Unemployment in Latin America and the Caribbean

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Abstract

This study constructs a new data set on unemployment rates in Latin America and the Caribbean and then explores the determinants of unemployment. We compare different countries, finding that unemployment is influenced by the size of the rural population and that the effects of government regulations are generally weak. We also examine large, persistent increases in unemployment over time, finding that they are caused by contractions in aggregate demand. These demand contractions result from either disinflationary monetary policy or the defense of an exchange-rate peg in the face of capital flight. Our evidence supports hysteresis theories in which short-run changes in unemployment influence the natural rate.

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1. Introduction

What determines the long-run level of unemployment, or natural rate? This paper examines this question for countries in Latin America and the Caribbean.

We see three related reasons for studying unemployment in Latin America. First, there is a lot of variation to be explained. For example, a quick glance at data for the 2000s suggests that the natural rate is around 5% in Mexico, 10% in Chile, and 15% in Argentina. In many countries, unemployment has changed greatly over time. In Argentina, unemployment was about 5% in the 1980s.

Second, Latin American unemployment is understudied. Few economists have made systematic efforts to explain the variation that we've noted. Heckman and Pagés (2004) seek to explain unemployment with differences across countries in government regulations, but they are mostly unsuccessful. The scarcity of research on Latin American unemployment contrasts with the huge literatures on unemployment in Europe and the United States.

Third, research on Latin America promises to shed light on unemployment more generally. The U.S. and European data have been mined extensively, and economists still disagree about the determinants of long-run unemployment. Some argue that labor-market institutions are the key factor (e.g. Nickell, 1997), some emphasize the interaction of institutions with a variety of macroeconomic shocks, (e.g. Blanchard and Wolfers, 2000), and some argue that monetary policy influences long-run unemployment through hysteresis mechanisms (e.g. Ball, 2009). Latin America provides a fresh set of experiences that will help us test these ideas.

A major reason that Latin American unemployment is understudied is lack of data. Unemployment statistics are fragmentary, and there are big differences in how unemployment is measured across countries and over time. Therefore, a major part of our project involves data gathering. We examine two data sets, one constructed by the Interamerican Development Bank and one that we have

put together ourselves. The two data sets are complementary: the first is more consistent across countries, while the second provides longer time series within countries. Section 2 of this paper describes these data.

Section 3 uses the IADB data to examine differences in unemployment across countries. Our strongest result is that unemployment depends negatively on the proportion of the population in rural areas. We find mixed evidence on whether payroll taxes affect unemployment, and no effect of legal restrictions on hiring and firing.

Section 4 uses the new data we have constructed to analyze changes in unemployment over time. Our most important results concern large increases in long-run unemployment, which we measure by smoothing annual unemployment with the Hodrick-Prescott filter. We identify six episodes since the 1970s in which a country's long-run unemployment rate rose by more than four percentage points. In every case, the cause was a deep recession produced by a fall in aggregate demand. In some episodes, the underlying shock was a tightening of monetary policy aimed at reducing inflation. In other episodes, capital flight caused a severe recession because a country maintained a rigid exchange-rate peg.

In conventional macroeconomics, demand-driven recessions affect unemployment in the short run but not in the long run. Thus, our interpretation of increases in unemployment is at odds with conventional models. Our evidence supports theories of hysteresis, in which short-run changes in unemployment influence the evolution of the natural rate.

Section V concludes the paper, and an Appendix provides details about our data.

2. Unemployment Data

We will examine two sets of unemployment data, one constructed by the Interamerican Development Bank and one that we have put together ourselves. The two data sets are complementary: the first is more consistent across countries, while the second provides longer time series within countries. The rest of this section describes these data.

A. The IADB Data

The IADB provides annual unemployment rates for 19 countries. The data start in 1990 but are highly incomplete: for many countries, there are only a few observations. There is no rhyme or reason to which years are available (e.g., for Ecuador, we have data for 1994, 1995, 1998, 2006, and 2007; for Venezuela we have data for 1991 through 2004). For most countries, the data include separate unemployment rates for urban and rural areas as well as nationwide unemployment.

The virtue of this data set is that the IADB has tried to adjust for differences across countries in definitions of unemployment. The data are sufficiently standardized that we can plausibly use them for cross-country comparisons of unemployment rates. In the IADB data, an individual is asked about a "reference week" shortly before the survey and is considered unemployed if he (i) Did not work or have a job during the reference week and (ii) Searched actively during the reference week. Active search involves contact with potential employers, interviewing for jobs, filling out applications or contacting employment agencies.

A few differences in unemployment definitions remain in the IADB data. As described in the Appendix, we have made simple adjustments to account for these differences. Table A1 reports our final version of the IADB data.

B. A New Data Set

Our study also examines a data set for 19 countries that covers far more years than the IADB data. For a number of countries we have annual data on unemployment back to the 1970s, with few missing observations. We have pieced together these data from country-specific sources – central banks, labor ministries and national statistical agencies – and international agencies such as the ILO (International Labor Organization).

It is challenging to find consistent data. There is great variation in how unemployment is measured, both across countries and over time in a given country. For example, some unemployment series cover a few cities and others cover the whole country; the series cover varying age groups (e.g. 12+ or 14+); and the definition of unemployment varies widely. Sometimes virtually everyone without a job is counted as unemployed, sometimes you must have searched for work within a certain period, and so on. Often, data sources have footnotes saying that changes in methodology occurred in certain years but not saying what the changes were.

It appears hopeless to derive long unemployment series that are comparable across countries. As we've noted, the IADB's efforts to construct comparable data were successful only for scattered years since 1990. However, we have constructed longer series that we believe are reasonably consistent *within* each country. We can use these data to study the evolution of unemployment over time.

To derive our data, we have gone country by country to figure out how unemployment was measured in different periods. We have made judgments about which changes in methodology are small enough to ignore, and how to adjust for larger changes. In some cases we can splice different unemployment series together using periods in which they overlap. When in doubt, we have sought advice from people at the agencies that produce unemployment data.

The Appendix describes how we constructed unemployment data for each country. To illustrate our strategy, we describe here how we dealt with breaks in the data for two countries. In one case, we adjusted the data to produce a consistent time series; in the other, we could not find an adjustment that we trusted, so we discarded data.

Mexico. Our data come from a government agency, the National Institute of Statistics and Geography. They cover three cities--Mexico City, Guadalajara and Monterrey--and begin in 1973. For years before 1985, the National Institute reports an aggregate unemployment rate for the three cities; starting in 1985, they report separate rates for each city. For the later period, we measure unemployment with a weighted average of the three city rates, where the weights are based on population in 1990.

In 1984, the government also changed its definitions of employment and unemployment. Two groups of people were moved from the category of unemployed to employed: people waiting to start a job within 30 days, and laid-off workers who expect to return to their jobs within 30 days. Also, unpaid family workers who work less than 15 hours a week, who were previously counted as unemployed, were dropped from the labor force. These changes reduce the unemployment rate. Fortunately, unemployment for the three cities was measured with both the old and new definitions in 1984. The unemployment rate was 6.0% by the old definition and 5.7% by the new definition. Therefore, to make pre-1985 unemployment rates comparable with later data, we multiply them by the ratio 5.7/6.0.

Trinidad and Tobago: We use a consistent unemployment series from the International Labor Organization that begins in 1987. Data are available before 1987, but with a different definition of unemployment: labor force entrants who are seeking their first job are counted as unemployed starting in 1987 but not before that. We have not found overlapping data with the two methodologies. Data from other countries suggests that first-time job seekers are a large share of the unemployed—sometimes more than a third. We don't know how much

the unemployment rates for Trinidad and Tobago are affected by the exclusion of first-time job seekers, so we discard the pre-1987 data.

We believe that the unemployment series we have constructed will be useful for future research. These data, reported in Table A2, cover 19 countries with 571 country-year observations. The median country has 33 years of continuous data. The longest series is Chile's, which runs from 1957 through 2007. We end the sample in 2007 for all countries; in this paper, we wish to sidestep the question of how the financial crisis of 2008-2009 affected unemployment.

3. Cross Country Differences in Unemployment

Here we examine differences in unemployment across countries, seeking to explain them with variables that capture the level of economic development and institutions in the labor market. We use the IADB data on unemployment, which are comparable across countries.

Measuring Long-Run Unemployment

We are interested in a country's long-run level of unemployment, or natural rate. One could estimate this variable by averaging unemployment rates for years in which data are available. This approach may be misleading, however, because the years in the IADB data set vary greatly from country to country. Latin American unemployment is generally higher in some years than in others, implying that the timing of data influences a country's average unemployment. This average is higher if the country's data happen to come from high-unemployment years.

In estimating long-run unemployment, we control for the timing of data. We run an unbalanced panel regression of unemployment on dummy variables for countries and years, using all country-year pairs in our sample. Our measure of a country's long-run unemployment is the coefficient on the country's dummy

plus the average of all time effects. We can interpret this variable as an estimate of average unemployment over the period spanned by the entire IADB data set (1990-2007).

Table 1 shows our estimates of long run unemployment for each of the 19 countries in the IADB data. For comparison, it also shows simple averages of the unemployment rates reported for each country, which do not control for time effects. The long-run unemployment rates that we create differ from simple averages by moderate amounts (sometimes one or two percentage points).

The data reveal great heterogeneity in Latin American unemployment rates. Long-run unemployment ranges from 1.2% in Guatemala to 12.9% in Argentina. The mean across countries is 6.0% and the standard deviation is 3.0%. This variation presents an opportunity for us to take a fresh look at the debate about unemployment. What could explain such differences across countries?

Candidate Explanations

We examine two sets of variables that might influence unemployment: measures of economic development and measures of labor-market distortions caused by government policy. Labor market policies are a focus of research on unemployment in advanced economies (e.g. Siebert, 1997; Nickell, 1997). Development levels are natural to examine in our context because they vary greatly across LAC countries; in 2000, for example, real GDP per capita ranged from US$ 2126 in Nicaragua to US$ 12095 in Mexico.

Here we briefly describe the variables that we examine. The Appendix gives further details on how the variables are constructed.

Development Variables: We examine four variables in this category:

- Real GDP per capita

- Educational attainment of the population, as measured by Barro and Lee (2001)

- Agricultural output as a percentage of GDP

- Rural population as a percentage of total population

Labor-Market Variables: Research on advanced-economy unemployment emphasizes distortions caused by government policies. Data on labor-market policies are relatively scarce in Latin America, but we have found two sources that provide measures of distortions. One is Heckman and Pagés's (2004) extensive study of Latin American labor markets; the other is *Doing Business*, a periodic publication of the World Bank.

We examine four variables that measure constraints on employment flexibility, two from the Heckman-Pagés data (HP) and two from Doing Business (DB). Brief definitions of these variables follow (see Appendix for details):

- Advance notice: the number of months' notice that an employee must be given before being fired (HP)

- Indemnities for dismissal: The cost to employers of mandatory payments to workers who are fired (HP)

- Firing costs (DB): A measure of the total cost of advance notice requirements and payments for dismissal

- Rigidity of employment (DB): A broad index of restrictions on employers in hiring, firing, and adjusting workers' hours

We also examine two variables that measure taxes paid by employers, one from each data set:

- Social security contributions (HP): the cost of required employer contributions to social security programs including retirement funds, disability insurance, and unemployment insurance

- Labor taxes (DB): the cost of "all charges levied on labor," including social security contributions, for a mid-size firm.

Cross-Country Regressions

Here we examine the explanatory power of our candidate variables for cross-country differences in unemployment. Overall we have ten candidate variables. With only 19 countries in the sample, we restrict attention to specifications with a small number of variables. We start with simple regressions of long-run unemployment on a single variable, then use these results to motivate multiple regressions. We first consider development variables, then labor-market variables, then combinations of the two.

Table 2 examines the four development variables. The first four columns show simple regressions of unemployment on each variable. Two have significant coefficients: GDP per capita, with a positive coefficient, and rural population, with a negative coefficient. Each of these results means that greater economic development--higher GDP or lower rural population—implies higher unemployment.

GDP per capita and rural population have a correlation of –0.80 (higher-income countries are less rural). To separate the effects of these variables, we regress unemployment on both of them, as shown in the last column of Table 2. In this specification, only rural population remains significant, suggesting that it is the primary development variable that influences unemployment. The first panel of Figure 1 shows a scatterplot of unemployment against rural population.

Table 3 presents simple regressions of long run unemployment on labor market variables. Of the six variables we consider, only one, social security contributions from the Heckman-Pagés data, is significant. Higher social security contributions (SSC) imply higher unemployment. The second panel of Figure 1 shows this relationship in a scatterplot.

Table 4 presents our final specification. Motivated by the previous tables, we regress unemployment on rural population and SSC. Here, rural population is significant and the significance of SSC is borderline (p=0.09). The adjusted R-squared is 0.60. We have checked that any third variable is insignificant when we control for rural population and SSC.

Discussion

Both the effect of rural population on unemployment and the effect of SSC have straightforward interpretations. Development economists have long recognized that unemployment is generally lower in rural areas than in urban areas (e.g. Squire, 1981). This fact is confirmed by the IADB data, which, for 17 countries, include urban and rural unemployment rates as well as total unemployment. When we compute long run unemployment rates for each country (again removing time effects), the averages of these rates across countries are 6.3% for urban unemployment and 3.2% for rural unemployment. Thus it is natural that total unemployment is lower in more rural countries.[1]

A number of factors may contribute to the difference between urban and rural unemployment. One is the Harris-Todaro (1970) effect: workers crowd into urban areas to seek scarce but high-paying jobs. Other possible factors include greater self-employment and larger informal sectors in rural areas; less unionization and weaker enforcement of minimum wages (Rosenzweig, 1987; Bernal, 2009); and more efficient matching of workers and jobs in small communities.

The effects of social security contributions are stressed by some students of European unemployment (e.g. Siebert, 1997). They argue that the costs to employers create a "tax wedge" that reduces labor demand and increases

[1] Under this interpretation, a country's rural population affects the weights on rural and urban unemployment in aggregate unemployment. In theory, rural population could also affect the underlying rural and urban unemployment rates. However, when we regress either urban unemployment or rural unemployment on rural population and SSC, rural population is insignificant.

unemployment. Our regressions provide some evidence for this effect in Latin America.

There is reason, however, to question the robustness of this result. Recall that one of our labor-market variables is "labor tax" from the Doing Business data set. This variable and SSC appear to be similar measures of tax wedges, although, as described in the Appendix, there are differences in details (for example, the Doing Business variable includes only taxes with statutory incidence on employers, while SSC includes contributions by workers). One might expect the two variables to be strongly correlated, but in fact the correlation across countries is only 0.30. As shown in Table 3, the effect of labor tax on unemployment is insignificant. Future work should further explore these results and seek to determine the best measure of tax wedges.

Comparison to Heckman and Pagés

This study builds on Heckman and Pagés (2004), who construct some of the labor-market variables that we examine. Heckman and Pagés find that labor-market variables have significant effects on unemployment in advanced economies (mainly in Europe). However, when they restrict their sample to Latin American countries, none of the variables is significant—including social security contributions, which is significant in our regressions (see Heckman-Pagés Table 8B).

There appears to be a simple explanation for this difference in results. Heckman and Pagés estimate the effects of labor-market variables in panel data, with country fixed effects. Thus, unlike us, they do not exploit the cross-country variation in their data; instead, their results are based on variation over time. In most countries, labor-market variables such as SSC do not change greatly over time, so it is not surprising that Heckman and Pagés's results are weak.

4. Time Series Evidence

We now turn from cross country comparisons to examine changes in unemployment over time. Following the strategy in Ball (2009), we first identify episodes of large rises and falls in trend unemployment. Then we examine each episode to see why unemployment changed.

Identifying Large Changes in the Natural Rate

Here we use the annual time series for unemployment that we have constructed for each country in our sample (Table A2). These series may not be comparable across countries, but we have sought to make them consistent over time in a given country. Therefore, we can use these data to measure changes in a country's unemployment rate.

We are interested in changes in a country's long-run or natural rate of unemployment, not in cyclical fluctuations. We estimate the natural rate by smoothing the unemployment series with the Hodrick-Prescott filter, with a smoothing parameter of 100. In the analysis that follows, U is the actual unemployment rate and U* is our estimate of the natural rate.[2]

Using our series for U*, we identify episodes of "large" changes in the natural rate. After some experimentation, we define such an episode as a period in which U* rises or falls monotonically and the total change from start to finish is greater than four percentage points in absolute value. An episode starts at either a local minimum of a country's U* series, a local maximum, or the first year for which we have data for the country; the episode ends at the next local minimum or maximum or the last year of data.

We believe that, by focusing on large changes in U*, we pick out episodes of true, substantial changes in long-run unemployment. Smaller changes in U*

[2] Many researchers treat the natural rate of unemployment as a time-varying parameter in a Phillips curve and estimate its path using data on inflation as well as unemployment (e.g. Staiger et al., 1997; Ball and Mankiw, 2002). This approach is not appropriate for Latin American countries, because episodes of very high inflation make the assumption of a stable Phillips curve untenable.

might reflect measurement error or cyclical movements in unemployment that our simple detrending has not removed.

For the 19 countries in our sample, our four-percentage-point criterion yields a total of 11 episodes of large unemployment changes—six increases and five decreases. For each episode, Table 5 lists the country, the time period, and the levels of U* at the start and end. Figure 2 shows the series for U and U* for all countries in which an episode occurred, with episodes shaded in light gray. The Figure also shows annual data on output growth, inflation, and the real exchange rate against the U.S. dollar (increases in the variable are appreciations of the local currency); we use these data to help interpret the episodes.[3]

A number of episodes include a sub-period when U* changed rapidly, accounting for most of the total change. In the rest of the episode, U* changed in the same direction, but not by much. In seeking explanations for the change in U*, we focus on what happened around the "core" period of rapid change. Specifically, we define the core as the period when U* changed by at least 0.5 percentage points each year. In Figure 2, the core of each episode is shaded in dark gray.

Chile, for example, experienced an episode of rising U* that lasted 18 years, from 1965 to 1983. U* rose a total of 10.1 percentage points (from 5.7% to 15.8%). The core of Chile's episode covers ten years, from 1971 to 1980, which account for 8.2 percentage points of the rise in U*.

Across the eleven cases in Table 5, the length of an episode ranges from 7 to 26 years. The core period ranges from 3 to 11 years, except for 20 years in Trinidad and Tobago. Each episode has one core, except for Jamaica's, which has two.

In the rest of this section, we seek to explain the large changes in U* that we have identified. For comparison, we also examine episodes in which actual unemployment, U, fluctuated sharply but U* did *not* change significantly.

[3] Inflation, output and exchange rates are taken from the WDI and the IFS.

Explaining Increases in U*

What causes increases in long run unemployment? When we examine the six cases in Table 5 and Figure 2, we quickly see that they have something in common: in each case, the core of the episode occurred around the time of a severe contraction in aggregate demand. The demand contraction caused a large increase in unemployment, U. The fact that U* also rose substantially suggests some hysteresis mechanism through which a demand-driven increase in unemployment affects the natural rate. This story is similar to Ball's (2009) interpretation of natural-rate increases in European countries in the 1980s and 90s.

What caused the demand contractions behind the increases in unemployment? There are two different answers, each of which is the primary explanation for three of our six episodes. In Chile, Colombia, and Venezuela, the cause was a severe tightening of monetary policy motivated by the central bank's desire to reduce inflation. In Argentina, Paraguay, and Panama, the cause was a combination of capital flight and a nonaccommodative policy response: the exchange rate was not allowed to fall, or could not fall because of dollarization.

To flesh out these stories, we briefly examine each of the six episodes, focusing on the core period of rapidly rising unemployment. Our analysis is based on the macroeconomic data in Figure 2 and on historical accounts of the episodes in sources such as the United Nation's annual Economic Survey of Latin America. We first consider the three cases of disinflation and then the three cases of capital flight.

Chile (core period 1971-1980): This episode resulted from an extreme shift in macroeconomic policy. The inflation rate rose to 500% under the Socialist government of Salvadore Allende. Then, in 1973, the Pinochet regime overthrew Allende and tightened fiscal and monetary policy severely to reduce inflation. The inflation rate fell steadily, to a low of 10% in 1982. The unemployment rate shot up from 3% in 1973 to 18% in 1976, then stayed in

double digits for the rest of the 1970s; this experience pulled up the estimated natural rate, U*.[4]

Colombia (1994-2001) In the 1970s and 80s, Colombia's inflation rate fluctuated between 15% and 30%. In 1991, a new Constitution made price stability the primary goal of the central bank. Policymakers slowed the growth of monetary aggregates, producing high real interest rates and a 46% real appreciation over 1991-98. Inflation fell to single digits in 2000 and unemployment experienced a long rise, from 8% in 1994 to 22% in 2002. (Capital flight sparked by the 1998 Russian crisis contributed to the last part of this increase.)

Venezuela (1996-1999) In 1996, with inflation running at 100%, Venezuela adopted an IMF stabilization program, the Agenda de Venezuela. As part of this program, the central bank adopted a crawling peg for the exchange rate that kept the rate of depreciation below the inflation rate. The real exchange rate rose by 68% over 1996-2001 and real interest rates peaked near 30% in 1998. Inflation fell to 13% in 2001, while unemployment rose from 7% to 18% over the decade from 1993 to 2003.

We now turn to the three episodes of large unemployment increases that were triggered by capital flight. In each case, the exchange rate was rigid. When unemployment rose, it stayed high because the economy lacked the "shock absorber" of depreciation.

Argentina (1987-1997) Argentina experienced capital flight in the 1990s, resulting first from the Mexican crisis of 1994 and then from its own rising debt and loss of confidence in its currency board. After the currency board fixed the nominal exchange rate 1991, Argentine inflation exceeded U.S. inflation for several years, causing a real appreciation of 60%. The combination of overvaluation and worsening capital flight pushed unemployment from 6% in 1991 to 18% ten years later, on the eve of the currency board's collapse.

[4] Because our series for U* smooths the data on unemployment, U* can start rising before an event that raises unemployment. Chile is an example: the core of the U* increase begins in 1971 while actual unemployment starts rising in 1973.

Panama (1982-1988) The core of this episode is the period of the Latin American debt crisis, which caused capital flight and raised unemployment across the region. Panama had no exchange rate to adjust because its currency is the U.S. dollar. In 1989 Panama experienced another shock, the U.S. invasion that overthrew Noriega, which caused further capital flight and helped keep unemployment high.

Paraguay (1997-1999) In Paraguay, capital flight was caused by a series of shocks: the crises in Mexico in 1994, Russia in 1998, and Argentina in 2000-2001. Paraguay did not have a hard peg, but policymakers chose to defend the exchange rate during much of the episode. The real exchange rate rose slightly from 1993 to 1998, but started to fall in 1999. Part of the increase in unemployment was reversed after 2002, and the increase in U* was smaller than those in Panama and Argentina (4.2 percentage points, compared to 8.3 points and 12.6 points).

Temporary Unemployment Increases

We have examined episodes in which unemployment rose and stayed high, producing a rise in our estimated natural rate U*. To get another perspective on these experiences, we compare them to episodes in which unemployment rose but then fell quickly, so U* did *not* rise significantly. What accounts for this different pattern?

Specifically, we examine episodes in which unemployment rose by at least five percentage points but U* rose by less than one point. Three such episodes exist: one in Colombia, from 1981 to 1983, and two in Uruguay, from 1981 to 1983 and from 1998 to 2002. Figure 3 shows U and U* in Colombia and Uruguay, with shading on the periods of temporary unemployment increases. (Here we ignore Colombia's persistent unemployment increase in the 1990s.) In the three episodes, U rises by amounts ranging from 5.9 to 8.8 percentage points, but the accompanying increases in U* are very small (from 0.3 to 0.9 percentage points).

What happened during these episodes? In all three cases, the rise in unemployment was caused by capital flight, which was triggered by the Latin American debt crisis in the 1980s and by contagion from Argentina in Uruguay's second episode. Thus the temporary unemployment increases had the same basic cause as some of the U* increases discussed above. The behavior of the exchange rate, however, was very different. In contrast to exchange-rate rigidity in Argentina, Panama, and Paraguay, the real exchange rate fell sharply during the temporary unemployment increases. Over 1981-86, the real exchange rate fell by 40% in Colombia and 50% in Uruguay; over 1998-2003 in Uruguay, it fell by 48%.

These experiences bolster our interpretation of the U* increases in Argentina, Panama, and Paraguay. Capital flight consistently causes an increase in unemployment, but the persistence of this increase depends on exchange rate policy. In flexible regimes, a sharp depreciation pushes unemployment back down. When the exchange rate is rigid, unemployment remains high and U* rises.

Explaining Decreases in U*

Finally, we examine the five episodes of large U* decreases (a fall of four percentage points or more) shown in Table 5 and Figure 2. What explains these experiences?

The five episodes have two features in common. First, each began with a high level of U*, ranging from 14.7% to 25.5%. These starting points were legacies of economic slumps that had previously raised U*. Evidently, it is possible for a rise in U* to be reversed eventually; on the other hand, there are no cases of large U* decreases starting from a moderate initial level.

Second, in all five cases, the fall in unemployment occurred during a period when economic growth accelerated. In this respect, these cases are similar to the experiences of some European economies. Rapid growth reduced

unemployment, for example, in the U.K. in the late 1980s and Ireland in the 1990s (Ball, 1999).

Beyond these broad features, the five episodes of U* decreases are heterogeneous. An increase in growth was spurred by a variety of factors, including shifts in monetary policy, changes in commodity prices, and in one case a rise in productivity growth. We briefly review why output growth increased in each case.

Argentina (core period 2003-2007): We saw that U* rose in Argentina in the 1990s as the country maintained its currency peg in the face of capital flight. A dramatic regime shift occurred when the currency board collapsed at the beginning of 2002. The real exchange rate fell by 70%, spurring exports, and output grew at an average annual rate of 9% from 2003 through 2007. The unemployment rate U fell from 20% to 7%, dragging down U*.

Panama (2003-2007): After rising during the 1980s, Panama's unemployment stayed high during the 1990s. But the 2000s brought an economic boom: over 2003-2007, output growth averaged 7.9% and unemployment fell rapidly. Causes of the rapid growth included expansionary fiscal policy and an investment boom in anticipation of expansion of the Panama Canal. Strong aggregate demand was reflected in the inflation rate, which rose from 0.4% to 4.2% over 2003-2007 despite Panama's dollarization.

Chile (1985-1992): Average output growth during the core of this episode was 7.6%. An unusual feature of the Chilean boom is that the primary cause appears to be an acceleration of productivity growth, perhaps due to liberalization of the economy, rather than a surge in demand. The inflation rate fell over much of the period when unemployment was falling. Ball and Moffitt (2002) argue that the productivity acceleration reduced the natural rate of unemployment because workers' wage aspirations did not rise as rapidly as productivity.

Trinidad and Tobago (1988-2007): Output in Trinidad and Tobago fell by 28% from 1982 to 1989, a result of disinflationary monetary policy and then low oil prices. (Oil and gas account for 40% of the country's GDP). The slump pushed unemployment to 22% in 1987, the first year for which we have data. Then oil prices recovered, monetary policy eased, and annual output growth averaged 5.1% from 1990 through 2007. Strong growth pulled the unemployment rate down steadily.

Jamaica (1984-1992, 2001-2007): In Jamaica, output fell 23.5% from 1972 to 1980; the diverse causes included political instability, drought, and an overvalued exchange rate. Unemployment reached 28% in 1982. Then stability improved, policymakers allowed the exchange rate to fall, and growth averaged 2.9% from 1981 through 2007. The result was a U*-decrease episode that lasted 26 years (including two separate cores when U* fell by more than 0.5 points per year.)

5. Conclusion

This paper constructs a new data set on unemployment rates in Latin America and the Caribbean, and then explores the determinants of unemployment. Cross-country differences are explained partly by the size of the rural population, and there is some evidence that tax wedges also matter. Within a country, large increases in unemployment are caused by contractions in aggregate demand, resulting from either disinflationary monetary policy or a combination of capital flight and a rigid exchange rate. Decreases in unemployment occur when unemployment starts very high and economic growth accelerates.

Our results about unemployment increases echo research on other parts of the world. Ball (1999) finds that disinflations explain increases in European unemployment in the 1980s and 1990s. Ball (2010) finds that capital flight and

exchange rate rigidity caused severe slumps in Hong Kong and the Baltic countries as well as Latin America.

Our results conflict with conventional macroeconomics, in which shifts in aggregate demand affect unemployment only in the short run. We find that demand contractions can have long run effects: unemployment often remains high for a decade or more. These findings suggest the presence of hysteresis in unemployment.

Our understanding of hysteresis mechanisms is hazy. A common story is that unemployed workers become detached from the labor force, turning a short-run rise in unemployment into a long-run rise. However, there is little direct evidence on the strength of this effect. Understanding hysteresis should be a priority for research.

In one way, our results do not support common stories about hysteresis. Many discussions of Europe emphasize the role of unemployment insurance: it is easier to become detached from the labor force if one can live on the dole indefinitely. Yet this paper finds strong hysteresis effects in Latin America, where unemployment insurance is much less common and generous than in Europe. Our findings suggest that unemployment insurance is not essential for hysteresis.

Tables and Figures

Table 1

Country	Simple Average Unemployment	Estimated Long Run Unemployment
Argentina	12.94	12.85
Bolivia	4.71	4.67
Brazil	8.56	8.45
Chile	7.41	7.60
Colombia	10.73	10.72
Costa Rica	5.46	5.57
Dominican Republic	6.71	5.69
Ecuador	2.60	3.19
El Salvador	4.58	4.24
Guatemala	1.78	1.24
Honduras	2.93	2.73
Jamaica	3.78	3.29
Mexico	3.27	3.28
Nicaragua	6.26	6.24
Panama	6.32	5.84
Paraguay	6.10	5.59
Peru	4.33	3.74
Uruguay	10.51	10.23
Venezuela	8.23	8.15
Mean	6.17	5.96
Standard Deviation	3.00	3.04

Source: Author's calculations based on IDB data

Table 2

Dependent Variable: Estimated Long Run Unemployment					
GDP per Capita	0.547**				-0.387
	(0.236)				(0.276)
Agricultural VA		-0.174			
		(0.129)			
Rural Population			-0.156***		-0.212***
			(0.0310)		(0.0499)
Education				0.678	
				(0.475)	
Constant	2.366	7.884***	11.23***	1.557	15.65***
	(1.677)	(1.581)	(1.142)	(3.164)	(3.349)
# of obs	19	19	19	19	19
R-squared	0.239	0.096	0.598	0.107	0.642
Adj R squared	0.195	0.0432	0.574	0.0543	0.597

Notes: Standard errors in parentheses. * significant at the 10%, ** Significant at the 5%, *** significant at the 1%.

Table 3

Dependent Variable: Estimated Long Run Unemployment						
Rigid Emp. (DB)	0.00905					
	(0.0436)					
Firing Costs (DB)		0.000591				
		(0.0192)				
Labor Tax (DB)			0.112			
			(0.0708)			
Adv. Notice (HP)				-0.476		
				(1.773)		
Indemn. Dismis (HP)					-0.556	
					(1.046)	
Soc. Sec. Contr. (HP)						0.222***
						(0.0503)
Constant	5.609***	5.922***	3.829**	6.688***	7.856**	-0.286
	(1.855)	(1.540)	(1.503)	(1.296)	(2.831)	(1.532)
# of obs	19	19	19	17	17	18
R-squared	0.003	0.000	0.129	0.005	0.019	0.549
Adj R-squared	-0.0561	-0.0588	0.0778	-0.0616	-0.0469	0.521

Notes: Standard errors in parentheses. * significant at the 10%, ** Significant at the 5%, *** significant at the 1%.

Table 4

Dependent Variable: Estimated Long Run Unemployment	
Rural Population	-0.0959**
	(0.0447)
Soc. Sec. Contr. (HP)	0.120*
	(0.0660)
Constant	5.828*
	(3.165)
# of obs	18
R-squared	0.655
Adj R-squared	0.609

Notes: Standard errors in parentheses. * significant at the 10%, ** Significant at the 5%, *** significant at the 1%.

Table 5

Country	Episode (U* total absolute change > 4 points)							Core (U* change > 0.5 points per year)			
	Starting Year	Ending Year	Episode Duration (years)	Change in Trend	Starting Value	Ending Value	Start/End of series involved	Starting Year	Ending Year	Total Core Years	Absolute Change During Core
Argentina	1979	2000	21	12.6	3.2	15.8	.	1987	1997	11	10.0
Chile	1965	1983	18	10.2	5.7	15.8	.	1971	1980	10	8.2
Panama	1963	1992	29	8.3	6.5	14.7	Start	1982	1988	7	4.4
Colombia	1990	2003	13	7.8	10.1	17.8	.	1994	2001	8	6.9
Paraguay	1989	2003	14	4.2	5.6	9.8	.	1997	1999	3	1.6
Venezuela	1989	2002	13	4.2	9.5	13.7	.	1996	1999	4	2.1
Panama	1992	2007	15	-5.8	14.7	9.0	End	2003	2007	5	-3.6
Argentina	2000	2007	7	-5.8	15.8	9.9	End	2003	2007	5	-5.1
Chile	1983	1994	11	-7.6	15.8	8.2	.	1985	1992	8	-6.8
Jamaica	1981	2007	26	-15.9	25.5	9.5	End	1984	1992	9	-7.8
								2001	2007	7	-4.7
Trinidad and Tobago	1987	2007	20	-17.1	22.7	5.6	Start/End	1988	2007	20	-17.1

Figure 1: Long Run Unemployment

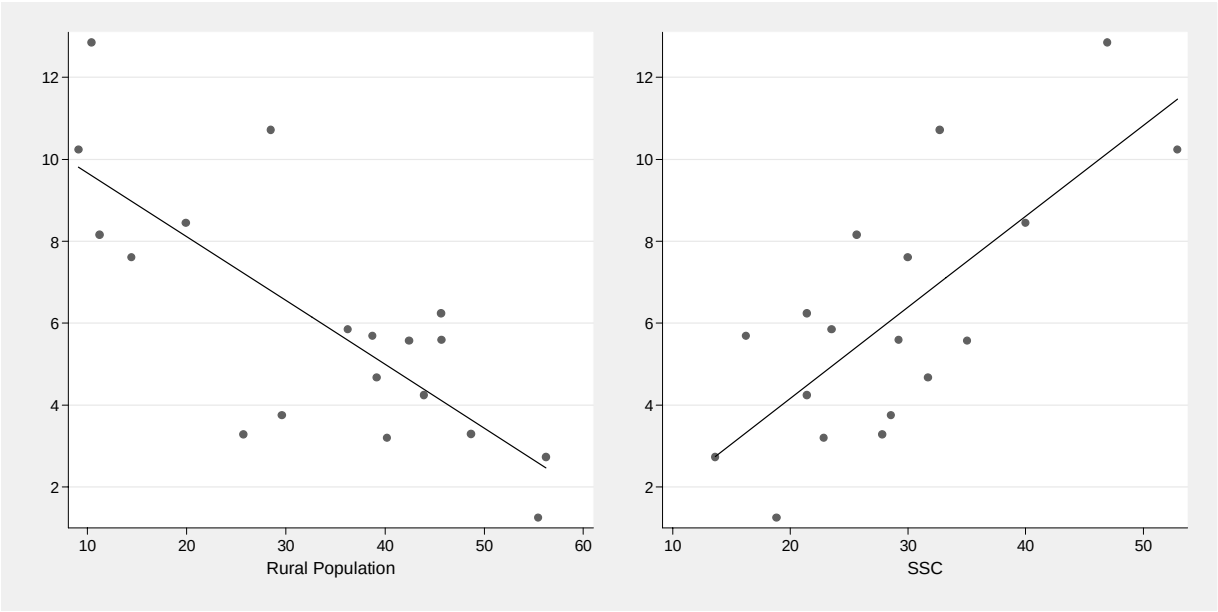
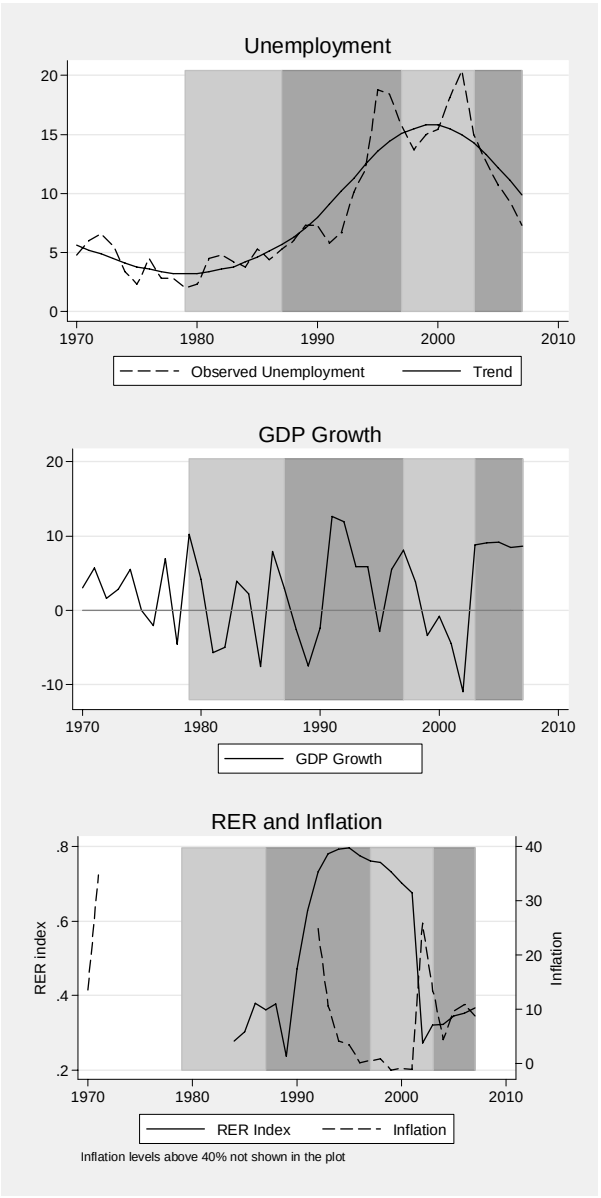


Figure 2

Argentina



Chile

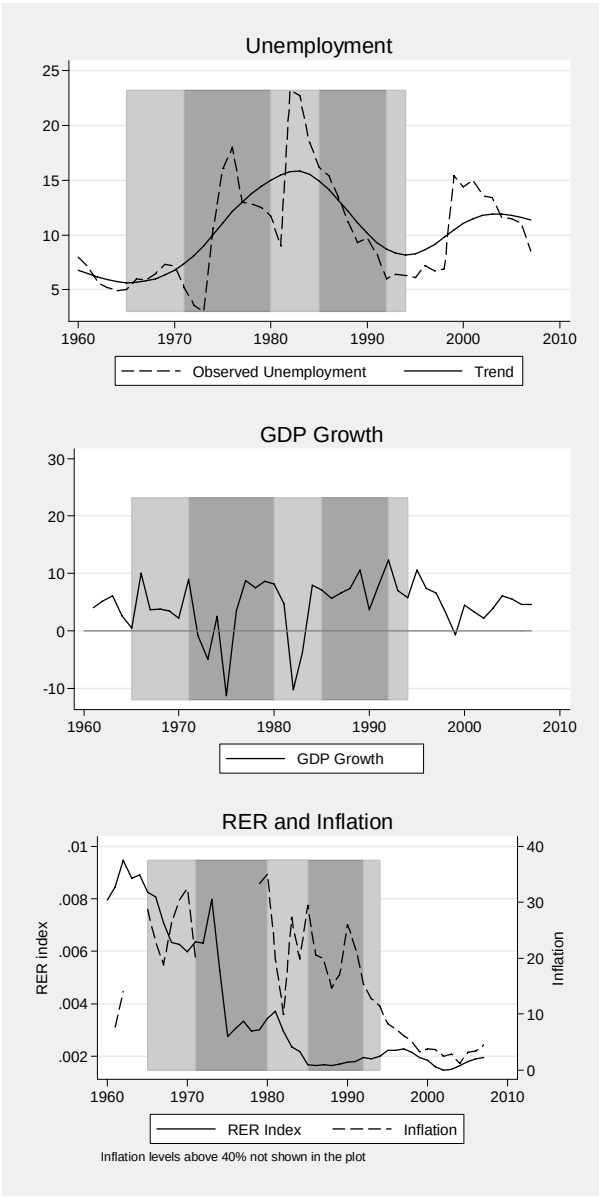


Figure 2 (continued)

Panama **Colombia**

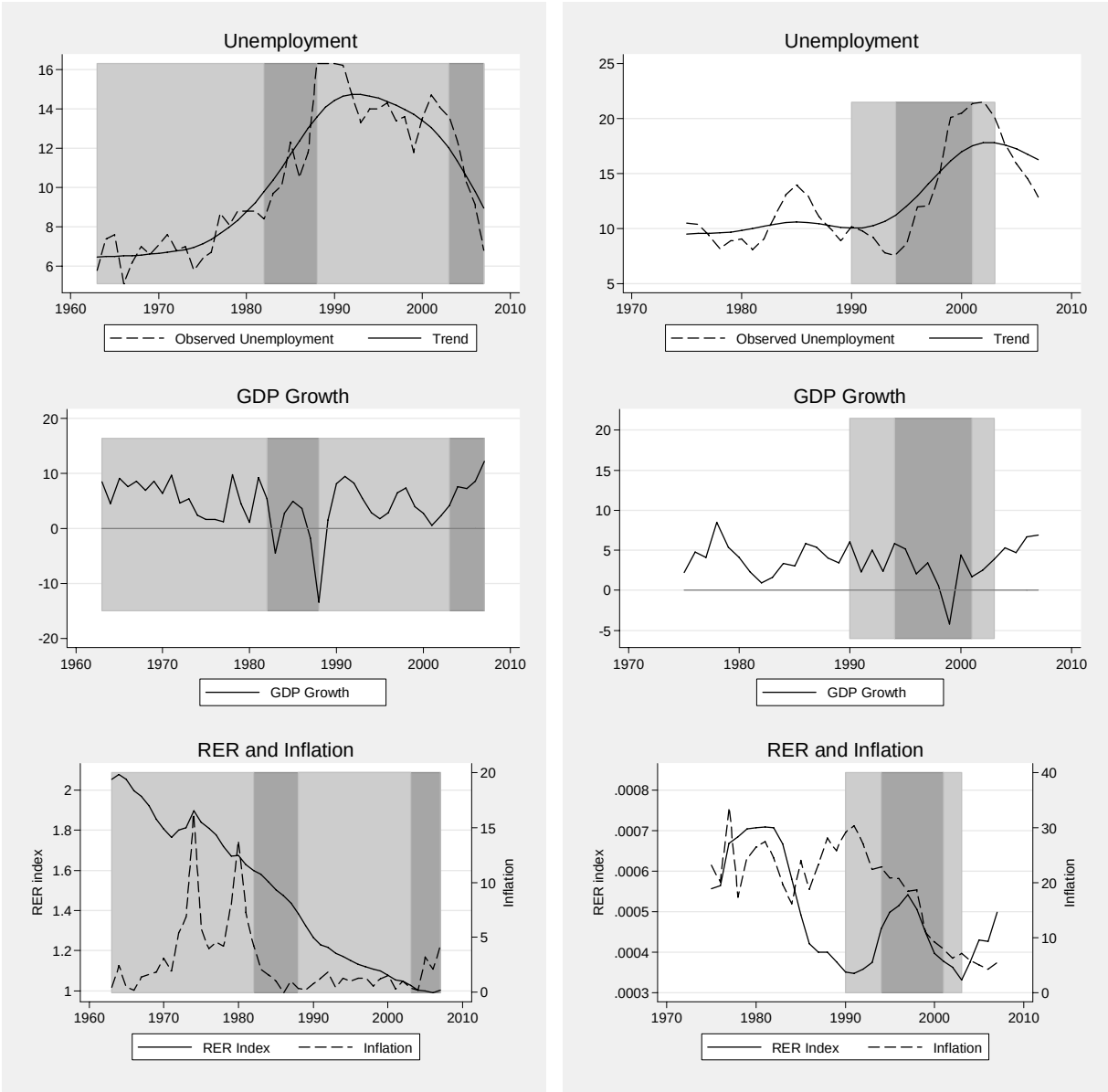


Figure 2 (continued)

Paraguay **Venezuela**

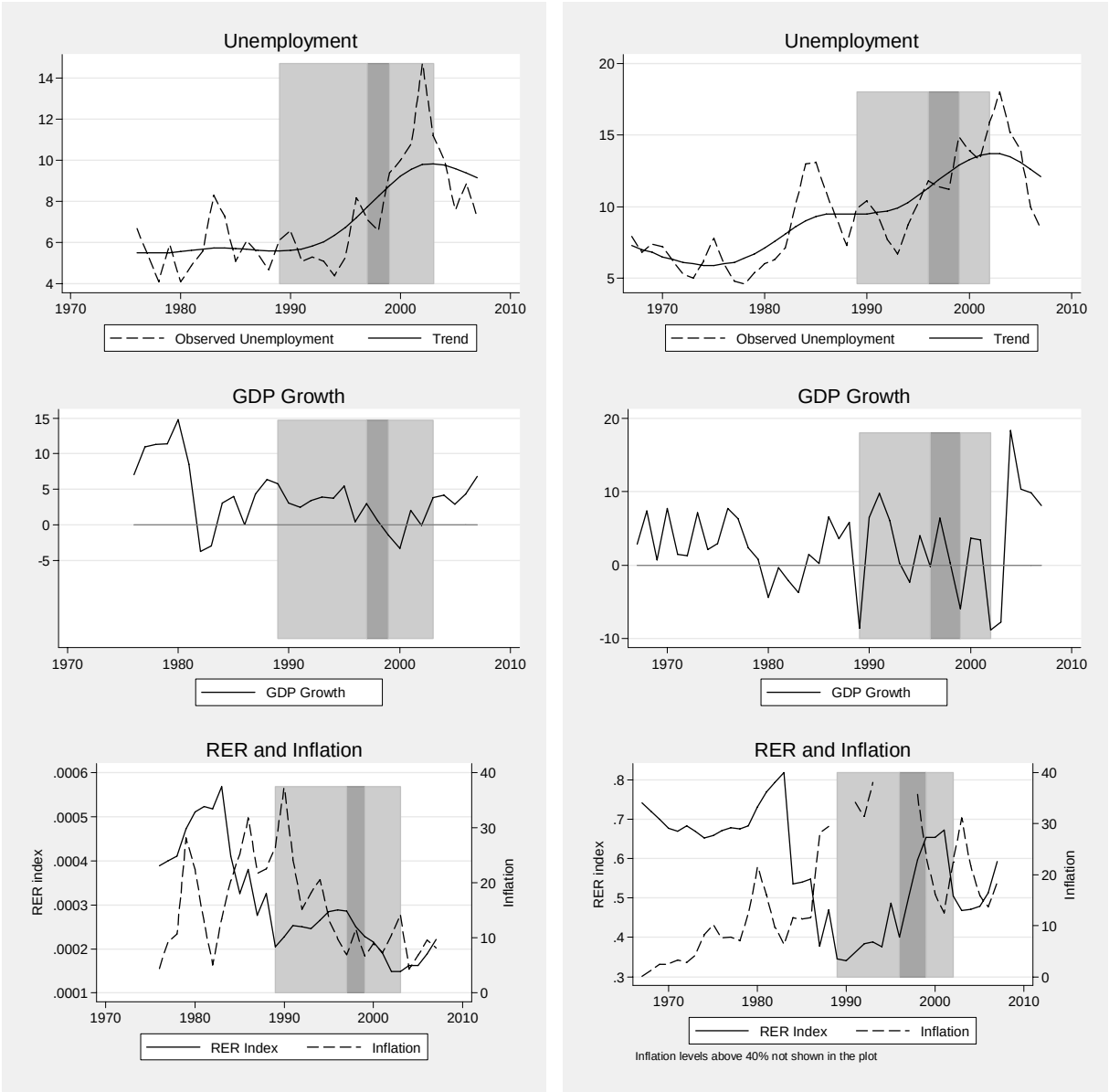
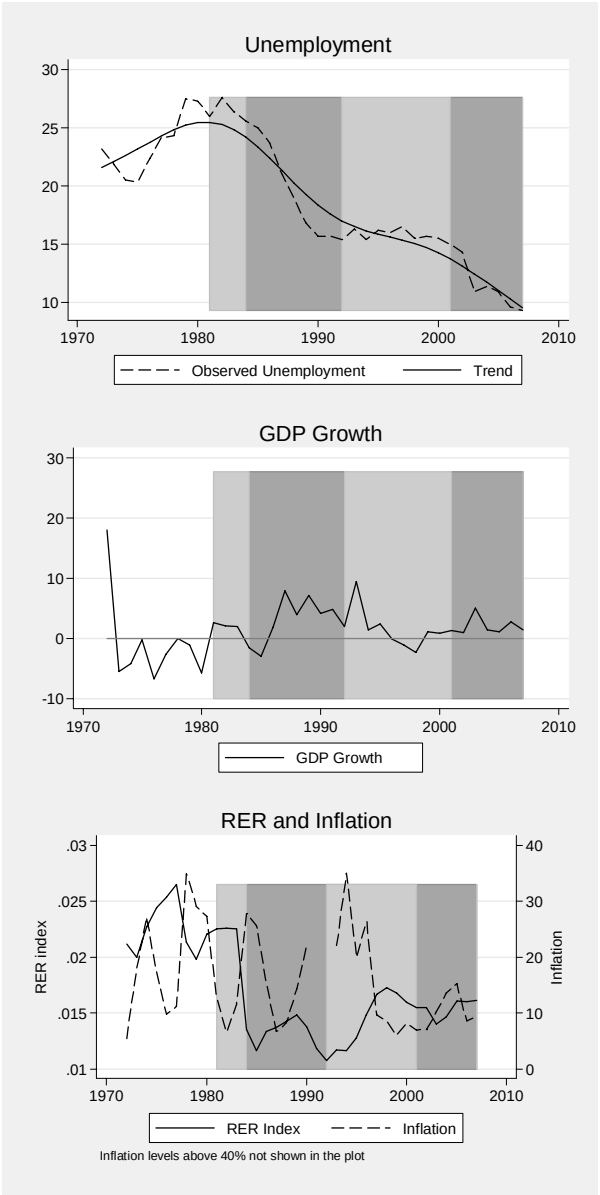


Figure 2 (continued)

Jamaica



Trinidad and Tobago

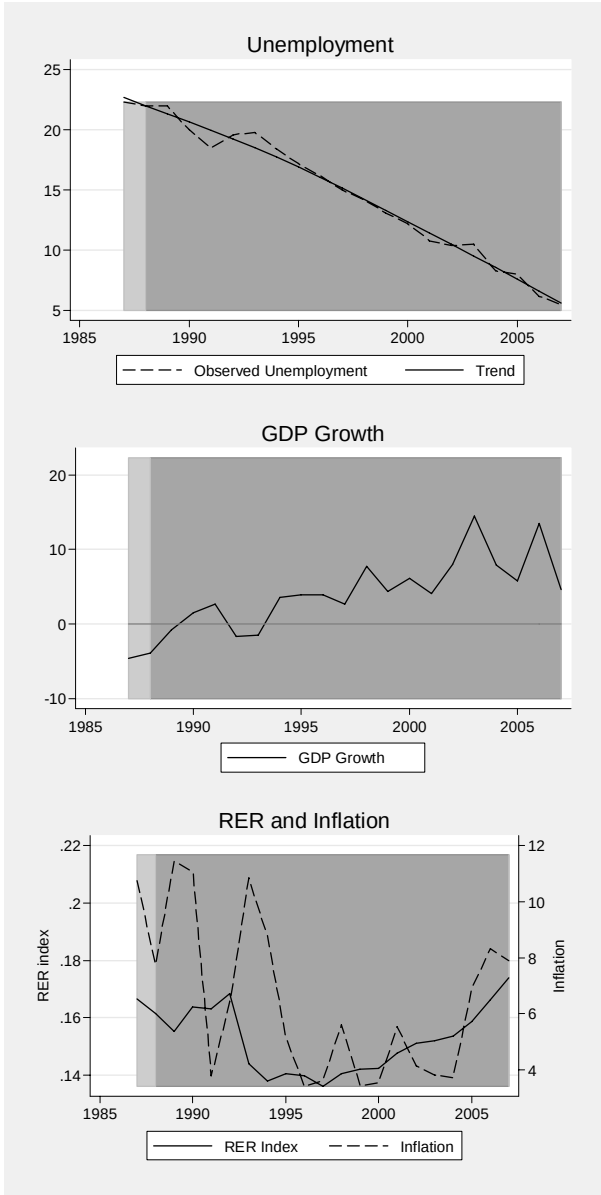
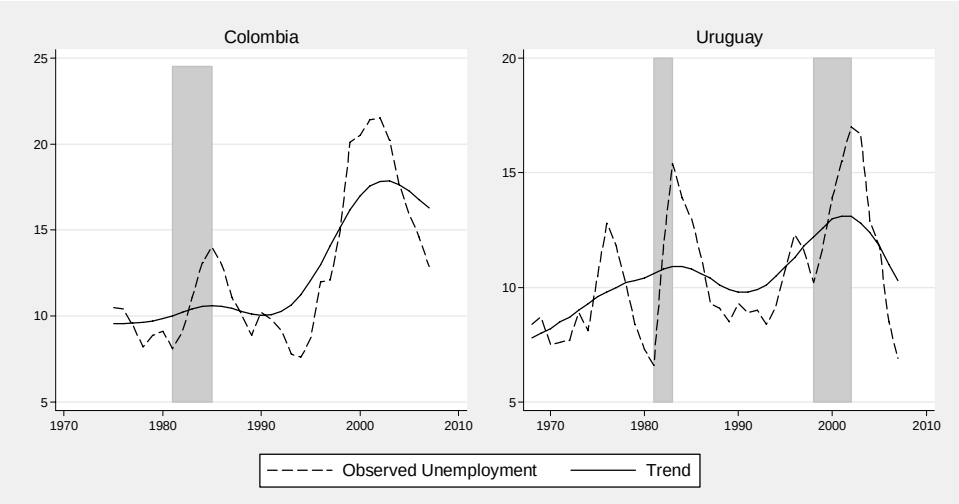


Figure 3


Colombia
Uruguay
25
20
15
10
5
1970
1980
1990
2000
2010
Observed Unemployment
Trend

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Data Appendix

A. Cross-country comparable unemployment rates from the IADB

The unemployment data from the Interamerican Development Bank are based on household surveys in each country in its sample. The IADB seeks to produce harmonized statistics that are as comparable as possible across countries and over time. The data are described in IADB (2004).

Unemployment Definition: The IADB measures unemployment as the number of unemployed divided by the labor force (employed plus unemployed). For most countries, an individual's status is determined by his situation during a "reference week." He is counted as unemployed if he was not employed and did not search actively for work during the reference week. Active search includes activities such as contacting potential employers or employment agencies, interviewing for jobs, or filling out applications. The labor force is restricted to ages 15 through 64.

In Colombia and Mexico, the reference period is one month rather than one week; in Chile, it is two months. A longer reference period increases the unemployment rate. Brazil's monthly employment survey reports unemployment rates based on one-week and one-month reference periods in June and July, 2002; the unemployment rate based on one week is 0.92 times the rate based on one month. Based on this example, we multiply all unemployment rates in Colombia, Mexico, and Chile by 0.92 to make them comparable with other countries. IADB staff have told us that this adjustment is reasonable.

Our adjusted version of the IADB data are presented in Table A1.

Table A1

IADB Unemployment rates

	Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Ecuador	El Salvador	Guatemala
1990		7.3	3.7	7.6		4.6				
1991		5.6			6.9	5.5				
1992	6.4	5.5	7.1	5.1	6.8	4.0				
1993	9.1	5.6	6.6		6.6	4.0				
1994	11.9			6.2	6.7	4.1		2.3		
1995	16.1	3.5	6.5		7.3	5.1		1.6	5.3	
1996	17.2	2.1	7.4	5.3	8.9	6.2			5.2	
1997	13.4	1.4	8.3		9.2	5.7			5.0	
1998	12.2		9.6	9.2	11.4	5.6		3.3	5.9	1.8
1999	13.6	4.0	10.4		15.1	6.0			5.2	
2000	13.9	4.3		9.7	15.6	5.2	4.9		4.7	1.5
2001	18.0	4.9	10.1		14.3	6.2	5.7		5.2	
2002	17.6	4.0	9.9		14.6		4.3		4.3	2.2
2003	15.5	4.5	10.7	9.1	13.7	6.8	5.1			
2004	12.6		9.8		12.2	6.5			3.8	
2005	10.7	6.0	10.3		10.9	6.7			4.3	
2006	9.6	5.7	9.2	7.0	12.1	6.0		2.5	3.1	1.6
2007	9.1	6.0	8.8		10.3	4.7	13.6	3.3	3.2	

	Honduras	Jamaica	Mexico	Nicaragua	Panama	Paraguay	Peru	Uruguay	Venezuela
1990	4.4								
1991									6.9
1992	2.7		3.7					8.1	5.5
1993				12.1					4.9
1994			3.7						6.4
1995	2.6				7.5	2.7		9.9	6.7
1996	3.7		4.1					11.1	8.1
1997	2.9				7.0		4.7	10.8	6.8
1998	2.7		2.4	3.0	7.5	4.6	3.9	9.6	7.4
1999	2.7				5.7	5.6	4.5	10.5	10.3
2000			2.5		6.0		4.0	12.9	9.6
2001	2.1			3.7	6.7	6.4	4.6	13.9	9.0
2002	1.8	7.5	2.8		6.8	9.9	5.2	15.7	11.1
2003	3.5				7.1	7.1	4.6	15.3	11.3
2004			3.6		6.1	6.8		11.3	11.1
2005		2.2	3.5		6.3	5.4		10.6	
2006		1.6	3.1		5.4	7.6	3.8	4.2	
2007	3.1				3.6	5.0	3.9	3.5	

B. New Data Set of Unemployment Rates

To derive our data, we have gone country by country to figure out how unemployment was measured in different periods. We have made judgments about which changes in methodology are small enough to ignore, and how to adjust for larger changes. In some cases we can splice different unemployment series together using periods in which they overlap. When in doubt, we have sought advice from people at the agencies that produce unemployment data. We have pieced together data from country-specific sources –central banks, labor ministries and national statistical agencies– and international agencies such as the International Labor Organization. Where a methodological change appears significant but we cannot reliably estimate its effects, we discard the shortest portion of the data that yields a consistent series

Here we report the sources of data, the definition of unemployment, and our adjustments to the series for each country. Table A2 reports the data.

Argentina. Sources: ILO (International Labor Organization) and INDEC (National Institute of Statistics and Census). Surveys cover Gran Buenos Aires and include people ages 10+. Definition: No job and searched actively during the reference week. Prior to 2003, unemployment rates are averages based on surveys in May and October. In 2003, several methodological changes were introduced: the frequency of surveys was increased to one per quarter; some types of female labor that had previously been ignored were included in employment; and the definition of job search of the unemployed was broadened. At one point in time, the INDEC reports results for both versions of the surveys: it reports the new series for the second quarter of 2003 and the old series for May 2003. The ratio of the unemployment rates in the new and old data is 1.14. Therefore, to correct for the break in the series in 03, for 03-07, we average outcomes for the second and fourth quarter and divide the figure by 1.14.

Bolivia. Sources: ILO and INE (National Institute of Statistics). The age covered by the surveys is 10+, while the geographical coverage is "main towns" prior to

1996 and urban areas thereafter. After analyzing the data, we decided that the change in geographical coverage was small enough to ignore. Definition: No job and searched actively during the reference week. The unemployment rate for 1998 is missing; in Table A2, we impute this number by averaging the unemployment rates in 1997 and 1999.

Brazil. Source: IBGE (Brazilian Institute of Geography and Statistics), PME (Monthly Employment Survey). The surveys cover people 15+. Geographical coverage: Metropolitan regions of Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo and Porto Alegre. The figures we report are averages of monthly rates. Definition before 2003: No job and searched actively during the reference week. In 2003, a number of methodological changes were introduced, including new definitions of the geographical areas covered by the survey and an extension of the reference period for search to 30 days. The IBGE performed both versions of the survey from March through December 2002; the average ratio of unemployment rates is 1.47. Therefore, we divide the unemployment rates for 2003 and later by 1.47 to make them comparable to the older data.

Chile. Source: Encuesta de ocupación y desocupación, Universidad de Chile. The survey covers Gran Santiago and is performed in June of each year. Ages 14+. Definition: No job and searched actively during the reference week. There are no breaks in the original series.

Colombia. Sources: ILO and DANE (Administrative National Department of Statistics). We use the survey from September of each year. Ages 12+. Geographical coverage includes seven cities: Bogota, Medellin, Cali, Barranquilla, Bucaramanga, Pasto and Manizales. The weights on the cities changed in 1991; we ignore this change. Definition before 2001: No job and searched actively during the last year (thus, includes "hidden unemployment" or "discouraged workers" who would not be counted as unemployed in many countries). In 2001, there were several methodological changes including a redefinition of unemployment to require search during a reference week. Both versions of the unemployment rate were reported in 2000; the ratio of the old

and new rates is 1.19. Therefore, we multiply unemployment rates in 2001 and later by 1.19. In 2006, new methodological changes were made; nevertheless, CEI (an independent commission of experts, 2008) concluded that the impact of the changes on the urban unemployment rate is statistically insignificant. Thus, we ignore the break.

Costa Rica. Sources: ILO and INEC (National Institute of Statistics and Census). National survey in July of each year. Ages 12+. Definition before 1987: No job and looked for one during the reference week or did not look for a job during the reference week for "circumstantial reasons" but looked for one "in the past". Starting in 1987, "In the past" is restricted to 5 weeks. This methodological change is similar to the narrowing of the unemployment definition in Colombia and Panama. Based on these countries, we estimate that the old definition raises unemployment rates by a factor of 1.1. Therefore, we divide the pre-87 data by 1.1.

Dominican Republic. Source: Labor Force National Survey, Central Bank of the Dominican Republic. National rates, ages 10+. Definition: Includes hidden unemployment, that is, no job search required to be counted as unemployed.

Ecuador. Source: ILO. Survey in November (except July in 1993 and 2001, December in 2007). Ages: 12+ until 1990, 10+ thereafter; we ignore this change. Geographic coverage is urban areas of Quito, Guayaquil and Cuenca. Definition: No job and active search during a reference period of five weeks.

El Salvador. Source: ILO. In the original data, unemployment rates are national except for 1988-1992, when they are urban. IADB data suggest that urban rates are 1.1 times national rates. Therefore, we divide the unemployment rates for 1988-92 by 1.1. Ages 10+. Definition: no job and have actively searched for a job (reference period is not explicit).

Guatemala. Source: ILO. National rates, ages 10+. Definition: No job during reference week and searched actively during the 4 preceding weeks.

Honduras. Source: INE (National Institute of Statistics). Survey of urban areas in September (except March in 1993 and 2001). Ages 10+. Definition: No job in the reference week and searched actively during the reference week. Unemployment rate for 2000 is missing; in Table A2 we impute this number by averaging the unemployment rates in 1999 and 2001.

Jamaica. Sources: ILO. National rates. Definition: "The unemployed comprise all those aged 14 years and over who were looking for work, wanting work and available for work. Persons looking for work must have made a positive attempt to seek a job such as: registration at employment agency; visiting job sites in search of a job; applying in person to prospective employers; putting advertisements in any public press or place; writing letters of application; asking someone to try to find a job; making investigations with a view of starting own farm or business."

Mexico. Sources: ECSO (Continuous Survey on Occupation), 1973-1984, and ENEU (National Employment Urban Survey), 1985-2004. The ECSO data cover three cities: Mexico City, Guadalajara and Monterrey. ENEU provides unemployment rates for individual cities; we construct a weighted average for the three cities using population estimates from the 1990 census. Ages 12+. Definition: No job and searched actively during the reference week. Before 1985, the unemployed include persons waiting to start a job in 30 days; persons who expect to return to a previous job within 30 days; and unpaid family workers working less than 15 hours per week. Starting in 1985, the first two groups are counted as employed and the third is out of the labor force. Both versions of the unemployment rate are reported for 1984; the ratio of the old definition to the new one is 1.05. Therefore, we divide the data before 1985 by 1.05.

Panama. Sources: UN Yearbook of Labour Statistics (1963-69), ILO (1970-99), Contraloría de Panamá (2000-). National rates, ages 15+. Definition: includes hidden unemployment. The unemployment rate is missing for 1980-81 and 1990. In Table A2, we use the 1979 rate for 1980-1981. (We did not use the 1982

rate because of the likely effect of the Latin American debt crisis.) We impute a rate for 1990 by averaging the rates for 1989 and 1991.

Paraguay. Sources: ILO (1979-96), LAC Statistical Yearbook (1997-). Geographical coverage is Asunción Metro area until 1994 and urban areas thereafter. Ages 12+ for 1979-1992 and 1994; otherwise, 10+. We ignore these changes. Definition: No job in reference week and searched actively during reference week. The unemployment rate for 1981 is missing; we use the average of 1980 and 1982.

Peru. Sources: MTPS (Ministry of Labor and Social Promotion), 1970-94; INEI (National Institute of Statistics), 1995-. Unemployment rates for Lima, ages 14+. Definition: No job in reference week and searched actively during reference week. Missing data for 1978, 1985, and 1988 are imputed by averaging adjacent years.

Trinidad and Tobago. Sources: Yearbook of Labour Statistics and ILO. National survey, ages 15+. Definition : includes hidden unemployment. (We have discarded data before 1987, which do not count first-time job seekers as unemployed, because we do not know how large an adjustment to make to these data.)

Uruguay. Sources: Yearbook of Labour Statistics and INE (National Institute of Statistics). Unemployment rates for Montevideo, ages 14+. Definition: No job during reference week and searched actively during reference week. Starting in 1981, domestic workers are not counted as employed; this change appears small enough to ignore. The unemployment rate in 1975 is missing; we impute it by averaging 1974 and 1976.

Venezuela. Sources: ILO and INE (National Institute of Statistics). National rates, ages 15+. We calculate annual unemployment rates as averages of rates for the first and second halves of each year. Definition: Includes hidden unemployment.

Table A2

New dataset of Unemployment rates

	Arg.	Bol.	Bra.	Chile	Col.	Costa Rica	Dom. Rep.	Ecu.	El Sal.	Gua.	Hon.	Jam.	Mex.	Pan.	Par.	Peru	Trin. & Tob.	Uru.	Ven.
1957				6.3															
1958				9.4															
1959				7.4															
1960				8.0															
1961				7.1															
1962				5.7															
1963				5.2										5.8					
1964				4.9										7.4					
1965				5.0										7.6					
1966				6.0										5.1					
1967				5.9										6.2					7.9
1968				6.5										7.0				8.4	6.8
1969				7.3										6.6				8.7	7.4
1970	4.8			7.2										7.1		7.0		7.5	7.2
1971	6.0			5.2										7.6		9.5		7.6	6.2
1972	6.6			3.6								23.2		6.8		7.6		7.7	5.3
1973	5.6			3.0								21.9	7.1	7.0		5.0		8.9	5.0
1974	3.4			10.6								20.5	6.8	5.8		6.5		8.1	6.2
1975	2.3			16.1	10.5							20.4	6.8	6.4		7.4		10.5	7.8
1976	4.5			18.0	10.4	5.7						22.4	6.4	6.7	6.7	6.5		12.8	6.0
1977	2.8			13.0	9.4	4.2						24.2	7.7	8.7	5.4	8.5		11.8	4.8
1978	2.8			12.8	8.2	4.1						24.3	6.5	8.1	4.1	7.5		10.2	4.6
1979	2.0			12.5	8.9	4.4						27.5	5.5	8.8	5.9	6.5		8.4	5.4
1980	2.3			11.7	9.1	5.4						27.3	4.3	8.8	4.1	7.1		7.3	6.0
1981	4.5			9.0	8.1	7.9						26.0	4.0	8.8	4.9	6.8		6.6	6.3
1982	4.8		6.9	23.2	9.1	8.5						27.6	4.0	8.4	5.6	6.6		11.7	7.1
1983	4.2		7.6	22.7	11.1	8.2						26.4	6.5	9.7	8.3	9.0		15.4	10.1
1984	3.8		8.1	18.4	13.1	4.5						25.6	5.7	10.1	7.3	8.9		13.9	13.0
1985	5.3		5.9	16.2	14.0	6.2						25.0	4.8	12.3	5.1	7.1		13.0	13.1
1986	4.4		4.0	15.4	13.0	5.6						23.7	4.8	10.5	6.1	5.3		11.4	11.0
1987	5.3		4.1	13.5	11.1	5.6						21.0	4.3	11.8	5.5	4.8	22.3	9.3	9.2
1988	6.0		4.2	11.2	10.1	5.5			8.5			18.9	4.1	16.3	4.7	6.4	22.0	9.1	7.3
1989	7.3	10.0	3.6	9.3	8.9	3.8			7.6			16.8	3.4	16.3	6.1	7.9	22.0	8.5	9.9
1990	7.3	7.3	4.7	9.7	10.2	4.6		6.1	9.1		6.9	15.7	3.0	16.3	6.6	8.3	20.0	9.3	10.4
1991	5.8	5.9	5.2	8.3	9.8	5.5	19.6	5.8	6.8		7.1	15.7	3.0	16.2	5.1	5.9	18.5	8.9	9.5
1992	6.7	5.5	6.1	6.0	9.2	4.1	20.3	8.9	7.2		5.1	15.4	3.3	14.7	5.3	9.4	19.6	9.0	7.7
1993	10.1	6.0	5.7	6.4	7.8	4.1	19.9	8.3	9.9		7.1	16.3	3.9	13.3	5.1	9.9	19.8	8.4	6.7
1994	12.1	3.1	5.4	6.3	7.6	4.2	16.0	7.1	7.7		4.0	15.4	4.0	14.0	4.4	8.8	18.4	9.2	8.7
1995	18.8	3.6	5.0	6.1	8.7	5.2	15.8	6.9	7.7		6.0	16.2	7.2	14.0	5.3	7.1	17.2	10.8	10.3
1996	18.4	3.8	5.8	7.2	12.0	6.2	16.7	10.4	7.7		6.6	16.0	6.5	14.3	8.2	7.2	16.2	12.3	11.8
1997	15.7	3.7	6.1	6.7	12.1	5.7	16.0	9.2	8.0		5.2	16.5	4.2	13.4	7.1	8.6	15.0	11.6	11.4
1998	13.7	5.5	8.3	6.9	15.0	5.6	14.4	11.5	7.3		4.6	15.5	3.7	13.6	6.6	6.9	14.2	10.2	11.2
1999	15.0	7.2	8.3	15.4	20.1	6.0	13.8	14.4	7.0	1.9	5.1	15.7	2.9	11.8	9.4	9.4	13.1	11.8	14.9
2000	15.4	7.4	7.8	14.4	20.5	5.2	13.9	9.0	7.0	1.4	5.7	15.5	2.5	13.5	10.0	7.8	12.2	13.9	13.9
2001	18.1	8.5	6.8	15.0	21.4	6.1	15.6	11.0	7.0	1.3	6.3	15.0	2.9	14.7	10.8	8.8	10.8	15.5	13.3
2002	20.4	8.7	7.9	13.6	21.5	6.4	16.1	9.3	6.2	3.1	5.9	14.3	3.0	14.1	14.7	9.7	10.4	17.0	15.9
2003	15.0	7.4	8.4	13.4	20.2	6.7	17.0	11.5	6.9	3.4	7.4	10.9	3.5	13.6	11.2	10.3	10.5	16.7	18.0
2004	12.7	6.2	7.8	11.6	17.6	6.5	18.4	8.6	6.8	3.1	8.0	11.4	4.4	12.4	10.0	10.5	8.3	12.9	15.2
2005	10.7	8.1	6.7	11.5	15.9	6.6	17.9	7.9	7.2	2.5	6.1	10.9	5.4	10.3	7.6	11.4	8.0	11.8	14.0
2006	9.3	8.0	6.8	11.1	14.6	6.0	16.2	7.8	6.6	1.8	5.2	9.6	5.1	9.1	8.9	8.8	6.2	8.5	10.0
2007	7.3		6.3	8.5	12.9	4.6	15.6	6.1	6.4			9.3	5.6	6.8	7.2	7.2	5.5	6.9	8.4

C. Other Variables

This appendix describes the data used in the cross-country regressions.

Development related variables:

- Per capita GDP, [PPP constant 2000 international US$]: average per capita GDP from the World Bank's World Development Indicators (WDI) between 1990 and 2007.
- Education: This is a measure proposed by Barro and Lee (2000) as a proxy for economic development. It is based on the educational attainment of the population ages 25+, measured as no schooling, primary, secondary, and higher. We took the average value for years 1990, 1995, 2000 and 2005.
- Value added of the agricultural sector as a percentage of GDP: we take the simple average between 1990 and 2007. Data come from the WDI.
- Rural population as a percentage of total population: we take the simple average between 1990 and 2007. Data come from the WDI.

Labor Market Rigidities: (Based on descriptions provided by Heckman and Pages (HP) and Doing Business (DB).)

For the HP data, available years vary widely across countries. In each country, the three HP variables are available for the same years. The only exception is Guatemala, where only data on social security contributions (SSC) are available. We exclude Guatemala from regressions that include other labor-market variables. The following table shows available years for each country. For the regressions, we compute the simple average of each country's available numbers:

Country	Years
Argentina	1996, 1997, 1998
Bolivia	1990, 1993, 1995-1997, 1999
Brazil	1992,1993, 1995-1999
Chile	1990, 1992, 1994, 1996, 1998
Colombia	1990, 1991, 1993, 1995-1999
Costa Rica	1991, 1993, 1995, 1997, 1998
Dominican Republic	1996, 1998
Ecuador	1995, 1998
El Salvador	1995, 1997, 1998
Honduras	1992, 1996-1999
Mexico	1992, 1994, 1996, 1998
Nicaragua	1993, 1998
Panama	1991, 1995, 1997-1999
Paraguay	1995, 1999
Peru	1991, 1994, 1996-1998
Uruguay	1995, 1997, 1998
Venezuela	1993, 1995, 1997-1999

Definitions:

- Advance Notice (HP): indicates the number of months with which an employee has to be notified if he is to be fired.
- Indemnities for Dismissal (HP): Cost of mandatory indemnities for dismissal, reported in multiples of monthly wages.
- Social Security Contributions (HP): expected discounted cost of complying with social security laws, in multiples of monthly wages. This cost includes "contributions by employers and employees to old age, disability and death; sickness and maternity; work injury; unemployment insurance and Family allowances programs".

For a few years the World Bank generated and reported data on labor market regulations as part of the Doing Business (DB) program. Unfortunately, that part of the dataset was later discontinued. We use some of labor market data once produced by DB. For two of the DB variables used in the paper—Rigidity of Employment and Firing Costs—we have figures for 2003-2006 (except for Trinidad and Tobago, where the information started in 2005). The labor tax variable is only available for 2006. For the regressions, we average the available numbers for each country.

Definitions:

- Rigidity of Employment Index (DB): This variable is the average of three other indexes: a difficulty of hiring index, a rigidity of hours index and a difficulty of redundancy index. They all take values between 0 and 100, with higher values indicating more rigidity. The difficulty of hiring index measures "(i) whether fixed-term contracts are prohibited for permanent tasks; (ii) the maximum cumulative duration of fixed term contracts; and (iii) the ratio of the minimum wage for a trainee or first-time employee to the average value added per worker". The rigidity of hours index "has 5 components: (i) whether there are restrictions on night work; (ii) whether there are restrictions on weekly holiday work;(iii) whether the workweek can consist of 5.5 days; (iv) whether the workweek can extend to 50 hours or more (including overtime) for 2 months a year to respond to a seasonal increase in production; and (v) whether paid annual vacation is 21 working days or fewer". The difficulty of redundancy index has 8 components: "(i) whether redundancy is disallowed as a basis for terminating workers; (ii) whether the employer needs to notify a third party (such as a government agency) to terminate 1 redundant worker; (iii) whether the employer needs to notify a third party to terminate a group of 9 redundant workers; (iv) whether the employer needs approval from a third party to terminate 1 redundant worker; (v) whether the employer needs approval from a third party to terminate a group of 9 redundant workers; (vi) whether the law requires the employer to reassign or retrain a worker before making the worker redundant; (vii) whether priority rules apply for redundancies; and (viii) whether priority rules apply for reemployment".

- Firing Costs (DB): This variable measures the cost of advance notice requirements, severance payments and penalties due when terminating a redundant worker, expressed in weekly wages.

- Labor Tax (DB): This variable is the sum of all labor-related taxes payable by a medium size business, including payroll taxes, mandatory social

security contributions, mandatory health insurance, mandatory unemployment insurance, and any local contributions that depend on the payroll or number of employees. Only taxes with statutory incidence on the employer are included. (For more detail on this variable, see Djankov et al., 2009).