

WP/19/55

# IMF Working Paper

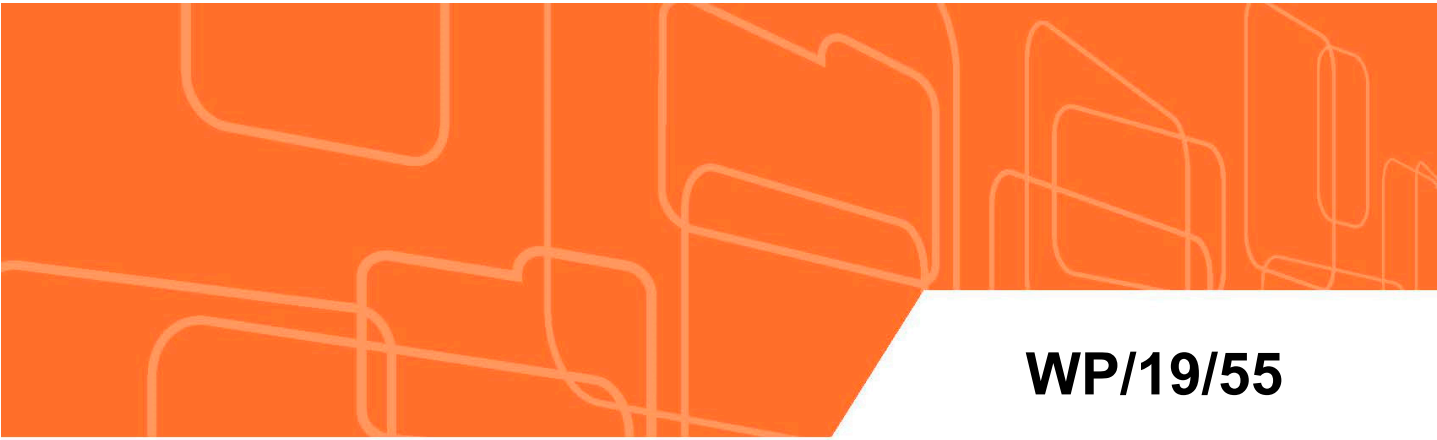
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## More Work to Do? Taking Stock of Latin American Labor Markets

by Antonio C. David, Frederic Lambert, and Frederik Toscani

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## IMF Working Paper

Western Hemisphere Department

### More Work to Do? Taking Stock of Latin American Labor Markets<sup>1</sup>

Prepared by Antonio C. David, Frederic Lambert, and Frederik Toscani

Authorized for distribution by Jorge Roldos

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#### Abstract

We analyze the performance of labor markets in Latin America since the late 1990s. Strong GDP growth during the commodity boom period led to important gains in employment and a fall in the unemployment rate as labor demand outpaced an increasing labor supply. We emphasize the role of informality in the dynamics of labor markets in Latin America. A re-examination of Okun's law shows that informality dampens changes in unemployment accompanying output fluctuations. Moreover, we present some evidence that countries with higher redundancy costs and cumbersome dismissal regulations, exhibit "excess" informality over and above what would be expected based on their income and educational levels. Labor market reforms could thus contribute to reducing informality and increasing the responsiveness of labor markets to output growth. However, looking at selected case studies of reforms using the synthetic control method, we find mixed results in terms of labor market outcomes.

JEL Classification Numbers: E24, J2, J4

Keywords: Labor Markets, Latin America, Okun's Law, Informality

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## I. INTRODUCTION

From the turn of the century strong labor demand growth led to high employment growth in Latin America, comparable to that observed in other emerging market and developing economies (EMDEs). Average unemployment across the region fell from 10.4 percent in 2000 to a low of 6.1 percent in 2014, and labor informality declined by close to 20 percentage points. Higher labor incomes, especially for poorer households, contributed to lower poverty and inequality. This good performance was particularly pronounced for commodity exporters during the commodity price boom (IMF, 2018). Since the end of the commodity boom, labor demand growth has slowed, leading to a renewed increase in unemployment rates and concerns about the sustainability of the past social gains. Indeed, employment growth in South America (less so in Central America) has lagged substantially behind other EMDEs since 2015.<sup>2</sup>

This paper takes stock of the performance of labor markets in Latin America through a series of simple exercises. We begin by presenting stylized facts on labor markets in Latin America from a comparative perspective to motivate and ground the subsequent work (Section II). At an aggregate level, the main labor market indicators in Latin America are in line with those in other emerging markets.

To understand the cyclical behavior of Latin American labor markets, in Section III we decompose changes in the unemployment rate into demand and supply factors and show how labor productivity, informality and the participation rate adjust to limit unemployment movements over the business cycle. Based on the decompositions, we argue that beyond the unemployment rate, information on formal job creation and changes in the informality rate is necessary to give a full picture of slack in labor markets in Latin America.

In Section IV, we re-examine the link between changes in unemployment and changes in output (Okun's law) and explore the cross-country variation in coefficients to gain insights on how structural features of the labor market affect its cyclical behavior. We find that unemployment reacted much less to changes in GDP in Latin America than it would have in advanced economies.

We argue that this result is the product of structural characteristics of labor markets in the region. Latin American labor markets are marked by a strong duality – well-protected formal sector employment stands in stark contrast to de facto highly flexible informal labor which accounts for over half of all employment.

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<sup>2</sup> In this paper, South America (SA) includes Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Peru, Paraguay, Suriname, Uruguay, and Venezuela. Central America (CA) includes Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. While Mexico behaves similarly to South American economies in certain aspects, it is included in the Central America group because of its close integration with the U.S. economy and lower exposure to the commodity cycle.

While we do not find a direct link between most labor market institutions and the cyclical behavior of labor markets conditional on informality, these institutions may still influence the ‘structural’ level of informality, thereby affecting the cyclical behavior of the labor market in an indirect way. Building on a large literature (e.g., Lehmann and Muryaev, 2012), in Section V, we use simple cross-country regressions to explore the effect of labor market institutions such as employment protection legislation on informality.

In the final part of the paper, we examine the impact of a small number of labor market reforms in Latin America since 2000 using the synthetic control method to build appropriate counterfactuals (Abadie and Gardeazabal, 2003). We study reforms in Chile (2001), Mexico (2012) and Uruguay (2005) and find mixed results in terms of impact of structural changes in labor market institutions on key outcome variables.

As an aside, we review the available data on labor market institutions in Latin America.<sup>3</sup> Data on minimum wages is available from several reliable sources for a large set of countries. The difficulty consists in choosing an adequate denominator to scale the data to gauge how binding the minimum wage is. On the other hand, data on employment protection legislation (EPL) needs to be studied with care given the many dimensions it covers. ‘Hard’ data on EPLs (Laws and Regulations data – L&Rs) is available from the World Bank (WB), the OECD and the International Labor Organization (ILO), while the World Economic Forum (WEF) constructs a number of perceptions-based indicators (PBIs) from its executive survey.

We study the relationship between different L&R datasets as well as between PBIs and L&Rs and find that complicated hiring and firing procedures have the strongest influence on perceptions of labor market rigidity, more than explicit redundancy costs. And other dimensions of EPL measured by the OECD, ILO and WB datasets such as notice periods do not impact perceptions at all. Combining perceptions-based indicators with ‘hard’ measures of laws and regulations is likely to provide the most comprehensive view of labor markets. But for both PBIs and L&Rs, care should be taken in using aggregate indexes which may mask the role of individual components. Appendix A contains a detailed list of available data, including sources, country and time coverage and a comparative analysis.

Evidence suggests that Latin American labor markets do exhibit noticeable rigidities in *some* key dimensions. Redundancy costs are higher than in advanced economies (AEs) or other EMDEs, permanent contracts are mandatory for permanent tasks in many countries, and dismissal of even 1 worker often requires third-party approval.

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<sup>3</sup> We focus on minimum wage policy and employment protection legislations and only very briefly touch upon other important aspects of labor market institutions such as payroll taxes, employment benefits, unemployment insurance and collective bargaining.

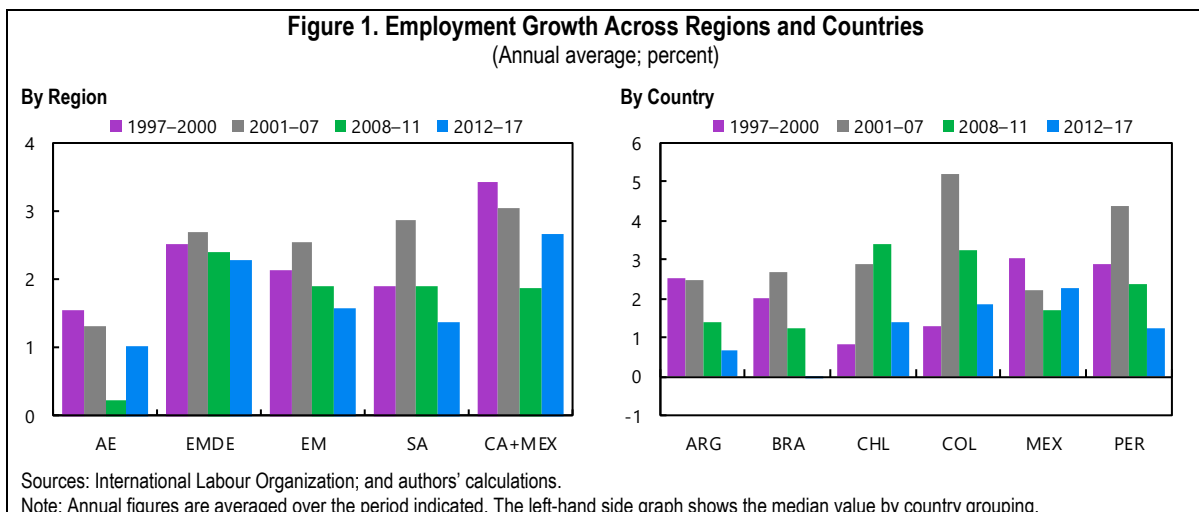
This paper adds to a vast literature studying different aspects of the nexus of labor market institutions, informality and unemployment in emerging and developing economies. Notable references include the review of the impact of labor market institutions in EMDEs by Betcherman (2014), Freeman (2010), and a recent paper by Duval and Loungani (2018) on designing labor market institutions in EMDEs. Kugler (2019) provides a comprehensive overview of the impact of labor market institutions in Latin America by surveying the microeconomic literature. Perry et al. (2007) provide a very detailed study of informality in Latin America. We build on this literature with a fresh look at the data for Latin America from a macroeconomic perspective.

## II. STYLIZED FACTS

Labor markets in Latin America tend to be highly informal, marked by low labor productivity levels, and a relatively rigid regulatory environment contributing to a strong duality between well-protected formal sector jobs and unprotected informal sector jobs. To motivate our subsequent analysis, in this section, we document stylized facts on unemployment/employment, labor productivity, labor informality, and labor market institutions in turn.

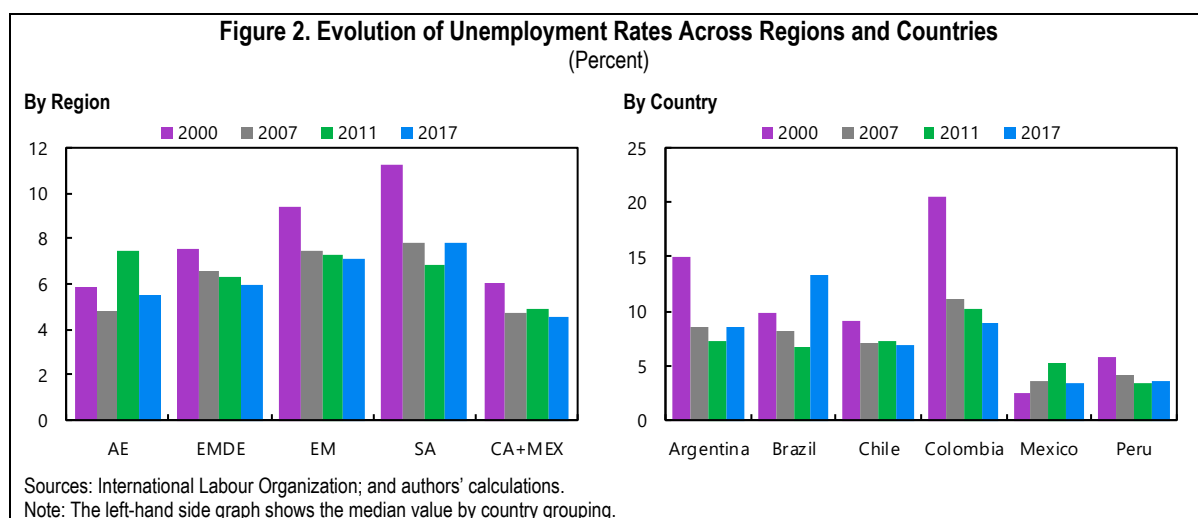
### A. Employment/Unemployment

Employment growth in Latin America over the past 25 years has been strong on average, comparable to countries at a similar level of development and significantly higher than in AEs. We look at the average employment growth rate over four distinct time periods: the late 1990s; the 2000s before the onset of the global financial crisis (GFC); the GFC period; and the post-GFC period (Figure 1). Total employment expanded at over 2 percent per year in the period prior to the financial crisis before slowing down somewhat. In Central America employment growth bounced back over the last few years while it continued to decelerate in South America following the end of the commodity boom.



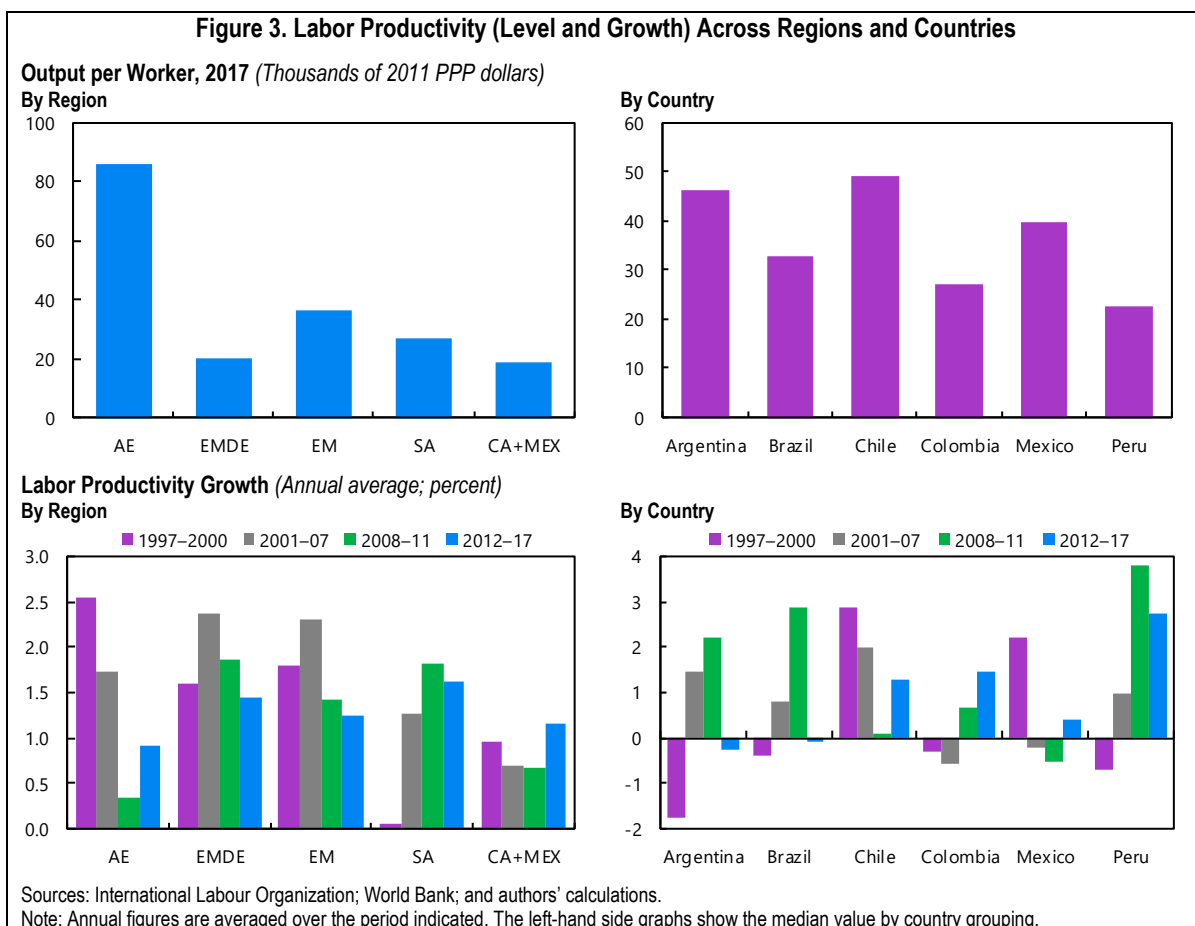
Argentina and Brazil, in particular, experienced a sharp slowdown, with both countries recording negative employment growth for at least one year after 2012. In Chile and Colombia, which had experienced large employment booms at the peak of the terms-of-trade cycle, growth rates dropped and converged with those for Peru and Mexico over 2015-17. Mexico has a somewhat different pattern relative to the other five countries given its lesser dependence on commodity exports and closer integration with the US economy.

Employment growth led to a fall in the average unemployment rate since the 2000s for most countries (Figure 2). In line with the above-discussed negative employment growth, unemployment rose again in Argentina and Brazil in recent years. Colombia has consistently reduced unemployment, albeit starting from a very high base. Mexico and Peru, on the other hand, stand out for having had a very low and relatively stable unemployment rate. We will return to this point below.



## B. Labor Productivity

The median value for output per worker in South America in 2017 was about 30 percent of the level for the median advanced economy (20 percent in Central America). In terms of growth rates, the strong employment growth of the early 2000s was accompanied by lackluster productivity growth in both Central and South America before the financial crisis but very strong growth rates over 2007-11 as commodity prices recovered quickly and the terms of trade of many South American countries peaked (Figure 3). Looking at country level data does not reveal any strong patterns, but the volatility of labor productivity growth stands out starkly, with all countries except Peru and Chile only achieving positive productivity growth in two out of the four periods.



### C. Informality

Informality in Latin America is high, accounting for over 50 percent of total employment (Figure 4). However, Latin America is not an outlier among emerging and developing economies - the level of informality in South and Central America is broadly comparable to that in other EMDEs. Informality in AEs is significantly lower.<sup>4</sup>

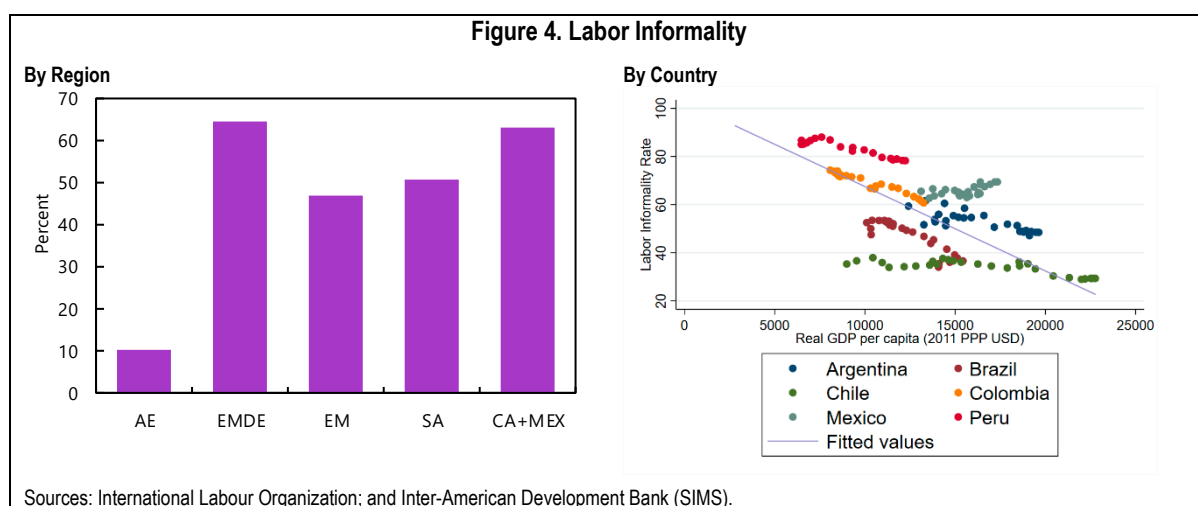
Even within Latin America, the degree of heterogeneity is large, with labor informality ranging from around 30 to 70 percent among the largest economies. The right panel of Figure 4 presents a scatter plot of GDP per capita against the labor informality rate. It shows that in line with standard predictions, labor informality has generally decreased as countries' income levels rose (except for Mexico where despite higher GDP per capita informality has actually increased). 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,

<sup>4</sup> Cross-sectional labor informality data comes from the ILO (we focus on the share of informal employment in total non-agricultural employment). Time-series labor informality data for Latin American countries comes from the Inter-American Development Bank's (IDB) SIMS database (Labor Market and Social Security Information System). Data are harmonized across countries and so is age coverage; the working age population is defined to be the population between ages 15–64.



Peru and Mexico, but also Argentina, do worse than other countries based on their level of development.

Interestingly, Latin American countries with some of the lowest and most stable unemployment rates (Peru and Mexico) are the ones with the highest level of informality relative to their level of development, suggesting that the second margin of adjustment (formal vs. informal employment) might be to some degree a substitute for the margin of adjustment between employment and unemployment. We will explore this further in subsequent sections.



## D. Labor Market Institutions

In Appendix A we discuss in detail the available labor market institutions data, both perceptions-based indicators (PBIs) and indicators aiming to quantify laws and regulations (L&Rs). As the Appendix discusses, 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 PBIs and L&Rs in this section.

The top two charts in Figure 5 show two key perceptions-based indicators from the World Economic Forum's executive survey on labor markets (WEF, 2018). They show that 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 pretty much everywhere else.

With this in mind, the two charts in the second row of Figure 5 show summary indicators of employment protection laws and regulations constructed by the OECD and ILO, respectively. Perhaps surprisingly, they do not show that South America has stronger employment protection legislation than other countries. This raises two possibilities: either de jure employment legislation is indeed not more rigid in South America but certain aspects of

implementation, perhaps related to the legal system, make it de facto rigid. Or, the aggregate indexes hide some more specific factors of the legislative framework which in practice are more important for the flexibility of the labor market than other (offsetting) elements which are included in the index.

In Appendix A we explore the latter possibility in detail by correlating each of the subcomponents of the ILO, OECD and World Bank EPL datasets with the WEF perceptions of hiring and firing practices. No matter which dataset we use – the main contributor to the perception of rigidities are cumbersome hiring and especially firing procedures, much more so than severance or redundancy pay per se. Other factors such as length of notice period or length of trial period (on the hiring side) do not impact perceived flexibility at all.<sup>5</sup>

Row 3 in Figure 5 thus focuses on hiring and firing procedures and compares Latin America to other regions in this dimension and the first graph in row 4 shows redundancy costs.<sup>6</sup> While this is not the case for *all* relevant dimensions, the three indicators shown here highlight that Latin American labor markets do exhibit noticeable rigidities in *some* key dimensions. Redundancy costs are higher than in AEs or other EMDEs, permanent contracts are mandatory for permanent tasks in many countries, and dismissal of even 1 worker often requires third-part approval. These indicators suggest a high level of de facto job protection for formal, permanent jobs.

The last chart in Figure 5 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.

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<sup>5</sup> Specifically, from the OECD indicators, stricter “Notification procedures”, “Definition of justified or unfair dismissal”, “Compensation following unfair dismissal” and “Possibility of reinstatement following unfair dismissal” are significantly negatively correlated with perceptions of a more flexible labor market. From the ILO indicators, stricter rules on “Valid grounds for dismissals”, “Prohibited grounds for dismissals”, “Procedural requirements for dismissals” and “[more] Redress [possibilities]” are significantly negatively correlated with perceptions of a more flexible labor market. Last, from the World Bank indicators “Fixed-term contracts prohibited for permanent tasks”, “Third-party notification if one worker is dismissed”, “Third-party approval if one worker is dismissed”, “Retraining or reassignment [obligations prior to dismissal]”, “Priority rules for redundancies or reemployment” and “Severance pay for redundancy dismissal (weeks of salary)” are significantly negatively correlated with perceptions of a more flexible labor market.

<sup>6</sup> We use World Bank data here since it has the broadest country coverage which makes the World Bank measures our preferred ones for the regressions in Sections IV and V.

Figure 5. Labor Market Rigidity Across Regions

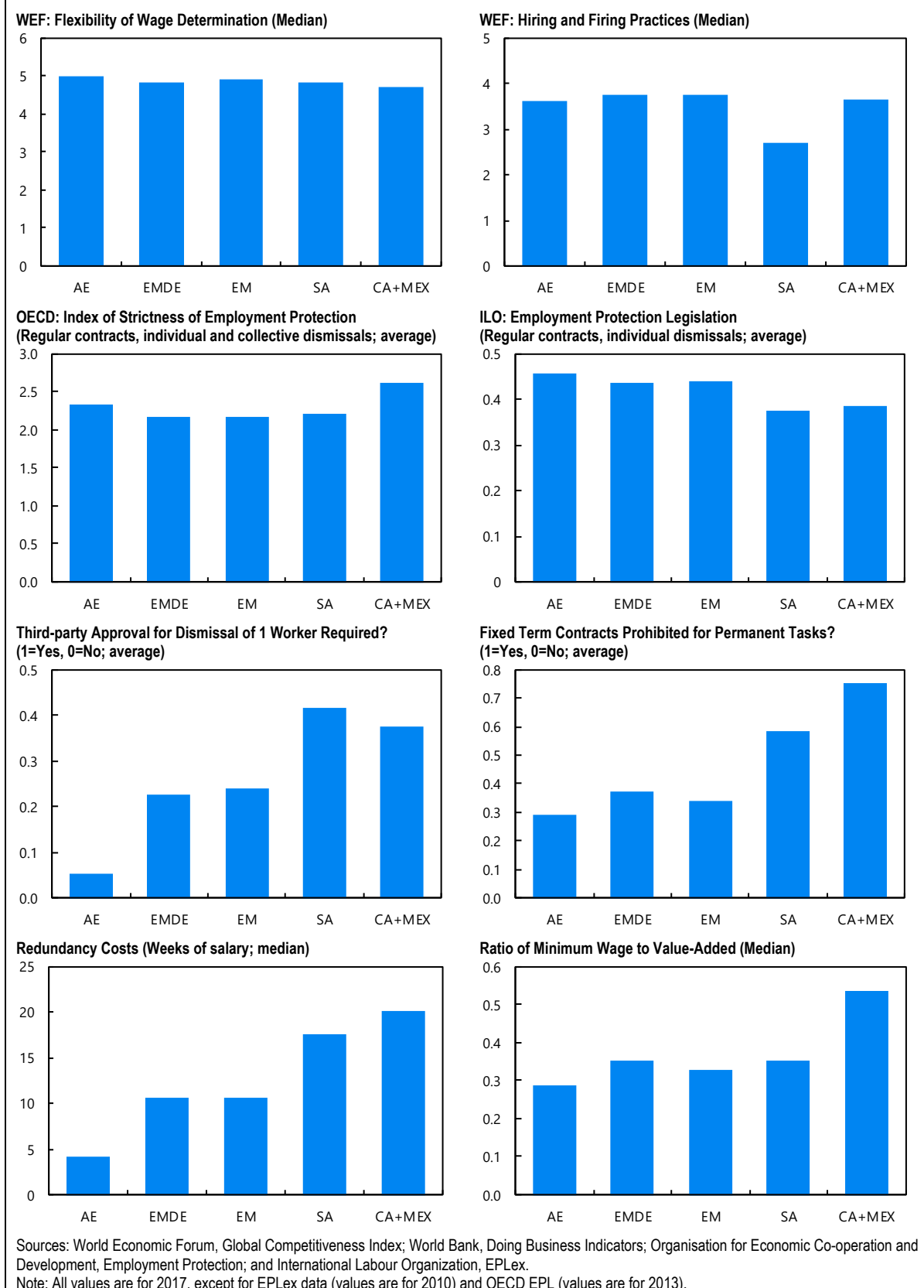
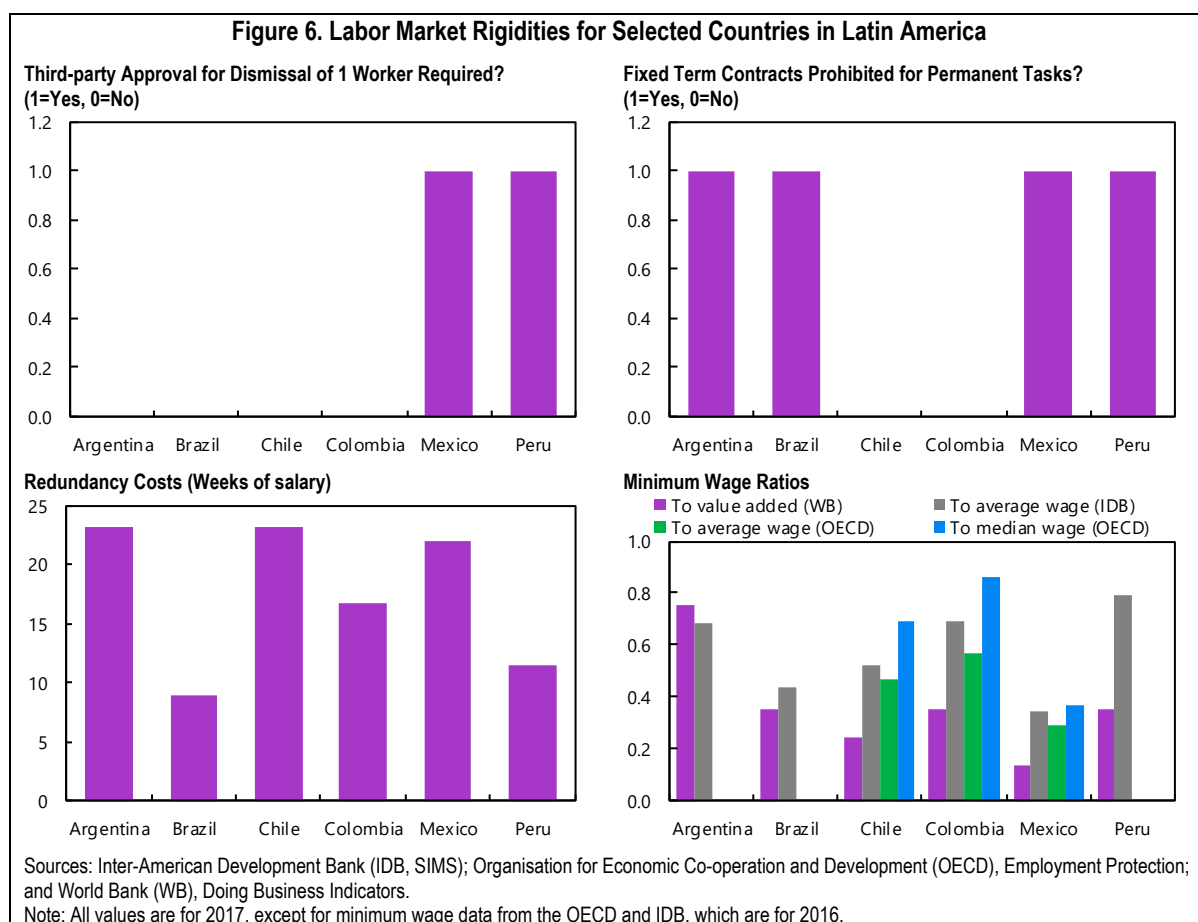


Figure 6 reproduces the bottom four panels of Figure 5 on hiring and firing procedures, redundancy costs and the minimum wage at the country level for the largest economies in Latin America. Cross-country comparisons suggest that those countries which underperform in terms of informality (Peru and Mexico – see above discussion) have cumbersome hiring and firing procedures. Argentina on the other hand, has the highest redundancy costs and a relatively high minimum wage. As the minimum wage bar chart shows, the choice of denominator plays an important role in the assessment of how binding the minimum wage is. The minimum wage is clearly quite low in Mexico and Brazil while it appears relatively high in Colombia and to a lesser degree in Peru. The ratio of the minimum wage to the median wage from the OECD is not available for three of the six countries.



Summarizing the above stylized facts, we note that (i) employment growth across the region was very strong in the 2000s but has moderated noticeably since the end of the terms of trade boom. (ii) Informality is a major feature of Latin American labor markets and those countries high informality relative to their level of development have the lowest and most stable levels of unemployment, suggesting that the informal/formal margin can act as a substitute for employment/unemployment margin. (iii) There is some evidence that those countries with higher informality also have more rigid employment protection legislation even though de

facto employment protection is a difficult concept to measure. In the following sections we explore the above points through several empirical exercises.

### III. DECOMPOSING UNEMPLOYMENT DYNAMICS

This section uses a simple approach to decompose changes in unemployment for the largest countries in Latin America into changes in labor demand and changes in labor supply.<sup>7</sup> A similar approach was implemented by Hijzen et al. (2017) for OECD economies. More specifically, changes in unemployment relative to a reference period can be decomposed as follows:<sup>8</sup>

$$u - u^* \approx -(y - y^*) + (z - z^*) + (part - part^*) + (wap - wap^*) \quad (1)$$

where  $u$  denotes the unemployment rate, and  $y$ ,  $z$ ,  $part$ , and  $wap$  the logarithms of GDP, labor productivity, the labor force participation rate and working-age population (\* indicates the value of a variable at the beginning of the period). In this set-up, changes in labor demand correspond to the sum of changes in output and changes in labor productivity, whereas changes in labor supply are captured by changes in the participation rate and working age population.

In broad terms, the decomposition shows that unemployment rose in the late 1990s as supply outstripped demand, then fell during the commodity boom period (2000 to 2011) as labor demand picked up more than labor supply (Figure 7). The global financial crisis only had a very limited impact on unemployment in the countries in our sample, with the trends over 2000-2007 similar to those over 2007-2011 in all countries except Mexico. In recent years, unemployment has been broadly stable except in Brazil and Argentina, where it rose due to a sharp drop-off in demand even as labor supply growth slowed.

More insightful than the simple split into demand and supply, is a look at the margins of adjustment. On the supply-side, working age population growth has been largely stable across countries and time-periods. The labor participation rate has been an active margin of adjustment, on the other hand, mostly mitigating fluctuations in unemployment. In Chile, Colombia and Peru, in particular, the participation rate expanded strongly during boom years, but has stopped growing in the most recent period, with substantially weaker output growth, avoiding a rise in unemployment.

Note that higher labor productivity growth works to reduce labor demand here, given that the same output can be produced with less workers. Labor productivity growth has also played a

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<sup>7</sup> In this section we use labor 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.

<sup>8</sup> See Appendix B.

key role in limiting fluctuations in unemployment (see, for example, Mexico during the GFC where labor productivity growth was negative and Brazil and Argentina since 2011). One mechanism through which labor productivity can adjust to limit changes in unemployment is firms engaging in labor hoarding. Labor productivity may also fluctuate with changes in informality, as productivity tends to be lower in the informal sector.

To show the role of labor formality/informality, the above decomposition can be rewritten as follows, where  $l_F$  is the logarithm of formal employment and  $f$  is the logarithm of the ratio of formal to total employment (labor formality) <sup>9</sup>:

$$u - u^* \approx -(l_F - l_F^*) + (f - f^*) + (part - part^*) + (wap - wap^*) \quad (2)$$

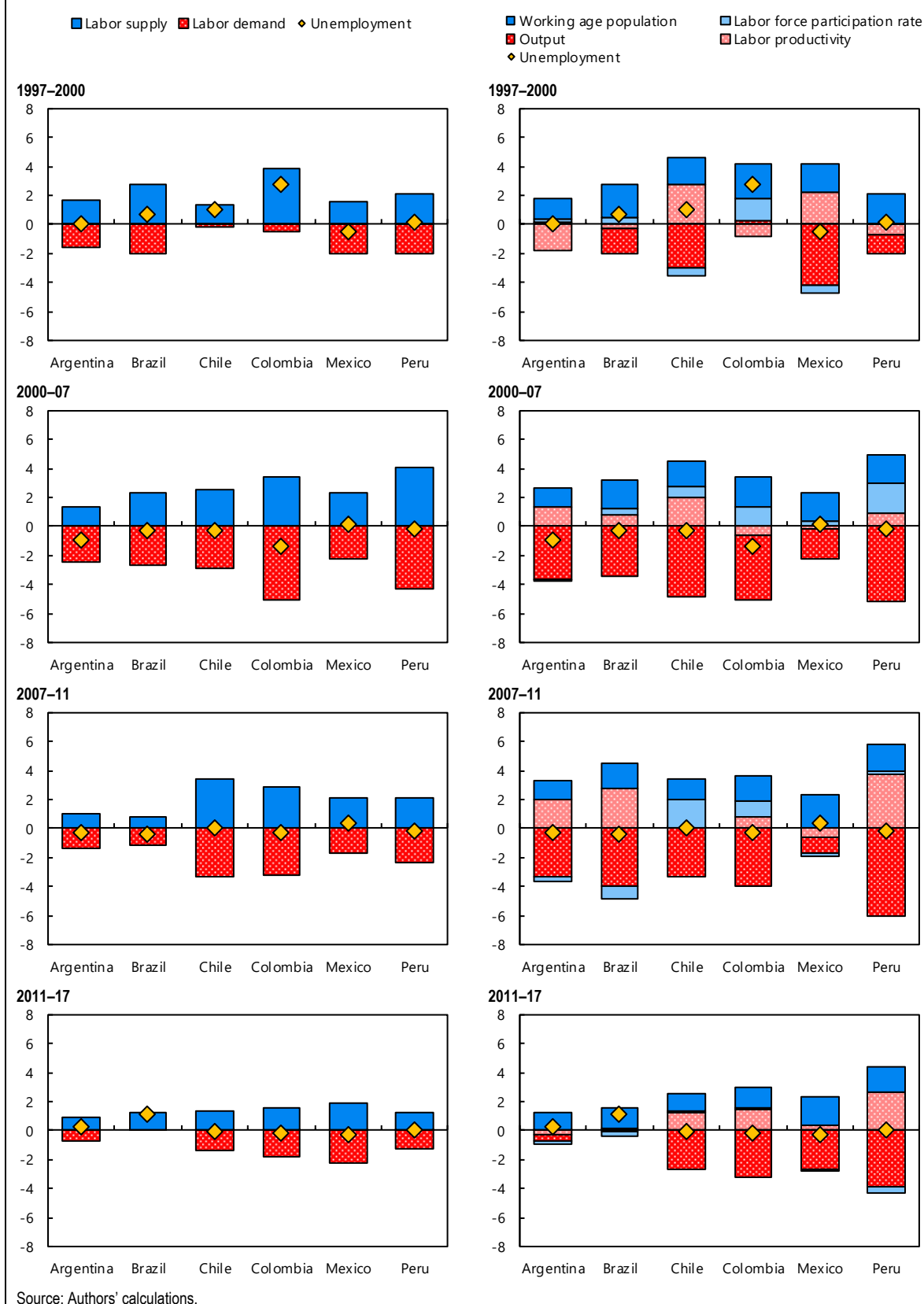
As Figure 8 shows, labor formality has played a crucial role in limiting movements in unemployment in Latin America. Consider the case of Colombia, for example. In the late 1990s, labor formality fell (informality rose), limiting the rise in unemployment during a difficult economic time, when labor demand was weak, and the labor force participation ratio rose. During the boom of the early 2000s, informality then fell sharply, only to resume its role as a shock absorber during the GFC. In the years since 2012 informality has fallen again significantly, implying that the unemployment rate did not fall as much as it would have otherwise.

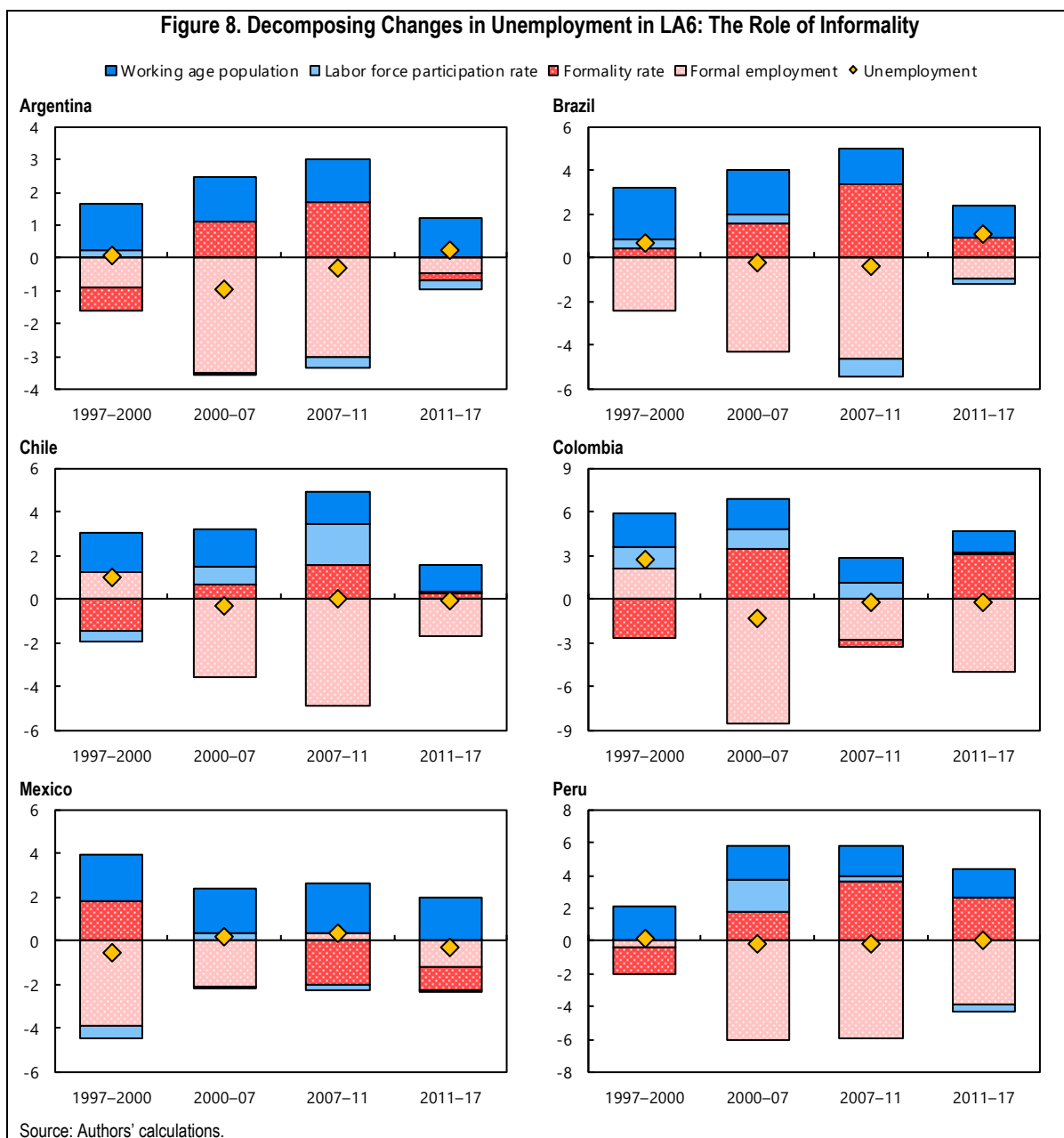
Similar counter-cyclical properties of informality can be observed in Argentina, Chile and Peru. Chile in 2007-11 shows how a strong increase in formal labor demand was met, in roughly equal shares, with increased participation and a reduction in informality for a stable unemployment rate. The two recent periods in Brazil and Mexico are interesting to look at for the 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.

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<sup>9</sup> Starting from (1), we multiply and divide employment by formal employment and cancel the output terms. Note that the formal/informal margin operates separately from the labor force participation margin given that the labor force comprises the unemployed, the formally employed and the informally employed workers.

Figure 7. Decomposing Changes in Unemployment in LA6





Overall though, changes in informality and labor force participation have helped to limit the rise in unemployment in downturns or during periods of growth slowdown. More generally, the above decomposition highlights the limited average annual fluctuations in unemployment over the various phases of the business cycle, stressing the need to look at a broader set of labor market outcomes to assess labor market 'slack' when studying Latin American countries. Based on the above decompositions we suggest using a combination of formal employment growth, the informality rate and unemployment to study the cyclical properties of labor markets in Latin America.



#### IV. REVISITING OKUN’S LAW

Okun’s law relates changes in output to short-term changes in unemployment and is a widely used tool to study cyclical relations between economic activity and labor markets. To compare how the observed fluctuations in unemployment vary over the business cycle in LAC with other EMDEs 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 labor markets to output growth.

We employ a heterogenous panel approach that 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 general empirical specification is summarized in equation 3 for  $i = 1, \dots, N$  countries; and  $t = 1, \dots, T$  time periods.<sup>10</sup>

$$u_{i,t} - u_{i,t-1} = \beta_i(y_{i,t} - y_{i,t-1}) + \vartheta_{i,t} \quad (3)$$

$$\vartheta_{i,t} = \alpha_i + \sum_{m=1}^p \lambda_{i,m} f_{m,t} + \varepsilon_{i,t},$$

where  $u_{i,t}$  is the unemployment rate,  $y_{it}$  is the log of output (real GDP),  $\alpha_i$  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 ( $\lambda_i$ ) can be country specific. One reason why accounting for such factors may be important when estimating Okun’s law is the possibility that for example, technological changes that are common across countries could affect the relationship between unemployment and output.  $\varepsilon_{it}$  is the error term, which is assumed to be white noise. An important caveat regarding the above specification is that changes in unemployment can lead to changes in future output, posing a possible endogeneity issue.

Standard panel estimators usually treat the slope coefficients ( $\beta$ ) as homogeneous across countries and frequently require stationarity of the variables included in the analysis, which might not be appropriate assumptions for macroeconomic panels. 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).

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<sup>10</sup> We also consider an alternative specification in which variables are expressed as “gaps” (i.e. deviations from trend), calculated using the HP filter with a smoothing parameter of 6.25. The results obtained are quantitatively very close to the ones reported on Table 1 below.

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 (Equation 3). The estimator yields consistent and efficient estimates and its small sample properties do not seem to be affected by residual serial correlation of the error terms. Crucially, Kapetanios, Pesaran and Yamagata (2011) show that this estimator performs well when variables included in the model are non-stationary and they advocate the use of this estimator irrespective of the order of integration of the data. Eberhardt and Presbitero (2015) apply this approach to examine the link between debt and growth.

### A. Baseline Results

Table 1 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). We exclude from the sample countries with less than 20 years of data. The unemployment rate (expressed as a percentage of the total labor force) series comes from the World Development Indicators Database and real GDP series in constant local currency units from the IMF's World Economic Outlook database.

Specification 1 presents the results of a model with no lags of the change in real GDP, the coefficient  $\beta$  is around -0.12 and is statistically significant at the 1 percent level. Including up to four additional lags of the change in GDP (specifications 2 to 5) does not change the contemporaneous coefficient much. Moreover, only the first lag of the change in GDP appears to be statistically significant in a robust manner.<sup>1112</sup>

Ball, Leigh, and Loungani (2017) obtain average estimates for  $\beta$  of around -0.40 for a sample of 20 advanced economies, but these authors point to significant cross-country variation in estimates.<sup>13</sup> This suggests that unemployment responds less to output fluctuations in developing countries. This conclusion is confirmed by average estimates by country income groups (Figure 9). We also present the sum of coefficients for changes in GDP in specification 2. In fact, coefficient estimates are larger in absolute value for advanced economies relative to all other groupings (including South and Central America with Mexico). Coefficients for LAC are somewhat larger than for EMs more broadly.

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<sup>11</sup> As a robustness check, we also estimate the specification using quarterly data and obtain similar estimates. Nevertheless, the country and time series coverage of the regressions is significantly reduced.

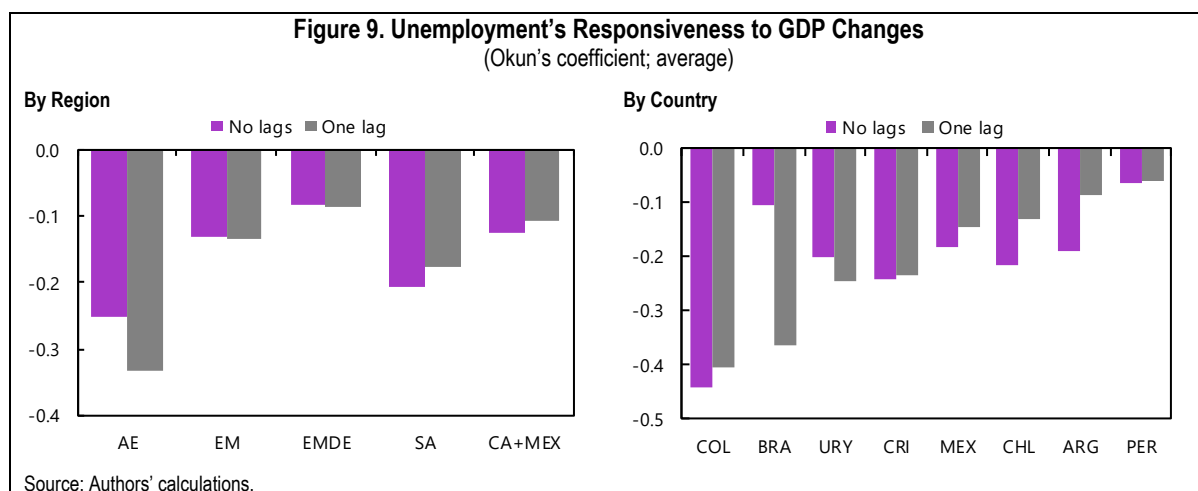
<sup>12</sup> We undertake a similar exercise using the employment rate as the dependent variable. Results are available on request.

<sup>13</sup> Ahn et al. (2019) also consider the cyclical sensitivity of unemployment for a broad sample of emerging and developing economies using more traditional panel data methods with interaction effects. They obtain results that are consistent and quantitatively similar to the ones discussed in this section.

Table 1.

	(1)	(2)	(3)	(4)	(5)
	$\Delta$ Unemployment	$\Delta$ Unemployment	$\Delta$ Unemployment	$\Delta$ Unemployment	$\Delta$ Unemployment
$\Delta GDP_t$	-0.125*** (0.0152)	-0.115*** (0.0169)	-0.124*** (0.0174)	-0.122*** (0.0173)	-0.126*** (0.0185)
$\Delta GDP_{t-1}$		-0.0330*** (0.00989)	-0.0386*** (0.0111)	-0.0387*** (0.0118)	-0.0372*** (0.0122)
$\Delta GDP_{t-2}$			0.0187* (0.0110)	-0.00683 (0.0114)	-0.000180 (0.0138)
$\Delta GDP_{t-3}$				0.0341*** (0.0109)	0.0202* (0.0110)
$\Delta GDP_{t-4}$					0.0282*** (0.00984)
Constant	0.0600 (0.0867)	0.0239 (0.107)	-0.0159 (0.106)	0.0966 (0.106)	0.205 (0.144)
Observations	3,399	3,379	3,355	3,331	3,307
Countries	127	127	127	127	127

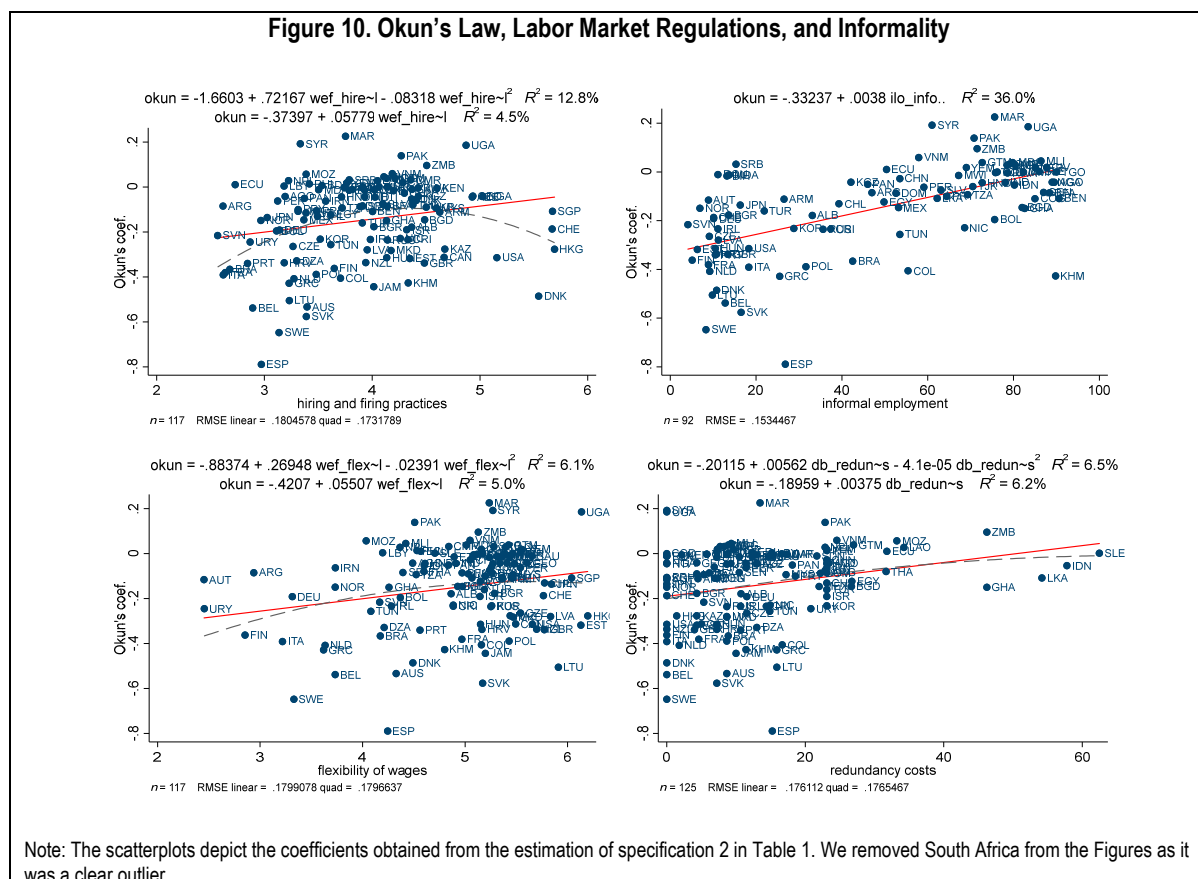
Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



## B. Okun's Coefficients and Labor Institutions

The remainder of the section relates the cross-country variation of estimated coefficients to key structural labor market characteristics and institutions (we focus on specification 2 of Table 1). More restrictive institutions can create distortions that would prevent the efficient allocation of labor, possibly leading to adverse impacts on productivity (Freeman, 2010; Duval and Loungani, 2018). Restrictive institutions can also impede adjustment to shocks by reducing churning/turn over in the labor market. Nevertheless, existing institutions can also play a neutral or positive role by reducing information asymmetries and solving coordination problems (see Freeman, 2010).

We begin by examining the link between country-specific coefficients and the hiring and firing practices indicator from the World Economic Forum's Global Competitiveness Report (top left panel of Figure 10).<sup>14</sup> We find no evidence of a clear linear relationship. The scatter plot suggests a possible inverted-U shaped relationship between the Okun coefficient and the hiring and firing practices indicator, but the fit is rather tenuous.



In contrast, there is a 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<sup>15</sup> (see top right panel of Figure 10). 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 can act as a margin of adjustment to cyclical fluctuations in line with the findings of Besley and Burgess (2004) regarding the overall impact of labor regulations on informality.

<sup>14</sup> Throughout the section, we use for each country average values of the labor market institutions over the sample period unless otherwise stated.

<sup>15</sup> The 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.

When considering other indicators of labor market institutions, we find some evidence of a bivariate relationship between Okun's coefficient and measures of redundancy costs (severance pay in weeks of salary from the World Bank's doing business database) and perceptions regarding the flexibility of wages indicator from the World Economic Forum's Global Competitiveness Report (bottom panels of Figure 9). Higher redundancy costs seem to be linked to a lower responsiveness of unemployment to cyclical fluctuations, suggesting that institutionally imposed costs would shift the burden of adjustment to shocks away from changes in the quantity of labor towards other margins. The evidence also suggests that higher wage flexibility dampens the impact of output fluctuations on unemployment, which is in line with economic theory.<sup>16</sup>

However, outlier-robust regressions of Okun's coefficients reported on Table 2 show that once we control for informality, most indicators capturing labor market institutions are not statistically significant, with the exception of the indicator capturing wage flexibility. To provide a sense of the relative economic importance of the different variables, if we consider specification 6 in Table 2, a one standard deviation increase in informality increases Okun's coefficient by 0.10 point and a one standard deviation increase in wage flexibility increases the coefficient by 0.03 point.

More specifically, we estimate the following specification, where  $X_{j,i}$  is a vector of control variables capturing different institutional features of labor markets (including informality):

$$\beta_i = c + \sum_{j=1}^k \gamma_j X_{j,i} + \varepsilon_i$$

In addition to the variables already presented in the bivariate scatterplots, we include in the regressions a dummy capturing whether a third-party approval is required to dismiss one worker as well as a dummy indicating whether fixed-term contracts are prohibited for permanent tasks (both variables come from the Doing Business indicators database). Moreover, we also consider the overall restrictiveness of employment protection legislation as measured by the ILO's index (higher values of the indicator reflect more restrictive regulations). The country coverage for the latter indicator is somewhat more limited. The results suggest that, if at all, labor market institutions are more likely to affect Okun's coefficient in an indirect manner i.e., to the extent that they affect the level of informality. We will explore this possibility in the next section.

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<sup>16</sup> For example, Bakker (2015) shows that wage adjustment played an important role in the very different developments of unemployment in Spain and the United Kingdom in the aftermath of the Global Financial Crisis.

**Table 2.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Okun's coefficient	Okun's coefficient	Okun's coefficient	Okun's coefficient	Okun's coefficient	Okun's coefficient	Okun's coefficient
Informality	0.00368*** (0.000487)	0.00368*** (0.000518)	0.00366*** (0.000537)	0.00363*** (0.000595)	0.00355*** (0.000593)	0.00354*** (0.000644)	0.00353*** (0.000843)
Wage flexibility		0.0419** (0.0203)	0.0398* (0.0230)	0.0404* (0.0234)	0.0446* (0.0233)	0.0442* (0.0235)	0.0829*** (0.0276)
Hiring and firing			0.00448 (0.0271)	0.00575 (0.0284)	0.0150 (0.0288)	0.0128 (0.0291)	-0.0118 (0.0350)
Dismissal approval				0.00642 (0.0434)	0.00929 (0.0433)	0.0122 (0.0444)	-0.000733 (0.0527)
Fixed term contract					0.0604* (0.0322)	0.0621* (0.0326)	0.0640 (0.0409)
Redundancy costs						0.000456 (0.00135)	0.000285 (0.00169)
Employment protection							-0.0276 (0.190)
Constant	-0.314*** (0.0275)	-0.518*** (0.0984)	-0.525*** (0.110)	-0.533*** (0.114)	-0.619*** (0.119)	-0.614*** (0.120)	-0.686*** (0.160)
Observations	93	90	90	90	90	89	65
R2	0.385	0.414	0.412	0.409	0.432	0.440	0.475

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Outlier-robust regressions following Li (1985).

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. Yet informality has economic implications that go beyond its role in dampening the cyclicalities of unemployment,<sup>17</sup> which makes it worth analyzing in more detail.

## V. LINKS BETWEEN INFORMALITY AND LABOR MARKET INSTITUTIONS

We have determined that informality is an important factor in mitigating the responses of unemployment to cyclical fluctuations in output. This section explores the relationship between the level of informality and labor market institutions. Specifically, we estimate a series of cross-country regressions of the level of informality measured as the ratio of informal employment over total non-agricultural employment<sup>18</sup> on several indicators capturing different aspects of labor market institutions including: hiring and firing practices; flexibility of wage determination; redundancy costs (in weeks of salary); the ratio of the minimum wage to value added per worker; a dummy variable that takes the value 1 if a third-party approval is required to dismiss one worker and zero otherwise; and a dummy variable

<sup>17</sup> See for example Levy (2018).

<sup>18</sup> As before, the measure of informality is based on the latest available year for a given country of the indicator presented in ILO (2018).

capturing whether fixed-term contracts are allowed for permanent tasks.<sup>19</sup> We also control for the level of real GDP per capita<sup>20</sup> and the level of education<sup>21</sup>, variables that are deemed to be important determinants of informality in the literature (see Shleifer and LaPorta, 2014).<sup>22</sup> The specifications take the following form:

$$informality_i = c + \gamma_1 GDP_i + \gamma_2 Schooling_i + \sum_{j=3}^k \gamma_j X_{j,i} + \varepsilon_i$$

The regression results are presented in Table 3. Again, we consider regressions robust to outliers following Li (1985). GDP per capita and years of schooling are highly significant determinants of informality with the expected negative sign in all specifications. In addition, the measure capturing redundancy costs is also statistically significant at the one percent level and the coefficient suggests that higher costs are linked to higher levels of informality. The dummy variable capturing whether a third-party approval is required to dismiss one worker is also statistically significant at conventional levels with the expected positive coefficient. This variable likely reflects added uncertainty costs of dismissal. Other measures capturing labor market institutions are not significantly related to informality.

As a robustness check, we undertake a Bayesian model averaging exercise (BMA) following the approach proposed by Magnus, Powell, and Prufer (2010). We include additional variables such as an indicator of cooperation in labor relations (from the World Economic Forum). Considering 256 different models, the results reported in the last column of Table 3 confirm that among the variables capturing labor market institutions, only the measures capturing redundancy costs and dismissal approval have high posterior probabilities of inclusion (PIP).

Overall, L&Rs aimed to protect employment seem to be associated with higher levels of informality. Given the results of the previous section, this relationship suggests that L&Rs exert an indirect influence on the cyclical response of unemployment to output fluctuations. In principle labor market reforms aimed at loosening some of these regulations could then increase the responsiveness of the labor market to growth and improve labor market outcomes. We investigate this question in the next section.

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<sup>19</sup> As 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.

<sup>20</sup> Real GDP per capita in 2011 PPP terms for 2016 comes from the World Bank's WDI database.

<sup>21</sup> Latest available observations for years of schooling in the Barro-Lee dataset (Barro & Lee, 2013).

<sup>22</sup> La Porta and Shleifer explain informality by a lack of demand for formal products (which imply that it is not worth encountering the fixed cost needed to produce them) and supply factors (a lack of skilled entrepreneurs able to thrive in the formal sector). Others have stressed the role of costly regulation which makes it unattractive for firms and labor to enter the formal sector. See Perry et al. (2007) for an extensive overview.

**Table 3.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	BMA
	Informality	Informality	Informality	Informality	Informality	Informality	Informality	PIP
GDP per capita	-11.87*** (2.096)	-11.69*** (2.114)	-11.71*** (2.139)	-11.70*** (2.095)	-11.64*** (2.108)	-8.705*** (1.905)	-8.908*** (1.900)	1.00
Schooling	-4.398*** (0.768)	-4.513*** (0.771)	-4.505*** (0.781)	-4.215*** (0.765)	-4.303*** (0.768)	-4.797*** (0.696)	-4.865*** (0.700)	1.00
Wage flexibility		2.649 (1.629)	2.601 (1.706)	2.596 (1.668)	2.733 (1.676)	2.590* (1.501)	2.438 (1.515)	0.19
Hiring and firing			0.112 (1.836)	0.536 (1.809)	-0.203 (1.923)	0.570 (1.747)	0.607 (1.736)	0.21
Dismissal approval				8.391** (3.440)	8.563** (3.459)	5.603* (3.173)	5.815* (3.156)	0.43
Fixed term contract					-2.820 (2.764)	-3.401 (2.478)	-2.889 (2.568)	0.21
Redundancy costs						0.393*** (0.0988)	0.403*** (0.0996)	0.99
Min. Wage/value added per worker							-3.759 (5.050)	0.11
Constant	192.7*** (14.73)	178.9*** (18.25)	178.8*** (19.25)	173.1*** (19.13)	176.6*** (19.80)	146.6*** (18.30)	150.7*** (18.86)	
Observations	94	89	89	89	89	88	88	
R2	0.819	0.830	0.829	0.837	0.839	0.874	0.877	

Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Posterior inclusion probability from Bayesian model averaging reported in the last column.

## VI. CASE STUDIES: ASSESSING THE IMPACT OF SELECTED LABOR MARKET REFORMS

In this section we apply the synthetic control method (Abadie and Gardeazabal, 2003) to study the impact of specific labor market reforms implemented by some countries in the region on key aggregate labor market variables. This methodology has been applied to the study of the impact of structural reforms (including labor market reforms) in a number of OECD economies (Adhikari et al., 2016).

The synthetic control method is a data-driven way to construct a relevant counterfactual (i.e. the evolution of the macroeconomic variable had the reform not taken place) for a rigorous analysis of a given reform. The method provides a systematic way to identify the control unit, which is selected as the linear combination of all potential comparison units that have similar characteristics to those of the country of interest before treatment. The estimation consists of identifying a specific treatment (structural reform in our case), and then comparing the difference in outcomes before and after the treatment for the treated country to the difference in outcomes before and after the treatment for the untreated countries.

We employ several reform databases to identify reform episodes as well as relevant “donor pools” of controls units that have not implemented reforms over a given exclusion window.



For advanced economies, we use the narrative database of major product and labor market reforms constructed by Duval et al. (2018). In addition, for the period from 2008 to 2014, we also rely on the information compiled by Adascalitei and Pignatti (2015) covering 111 countries. For earlier periods, we use the reform database constructed by Campos and Nugent (2012) and cross-check against the information in Aleksynska and Schindler (2011).

An examination of those different databases and policy documents indicates three potentially interesting case studies in the region: Mexico 2012; Chile 2001; and Uruguay 2005.<sup>23</sup> While the Mexican reform of the Federal Employment law enacted in end-2012 increased the flexibility of labor market regulations in the country, the reform enacted by Chile in 2001 moved the legislation in the direction of increasing labor market regulations. Moreover, reforms enacted by Uruguay starting in the mid-2000s strengthened regulations on collective wage bargaining.

### **A. Mexico's 2012 Labor Reform**

In November 2012 the Mexican government approved a reform of the Federal Employment Law overhauling labor laws dating from the 1970s. Crucial changes to the legislation included measures to lower the costs of hiring workers and stimulate formal employment, as well as the introduction of new types of flexible labor contracts (IMF, 2013 and OECD, 2015). The new law also provided more judicial certainty and reduced firing costs by simplifying legal dispute settlement and by imposing ceilings on compensation for unjustified dismissals. The law also stipulated that productivity and skills should take precedence over seniority as the main criteria for promotion and filling vacancies. As Figure 11 shows, while the law relaxed employment protection for temporary contracts, overall the employment protection regime in Mexico seems to have remained relatively unchanged.

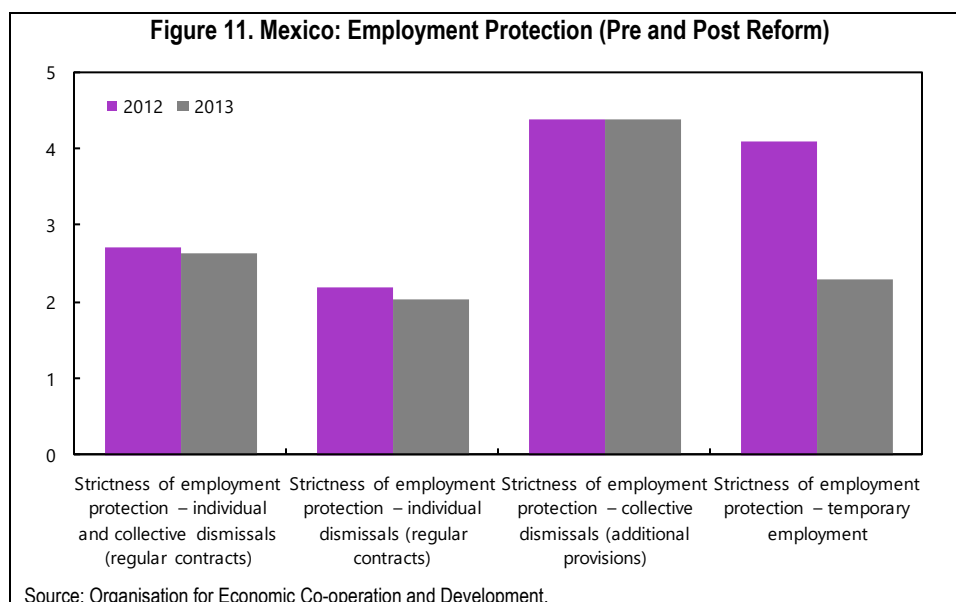
In a broader context, the new labor market legislation was enacted in a period of relatively strong growth for the Mexican economy with a narrowing of the output gap that had opened-up in the aftermath of the global financial crisis. In 2013, despite a slowdown in growth, the government continued to pursue an ambitious structural reform agenda covering other areas such as energy production and distribution, telecommunications, education, and the fiscal framework.

When implementing the synthetic control method for the Mexican case, we consider a sample period going from 2001 to 2017. We exclude from the donor pool of possible control units countries that have implemented major labor market reforms in a 10-year window

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<sup>23</sup> Brazil did a large labor market reform in 2017 but it is still too early to assess its impact. Colombia had a number of important reforms with implications for the labor market (most notably a substantial cut to payroll taxes) but our focus here is not on labor taxation but rather on institutional features of the labor market. See Kugler, Kugler and Herrera Prada (2017) for a detailed assessment of Colombia's payroll tax reform.

around (i.e., 5 years before and 5 years after) the “intervention” date (2012). Reforms in the potential control units were identified using the episodes described in Duval et al. (2018) as well as reforms contained in the Adascalitei and Pignatti (2015) database for a wider sample of countries. We also chose to exclude low income countries as well as Iraq from the donor pool.



To construct the synthetic controls used to approximate the unit affected by the reform, we included the following variables as predictors of the outcome variables of interest: the average value of the variable itself over the pre-treatment period (as well as the values for 2009 and 2011 to improve the fit of the synthetic control); the average GDP growth over the pre-treatment period; the level of informal employment in the non-agricultural sector, the average growth of the labor force over the pre-treatment period, and redundancy costs (in terms of weeks of salary) for the year 2007.<sup>24</sup>

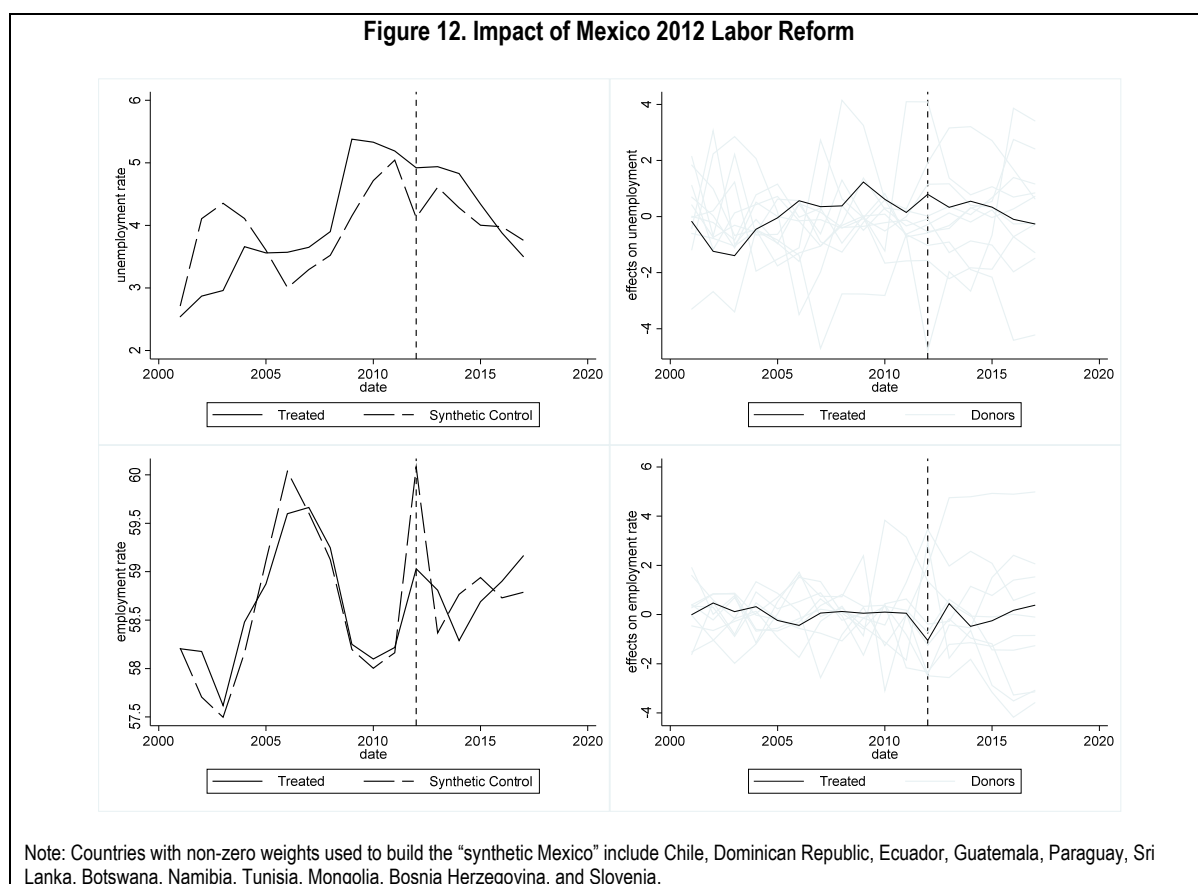
We focus the analysis on the evolution of two outcome variables: the unemployment rate and the employment rate.<sup>25</sup> Figure 12 presents estimates of the effect of the reform by comparing the evolution of these variables for Mexico to their evolution for the synthetic control group constructed as a weighted combination of control units chosen to approximate the treated unit. Overall, the exercise does not suggest that the reform enacted in end-2012 had a significant favorable impact on either the unemployment rate or the employment rate. Differences between Mexico and the counterfactual synthetic country are small for both outcomes variables.

<sup>24</sup> See previous sections for data sources and definitions.

<sup>25</sup> Ideally, we would like to study the impact on informality, but we do not have a large enough panel of consistent informality data for such an exercise.

We also undertake several “placebo” tests (see the right-hand-side panels of Figure 12), where we estimate the same model for each untreated unit assuming it was treated (Abadie et al., 2014 and Cavallo et al., 2013). If the distribution of the placebo effects yields similar or larger effects as in the baseline case, then the estimated baseline effects are likely to be spurious. These tests confirm that the effects of the reform are not significant. The p-value statistic proposed by Abadie et al. (2014) that captures the proportion of untreated units that have an estimated effect at least as large as the treated unit does not point to statistically significant effects.

The relatively muted impact of the reform could be a reflection of its limited scope. As illustrated in Figure 11, overall employment protection regulation seems to have remained strict after the reform (according to the methodology followed by the OECD), despite a relaxation of specific regulations.



## B. Chile's 2001 Labor Reform

The labor reform enacted in Chile in 2001 was perceived as a change in regulations that increased rigidities, notably by increasing firing costs as well as strengthening the rights of trade unions on several aspects (IMF, 2002 and OECD, 2003). Significant changes in the legislation included increases in firing costs when the dismissal is deemed unjustified or “anti-union” by the labor court; increased penalties for violating labor laws; increased costs for nightly overtime; restrictions of employers’ right to replace striking workers; as well as a gradual reduction in the work week by 2005. The 2003 OECD Economic Survey for Chile reports (on page 83) that the reform was met with hostility by employers and was perceived as a cause for decreases in recruitment and increases in the use of sub-contractors.

Contrary to the case of Mexico (discussed above), the reform was undertaken in a context of modest GDP growth, which was hampered by weak domestic demand and an adverse external environment, notably because of a decline in terms of trade and spillovers from the crisis in Argentina. Unemployment remained significantly above historical trends (IMF, 2002).

When implementing the synthetic control method for Chile, we consider a sample period going from 1991 to 2006. As before, we exclude from the donor pool of possible control units countries that have implemented major labor market reforms in a 10-year window around the “intervention” date (2001). For advanced economies, reforms in the potential control units were identified using the episodes described in Duval et al. (2018). For other countries we rely on large changes in the rigidity of labor market regulations index constructed by Campos and Nugent (2012) for the period 1960-2004.<sup>26</sup> We also chose to exclude low income countries and Iraq from the donor pool. We use similar predictors of the outcome variables of interest to the ones considered for the previous application (average GDP growth over the sample period; the average growth of the labor force; the level of informal employment in the non-agricultural sector as well as redundancy costs), but also add the values for the outcome variables and GDP growth in 1999 and 2000 to improve the pre-intervention fit of the synthetic control.

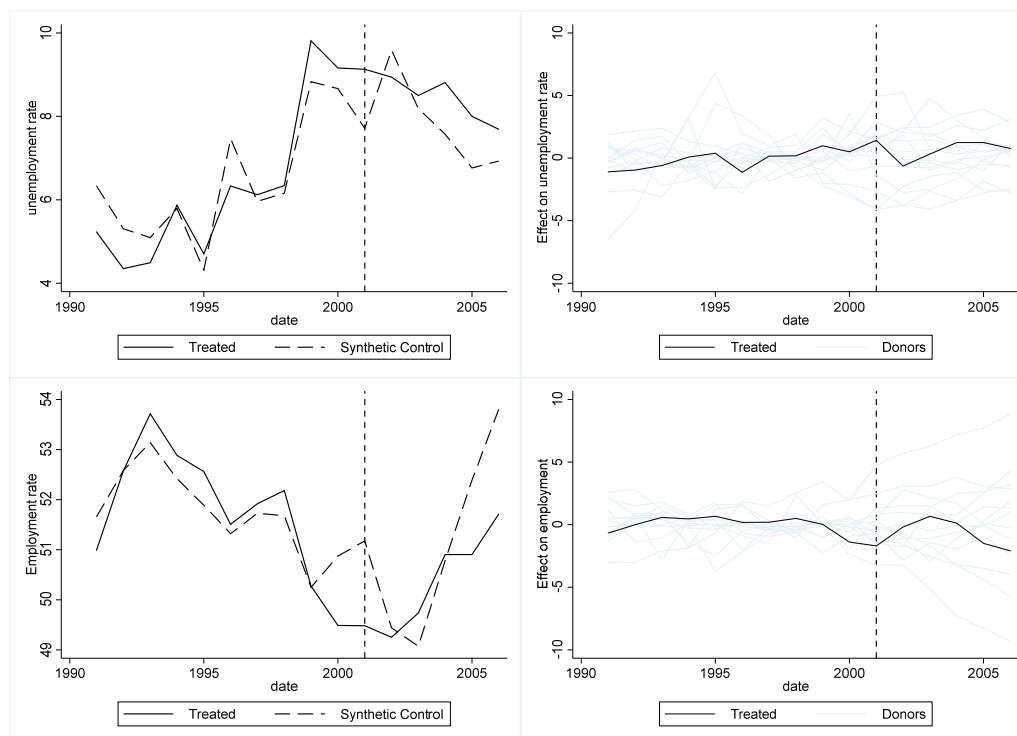
We find some evidence that the reform had modest adverse effects on outcome variables (Figure 12), particularly on the employment rate, with differences becoming relatively larger towards the end of the period considered, when the employment rate in the synthetic control is over 2 percentage points higher than in Chile. Differences in the evolution of the unemployment rate are smaller, not exceeding 1.2 percentage points and dropping below 0.8 percentage point by the end of the period. The placebo tests, presented in the right-hand-side panels of Figure 13, generally do not point to a significant impact of the reform (the p-value

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<sup>26</sup> We use a threshold of 0.2 for the absolute change in the index, which is similar to what is observed for Chile after the reform.

statistic for the employment rate only points to significant effects for the initial year of treatment).

**Figure 13. Impact of Chile 2001 Labor Reform**



Note: Countries with non-zero weights used to build the "synthetic Chile" include Brazil, Costa Rica, Pakistan, Paraguay, Turkey, Tunisia, and Venezuela.

### C. Uruguay's 2005 Labor Reform

The government that took office in Uruguay in 2005 revived wage councils in the private sector with greater coverage than before (OECD, 2014). Wage councils had effectively been suspended since 1992 and during that time firm-level wage bargaining prevailed in the country. Decree 105/05 of March 7<sup>th</sup>, 2005 created the two tripartite councils, the Senior Tripartite Council and the National Rural Council, with representatives from trade unions, business organizations, and the government. From a macroeconomic perspective, the reform occurred at a time when the economy had recovered from the 2002 crisis, inflation was under control at single digit levels, and external conditions were favorable (IMF, 2006).

The reform completely changed the wage bargaining process in the country (Mazzuchi, 2009). Since then, agreement on wage bargaining has usually been reached by consensus at the sector level. Nevertheless, there is room for flexibility in the framework to take into account factors such as geographical location; company size; as well as firm specific

circumstances (firms can opt-out if compliance threatens jobs), but these considerations have not been frequently applied in practice (Mazzuchi, *ibid*).

As documented by Mazzuchi (2009), the share of workers covered by collective bargaining in the private sector went from around 28 percent in 2000 to over 97 percent in 2005. Uruguay now has the highest share of workers protected by the conditions negotiated by unions in the region with collective bargaining coverage levels similar to what is observed in OECD countries (Kugler, 2019).

When implementing the synthetic control method for the Uruguayan case, we consider a sample period going from 1995 to 2010. As before, we exclude from the donor pool of possible control units, countries that have implemented major labor market reforms in a 10-year window around (i.e., 5 years before and 5 years after) the intervention date. Reforms in the potential control units were identified using the episodes described in Duval et al. (2018) and the reforms of the Adascalitei and Pignatti (2015) database. We also chose to exclude low income countries, as well as Iraq from the donor pool.

We use similar predictors of the outcome variables of interest to the ones considered for the previous applications (average GDP growth and average growth of the labor force over the pre-treatment period; the level of informal employment in the non-agricultural sector as well as redundancy costs), but also add the values for the outcome variables and GDP growth in 1998 and 2002 and 2003 to improve the pre-intervention fit of the synthetic control. The measure of informality constructed by the ILO, which we used in previous sections is not available for Uruguay. In this context, we chose to rely on the informality measure for Uruguay constructed by the Inter-American Development Bank (IDB) instead.

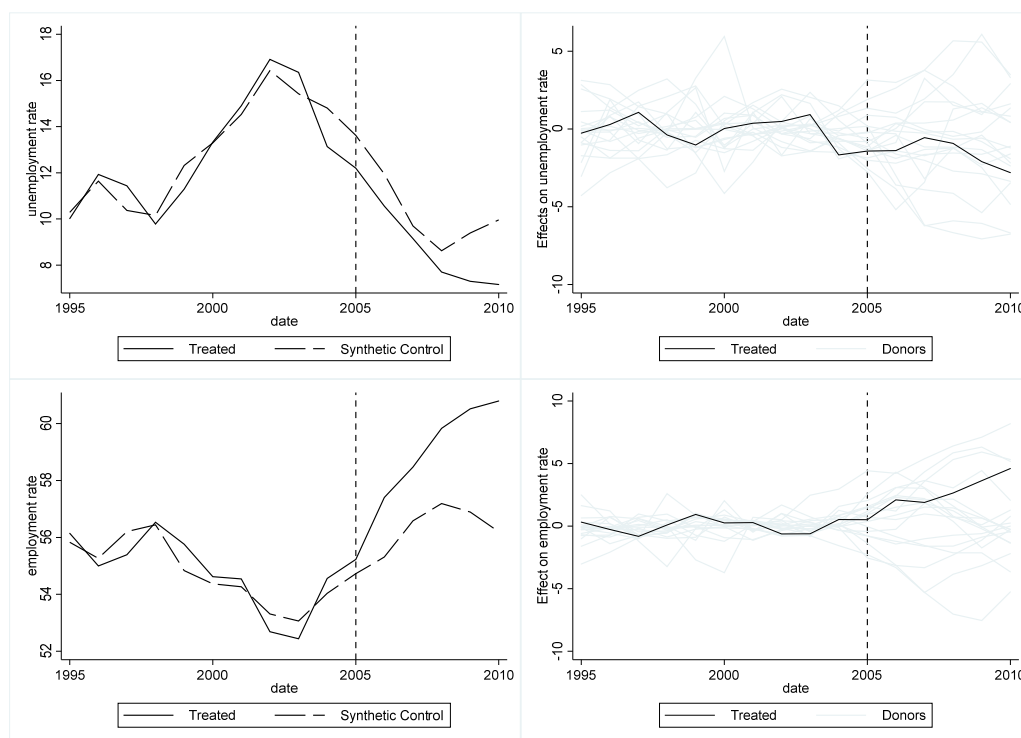
The reform seems to have entailed positive effects on outcome indicators: unemployment rates fell, and employment rates increased relative to the synthetic control, albeit the effects on the unemployment rate are rather small. The placebo tests depicted in Figure 14 point to insignificant effects of the reforms on the unemployment rate, while the effects on the employment rate are only marginally significant at longer horizons.

It is plausible that the reform might have helped to improve coordination in a context of favorable economic growth. In fact, The IMF's 2006 Article IV staff report for Uruguay suggests that the reinstatement of the wage councils helped to bring stability to labor relations channeling demands in an orderly fashion and fostering an environment conducive to moderation. As a result, wage pressures in 2005 were contained and the increase in wages was broadly in line with productivity growth (IMF, 2006).

More generally, recent empirical work on the effects of collective bargaining arrangements suggests that coordinated collective bargaining systems tend to lead to higher employment and lower unemployment when compared to fully decentralized systems, while fully

centralized systems fall somewhere in the middle (OECD, 2018). One channel explaining this result is that coordination in wage bargaining can help to take into account the macroeconomic effects of wage agreements by ensuring that they do not undermine competitiveness and also consider the economy's position in the business cycle.

**Figure 14. Impact of Uruguay 2005 Labor Reform**



Note: Countries with non-zero weights used to build the "synthetic Uruguay" include Mexico, Paraguay, Poland, Slovenia, and South Africa

## VII. CONCLUSION

The strong performance of labor markets in Latin America in the 2000s and early 2010s was mainly driven by strong economic growth, supported in some countries by the commodity price boom. Since the end of the terms of trade boom, employment growth in Latin America has moderated noticeably, lagging behind employment growth in other EMDEs. In that sense, there has been nothing extraordinary about the performance of Latin American labor markets compared to that of other EMDEs' labor markets.

This paper emphasizes the role played by informality in the dynamics of labor markets in Latin America. A decomposition of changes in unemployment over several sub-periods highlights the countercyclical role of informality, which has been shown in the literature by Bosch et al. (2008), among others. An econometric analysis of the Okun's law shows that the formal/informal adjustment margin reduces the importance of the employment/unemployment margin. This result implies 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 capture labor market slack. To gauge the cyclical position of Latin American labor markets it is more informative to additionally also report the informality rate (as shown is the decomposition of Section III).

A country's income level (demand for formality) and the level of education of its workforce (supply of formality) have been found to be two key determinants of informality. Controlling for both, we show that certain dimensions of stricter employment protection legislation increase informality, most notably higher redundancy costs and cumbersome dismissal regulations.

In Latin America, anecdotally, 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 to matter for informality (requiring third party approval for dismissal of even one worker, for example).

The evidence of the role of certain EPLs in determining the level of informality supports the recommendation in Duval and Loungani (2018) that reducing the expected cost of firing procedures, making them more transparent and predictable and less administratively burdensome, is likely to be an important way to tackle informality and ultimately further improve the functioning of Latin American labor markets. Duval and Loungani (2018) also highlight the importance of building up unemployment insurance and other benefits at the same time to guarantee adequate protection of workers.

The case studies of selected labor market reforms indicate that Mexico's 2012 attempt to increase flexibility and stimulate formal employment yielded muted results in terms of labor market outcomes. Similarly, reforms introduced by Chile in the early 2000s that moved in the direction of increasing rigidities do not seem to have had significant deleterious effects on the unemployment rate or the employment rate relative to the synthetic control. Reforms introduced in the mid-2000s in Uruguay that fundamentally changed collective bargaining seem to have entailed some positive effects on the employment rate in the first five years after the reform was enacted, possibly because it might have helped to improve coordination in a context of favorable economic growth. Overall, these findings highlight the importance of the specific design and context in driving the success or failure of reforms in improving labor market functioning.



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## APPENDIX A: MEASURES OF LABOR MARKET INSTITUTIONS AND REGULATIONS

### Overview

Labor market institutions encompass a broad and complex set of factors. The OECD distinguishes between four broad categories of labor market policies and institutions: (i) labor market programs, (ii) strictness of employment protection, (iii) statutory minimum wages and (iv) collective bargaining coverage. The World Bank distinguishes between three broad categories of labor market regulations: those related to (i) entering employment and working conditions, (ii) statutory minimum wages and (iii) redundancy.

Here we will focus on a discussion of data related to employment protection legislation (point (ii) in the OECD list and point (iii) in the World Bank list) and minimum wages. Labor market programs and a broader assessment of working conditions (such as leave policies and working hour rules) are outside the scope of this paper, as are payroll taxes and issues related to collective bargaining.

Employment protection rules are multidimensional and difficult to quantify. There exist three comprehensive datasets which measure aspects of employment protection legislation in Latin America. They are the OECD's "Indicators of Employment Protection Dataset", the International Labor Organization (ILO)'s "EPLex Dataset" and the World Bank's "Doing Business" labor market appendix.<sup>27</sup> The OECD and ILO provide aggregate indexes which are constructed as a weighted average of the individual components. While such an aggregate index can be useful, the correlation among the individual components is often low (or even negative) and it is not clear whether they have the same importance for labor market outcomes. Using the subcomponents will thus be preferable in most applications.

In addition, institutions such as the World Economic Forum (WEF) and the Fraser Institute construct indexes of labor market regulation. As we discuss below, the latter two indexes should be used with caution given methodological shortcomings (see Aleksynska and Cazes, 2014).

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<sup>27</sup> OECD - <http://www.oecd.org/els/emp/oecdindicatorsofemploymentprotection.htm>;  
ILO - [https://www.ilo.org/travail/areasofwork/WCMS\\_435450/lang-en/index.htm](https://www.ilo.org/travail/areasofwork/WCMS_435450/lang-en/index.htm);  
WB - <http://datatopics.worldbank.org/jobs/topic/labor-market-institution>

Source	Type of Data	Timeseries coverage	Country coverage	LAC country coverage
WB	De jure for a specific type of firm	2014-18 (updated annually)	189 countries	32 countries
OECD	De jure as well as de facto implementation of laws and regulations	1985-2013/14	Up to 45 countries, depending on the year	Limited, except in 2014 (18 countries)
ILO	Purely de jure	2009-2013	70-93 countries depending on the year	1-11 depending on the year
WEF	Mix of survey based, statistics and de jure	2007-2017	128-139 countries depending on the year	20-24 depending on the year

***WB Doing Business Labor Market: Redundancy Rules and Regulations:*** The data capture de jure rules and regulations as applicable for the representative ‘World Bank Doing Business Firm’. The redundancies section measures five dimensions of EPL for regular contracts: (i) procedural requirements (such as whether third-party notification or approval is required for dismissal), (ii) retraining and or reassignment obligation prior to dismissal, (iii) priority rules, (iv) notice period and (v) severance pay. Many of the variables are indicator variables. The data is available for over 190 countries, offering the broadest cross-country coverage. For a detailed discussion see Kuddo (2018).

***OECD Indicators of Employment Protection Legislation:*** The data are based on legal provisions as well as estimates of EPL practices such as the de facto observed compensation for unfair dismissal. EPL is measured in three areas – regular contracts, temporary contracts and collective dismissals. In the area of regular contracts (which are the focus of the data used in this paper), the data capture the following nine dimensions: (i) notification procedures, (ii) delay before notice can start, (iii) length of notice period, (iv) severance pay, (v) definition of justified or unfair dismissal, (vi) length of trial period, (vii) compensation following unfair dismissal, (viii) possibility of reinstatement following unfair dismissal and (ix) maximum time to make claim of unfair dismissal. Higher values indicate stricter employment protection. Data is available for all OECD countries as well as certain non-OECD countries. In particular, data for Latin America and the Caribbean is available due to a collaboration with the Inter-American Development Bank (IDB). For a description of the underlying methodology as well as the Latin America and Caribbean data see OECD/IDB (2014).

***ILO EPLex:*** The dataset quantifies the strictly de jure aspect of EPL. It covers the following eight dimensions of EPL with regard to regular (permanent) contracts (unlike in the OECD

dataset, no information on temporary contracts or collective dismissals is available): (i) valid grounds for dismissal, (ii) prohibited grounds for dismissals, (iii) probationary period, (iv) procedural notification requirements for dismissals, (v) notice periods, (vi) severance pay, (vii) redundancy pay and (viii) avenues for redress. Higher values indicate more labor protection. The ILO dataset has a wide country coverage but is only available for the years 2009-2013. For a detailed methodological description and an item-by-item comparison with the OECD data see ILO (2015).

***WEF Labor Market Efficiency:*** The WEF labor market efficiency index is constructed using ten sub-indexes, covering not only EPL but labor market regulation in a broad sense. Eight of those sub-indexes come from an opinion survey of business executives conducted by the WEF, one sub-index is taken from the World Bank Doing Business dataset and one indicator is an outcome statistic.<sup>28</sup> The aggregate index thus contains information from different sources, some measuring perceptions of aspects of EPL, others measuring perceptions of the labor market more broadly. Given changes in methodology over time, care should be taken when using the timeseries dimension of the data (Aleksynska and Cazes, 2014). For a description of the data see WEF (2018).

***Fraser Institute Labor Market Regulations:*** The aggregate index is composed of six sub-indexes, covering not only EPL but labor market regulation in a broad sense. All input into the Fraser index are taken from existing datasets. Three of them (hiring regulations and minimum wage, hours regulations and mandated cost of worker dismissal) are taken from the World Bank Doing Business dataset. Two are taken from the WEF labor market efficiency dataset (hiring and firing regulations and centralized collective bargaining). Finally, a measure of conscription (included with the justification that it reduces labor market choice) is taken from the International Institute for Strategic Studies. In contrast to the WEF data, the Fraser Institute data is thus a pure aggregation of existing data. For most purposes, using the underlying data instead would be preferable. Given changes in methodology over time in the underlying series, the aggregate timeseries dimension should be used with particular caution. For a detailed description of the data, see Vasquez and Porcnik (2018).

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<sup>28</sup> The perception-based sub-indexes are: (i) cooperation in labor-employer relations, (ii) flexibility of wage determination, (iii) hiring and firing practices, (iv) effect of taxation on incentives to work, (v) pay and productivity, (vi) reliance on professional management, (vii) country capacity to retain talent and (viii) country capacity to attract talent. The sub-index taken from the WB is average redundancy costs in weeks of salary and the outcome variable taken from the ILO is female participation in the labor force. See WEF (2018).

## Correlation between ‘hard’ EPL measures and perception-based WEF indexes and correlation among subcomponents of OECD/ILO/WB measures

### Pairwise correlations

	WEF Hiring and Firing Index	ILO EPLex Index	OECD EPL Index
WEF Hiring and Firing Index	1		
ILO EPLex Index	-0.3837*	1	
OECD EPL Index	-0.4312*	0.6322*	1

Note: A star indicates significance at the 1 percent level. Higher values of the ILO and OECD indexes indicate more protection/rigidity, whereas higher values of the WEF index indicate more flexibility.

	Correlation with WEF Hiring and Firing Perceptions
<b>WB EPL Indicator</b>	
Fixed-term contracts prohibited for permanent tasks?	-0.288*
Maximum length of a single fixed-term contract (months)	0.3385*
Maximum length of fixed-term contracts (months)	0.2831*
Dismissal due to redundancy allowed by law?	0.2589*
Third-party approval if one worker is dismissed?	-0.2363*
Third-party notification if one worker is dismissed?	-0.2556*
Retraining or reassignment?	-0.2194*
Priority rules for redundancies?	-0.1662*
Priority rules for reemployment?	-0.2235*
Severance pay for redundancy dismissal (weeks of salary)	-0.1325*
Notice period for redundancy dismissal (weeks of salary)	-0.0330
<b>OECD EPL Indicator</b>	
Notification procedures	-0.2779
Delay involved before notice can start	-0.1202
Length of the notice period at 9 months tenure	-0.0674
Length of the notice period at 4 years tenure	0.0455
Length of the notice period at 20 years tenure	-0.1413
Severance pay at 9 months tenure	-0.0965
Severance pay at 4 years tenure	-0.0574
Severance pay at 20 years tenure	-0.0679
Definition of justified or unfair dismissal	-0.4155*
Length of trial period	-0.0535
Compensation following unfair dismissal	-0.3295*
Possibility of reinstatement following unfair dismissal	-0.1816*
Maximum time to make a claim of unfair dismissal	-0.0158
<b>ILO EPL Indicator</b>	
Sub-indicator "Valid grounds for dismissals"	-0.3772*
Sub-indicator "Prohibited grounds for dismissals"	-0.1446*
Sub-indicator "Maximum probationary (trial) period"	-0.1399
Sub-indicator "Procedural requirements for dismissals"	-0.2362*
Sub-indicator "Notice periods"	-0.0785
Sub-indicator "Severance pay"	0.0588
Sub-indicator "Redundancy pay"	0.0125
Sub-indicator "Redress"	-0.2796*

Note: A star indicates significance at the 1 percent level.



### **Data sources for minimum wages and other labor market variables**

- *Minimum wages:* Data on national minimum wages are relatively uncontroversial given that they can be obtained from national authorities and are generally widely publicized (some difficulty can arise with respect to the applicability of minimum wages). Comparing the minimum wage across countries and gauging how binding it is requires the choice of a relevant denominator to scale the data. Generally, average wages or median wages or a measure of value-added are used. The OECD constructs measures of minimum wage to mean and median wages for a limited set of countries (Chile, Colombia, Costa Rica and Mexico in Latin America). The World Bank constructs a measure of minimum wage to value added as part of its Doing Business exercise. And the IDB constructs measures of minimum wage to average monthly wage in the main occupation for Latin American countries. We present all three measures in the stylized facts section.
- *Employment, Unemployment, Labor Force Participation and Working Age Population:* ILO
- *Informality:* We combine informality data from two sources. For the broadest coverage, we use cross-sectional data for 2016 from the ILO taken from the report “Women and Men in the Informal Economy: A Statistical Picture” (2018). Timeseries data on informality in Latin America is taken from the IDB’s SIMS database.

**APPENDIX B: DECOMPOSING CHANGES IN UNEMPLOYMENT**

$$u \approx -\ln(1-u) = -\ln\left(\frac{L}{LF}\right) = -\ln(Y) + \ln\left(\frac{Y}{L}\right) + \ln(\rho) + \ln(WAP)$$

Alternatively,

$$u \approx -\ln(L_F) + \ln\left(\frac{L_F}{L}\right) + \ln(\rho) + \ln(WAP)$$

where  $U$  is the number of unemployed workers,  $u$  is the unemployment rate,  $LF$  is the labor force,  $L$  is the number of persons employed,  $L_F$  is the number of formal employees,  $Y$  is output,  $\rho$  is the labor force participation rate defined as  $LF/WAP$  and  $WAP$  is the working age population.