w_{ijt}^0)}{1 - \alpha_j\gamma_j}$. To do so, we approximate $\alpha_j\gamma_j$ to be the median labor share for the sector. In the case of manufacturing, this is taken directly from the UNIDO data. For services and construction, we build the median labor share from the OECD STAN dataset. Log labor productivity (v) is constructed as the log of output per worker. We proxy w_{ijt}^0 with the average labor productivity across countries. In estimating ϕ we instrument $\Delta v_{ijt} - \Delta w_{ijt}^0$ with $\Delta w_{ijt-1} - \Delta w_{jt}^0$.

Having estimated ϕ , we construct the employment gap using equation A1. With the proxy for the employment gap we estimate the adjustment parameter from equation 1. Importantly, because we use a two-step procedure, we use the Murphy-Topel standard errors in the second stage, which takes into account the fact that ϕ is estimated with error. When calculating the employment gap, we subtract lagged differences between sectoral labor productivity and average productivity to account for systematic productivity differences across sectors within countries.

Beyond its implications for employment adjustment, the model presented in CCEM can be used to study the link between microeconomic flexibility and growth. More specifically, using a simple AK growth model and the microeconomic structure described above, CCEM show that the difference in long-term growth between two countries that only differ in their speed of adjustment coefficient (λ_i , with $\lambda_2 > \lambda_1$) can be approximated by the following equation:

$$g_2 - g_1 = (g_1 - \delta) \left[\frac{1}{\lambda_1} - \frac{1}{\lambda_2} \right] \varepsilon$$

Where δ is the rate of depreciation of capital and ε is a constant that depends on the labor share, the volatility of productivity, and the demand elasticity. We take the values used by CCEM to compute the values in Table 7.

Data

Sectoral data comes from three sources:

- Data for manufacturing sectors comes from the 3-digit United Nations Industrial Development Organization (UNIDO) Industrial Statistics (INDSTAT) database, Rev. 3. The dataset contains output, employment, wages and capital data for 28 sectors for a large set of countries.
- Employment, output, and wage data for construction and service sectors for European countries comes from the STAN dataset, which contains information for the 2005–17 period.
- Employment and value-added data for construction and service sectors for non-European countries comes from the 10-sector database compiled by Timmer, de Vries and de Vries (2015), which contains information for 40 countries for the period between 2000 and 2010.

Our employment protection and minimum wage variables are constructed from the World Bank’s Doing Business indicators. The labor protection index is the sum of three variables each of which is normalized to take a value between 0 and 1. The variables are: time to notify dismissals, approval of dismissals by a third party, and severance payments. The minimum wage variable is the ratio between the national minimum wage and GDP per worker (labor productivity).

The government effectiveness estimates are taken from the latest Kaufmann, Kraay, and Mastruzzi (2010) governance indicators dataset. The authors construct estimates by using information from a large number of surveys and databases. The variable “High government effectiveness” is a dummy variable taking value one if a country has a government effectiveness estimate in 1996 above the global median in that year.