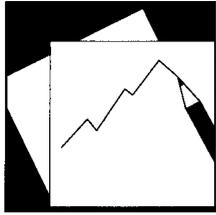


# Working Paper

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INTERNATIONAL MONETARY FUND



# IMF Working Paper

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## Is the Growth Momentum in Latin America Sustainable?

*Sebastián Sosa, Evridiki Tsounta, and Hye Sun Kim*

**IMF Working Paper**

Western Hemisphere Department

**Is the Growth Momentum in Latin America Sustainable?\***

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**Abstract**

A favorable external environment coupled with prudent policies fostered output growth in most of Latin America during the last decade. But, what were the drivers of this strong growth performance from the supply side and will this momentum be sustainable in the years ahead? We address these questions by identifying the proximate causes of the recent high GDP growth and estimating potential growth rates for the period ahead for a large group of Latin American countries based on standard (Solow-style) growth accounting methodologies. We find that factor accumulation (especially labor), rather than growth in total factor productivity (TFP), remains the main driver of GDP growth. Moving forward, given the expected moderation of capital accumulation and some natural constraints on labor, the strong growth momentum is unlikely to be sustainable unless TFP performance improves significantly.

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Keywords: economic growth, potential growth, total factor productivity, Latin America

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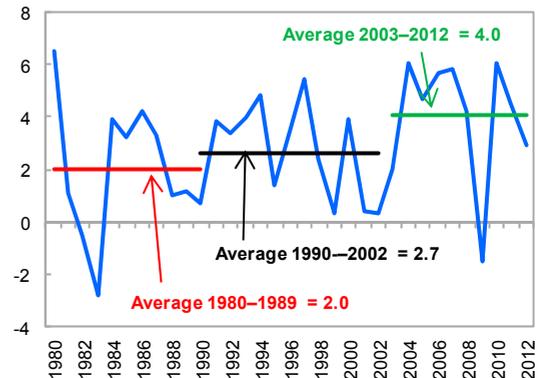
## I. INTRODUCTION

Highly favorable external conditions—interrupted only temporarily during the 2008–09 global financial crisis—coupled with prudent macroeconomic policies bolstered GDP growth in most of Latin America during the last decade. In contrast, growth in the Caribbean has been disappointing. On average, the Latin American and the Caribbean (LAC) region has grown by 4 percent annually since 2003, compared with less than 2½ percent in 1980–2002 (Figure 1). But, what were the (supply side) drivers of this remarkable growth performance and will this momentum be sustainable moving forward?

This paper addresses these questions by identifying the proximate causes of the recent strong growth performance and estimating potential growth rates for the period ahead based on standard (Solow-style) growth accounting methodologies. Our analysis is based on a group of 19 LAC countries starting in 1980.<sup>1</sup> First, we decompose the sources of output growth into accumulation of factors of production and total factor productivity (TFP). The results are compared with the region’s performance in the past as well as with other regional benchmarks. Then, we project potential growth rate *ranges* for each country for the period 2013–17 using the production function approach.<sup>2</sup> To this end, we use a battery of commonly used filtering techniques to measure the trend of the sub-components of output (namely, capital, labor, and TFP), smoothing out cyclical fluctuations. To investigate the sustainability of the recent growth momentum, we explore possible constraints on factor accumulation for the region’s growth performance.

The analysis of the sources of economic growth dates back to the work of Robert Solow, who first decomposed U.S. output growth into a weighted average of the rate of growth of labor and capital, and a residual (the so-called “Solow residual” or total factor productivity). For Latin America and the Caribbean, the most detailed recent study of the sources of growth is Loayza et al. (2005), which analyzes a sample of 20 LAC countries for the period 1961–2000. The study builds on earlier work by Elias (1992), De Gregorio (1992), Bosworth and Collins

**Figure 1. Latin America and the Caribbean: Real GDP Growth<sup>1</sup>**  
(Percent)



Sources: IMF, *World Economic Outlook*; and authors' calculations.

<sup>1</sup> Weighted average of Latin American and the Caribbean countries.

<sup>1</sup> Our sample includes: “LA6” (Brazil, Chile, Colombia, Mexico, Peru, and Uruguay), “other South American economies” (Bolivia, Ecuador, Paraguay, and Venezuela), “Central America” (Costa Rica, Dominican Republic, El Salvador, Honduras, Nicaragua, and Panama) and “the Caribbean” (Barbados, Jamaica, and Trinidad and Tobago). Argentina, Guatemala, and most of the small Caribbean islands are excluded due to data limitations.

<sup>2</sup> Given uncertainties in estimating potential growth rates, we choose to deploy a battery of techniques and present a range of estimates rather than a point estimate.

(1996), and Easterly and Levine (2002).<sup>3</sup> Overall, this literature points to two key results. First, TFP performance in LAC (either in terms of the contribution to GDP growth or in level terms compared to other regions/countries) was very weak from 1980 through 2000, with TFP being a particular drag to growth in the 1980s. Second, the contribution of TFP to overall growth tends to be procyclical and changes in output growth are explained, to a large extent, by movements in TFP.

Our paper contributes to this literature in several ways. To the best of our knowledge, this is the first study examining the sources of growth in LAC with actual data extended to 2012, thus including the recent high growth episode.<sup>4</sup> In addition, while most existing studies focus on one country or a small group of countries (typically including Latin America's largest economies), this paper includes a larger number of countries from all sub-regions in Latin America (i.e., South America, Mexico, and Central America), and it also adds the Caribbean into the analysis. Furthermore, while most studies restrict their attention to long-term developments (usually up to the mid-2000s), we actually attempt to project the future range of potential growth rates thus answering the question of whether the current strong growth momentum can be sustained or not in the years ahead. To undertake this task, we create a new database that incorporates the latest available data from various sources from 1980 through 2012.

The main findings of the paper are:

- Factor accumulation (especially labor), rather than TFP growth, remains the main driver of output growth in Latin America and the Caribbean. The strong labor contribution to growth in recent years is mostly stemming from declining unemployment.
- Higher TFP accounts for most of the recent growth pickup in Latin America. Indeed, after exhibiting declines in most of the region in previous decades, TFP growth mostly turned positive in the last decade.
- There are large output growth disparities within the LAC region, with growth in the Caribbean being particularly disappointing. In general, growth in the LAC region remains below that of emerging Asia, with most of the growth differential being explained by differences in TFP performance.
- If recent historical trends continue for capital and TFP and given some natural constraints on labor, the current strong growth momentum is unlikely to be sustainable. Improvements in TFP will be pivotal to sustain the high growth rates in the region.

---

<sup>3</sup> More recently, Solimano and Soto (2004) analyze the sources of growth for a group of 12 Latin American economies for the period 1960-2002. Daude and Fernandez Arias (2010) and Inter-American Development Bank (2010) use growth accounting techniques to explain Latin America's negative income gap relative to developed economies from 1960 to 2005. Finally, Ferreira et al. (2013) use a production function approach to study the evolution of relative TFP in 7 Latin American countries between 1960 and 2007.

<sup>4</sup> For an analysis of the impact of the 2008–09 global financial crisis on Latin America's potential output growth rates, see Sosa and Tsounta (2013).

The paper is structured as follows. Section II describes the growth accounting exercise and its results, while Section III estimates potential growth rate *ranges* and discusses the sustainability of the recent strong growth momentum. Section IV concludes.

## II. WHAT FACTORS EXPLAIN THE RECENT STRONG GROWTH PERFORMANCE?

Although there is consensus that the robust growth performance in Latin America in recent years has been to a great extent driven by favorable external conditions (namely strong global growth, high commodity prices, and easy external financing conditions) that fueled external and domestic demand, it is less clear what the main drivers were from a supply side perspective.<sup>5</sup> To study this, we use a simple accounting framework that decomposes output growth into the contributions from accumulation of capital and (quality-adjusted) labor, and changes in TFP.

### A. Methodology and Data

We assume the following standard Cobb-Douglas production function:

$$Y_t = A_t K_t^\alpha (L_t h_t)^{(1-\alpha)} \quad (1)$$

where

$Y_t$  represents domestic output in period  $t$ ,  $K_t$  the physical capital stock,  $L_t$  the employed labor force,  $h_t$  total factor productivity. Our assumptions for  $\alpha$ , the capital share of output, are country-specific and based on Loayza et al. (2005).<sup>6</sup>

We use annual data for most variables from Penn World Table 7.1 (PWT) for the period 1980 until 2010 and other sources—mainly the IMF’s World Economic Outlook (WEO) database for the subsequent years. Specifically, data on output, measured by real GDP, are obtained from PWT until 2010 and extended up to 2012 using WEO.<sup>7</sup> The capital stock series is constructed with investment data from the PWT using the perpetual inventory method until 2010, and investment data from WEO for 2011–12.<sup>8</sup> We assume that the economy is on a balanced growth path at time zero and compute the initial capital stock,  $K_0$ , according to the expression:

$$K_0 = \frac{I_0}{(1+g)(1+n) - (1-\delta)} \quad (2)$$

<sup>5</sup> See Inter-American Development Bank (2008); Izquierdo and others (2008); and Osterholm and Zettelmeyer (2008) for studies on the role of external factors in driving GDP growth in Latin America.

<sup>6</sup> Our assumptions on  $\alpha$  are broadly in line with those in Gollin (2002). Our main findings are robust to a range of reasonable values for this parameter.

<sup>7</sup> We use the *rgdpl* series from PWT—PPP converted GDP per capita (Laspeyres), at 2005 constant prices—multiplied by total population (POP).

<sup>8</sup> We use the *ki* series from PWT—investment share of PPP converted GDP per capita at 2005 constant prices.

where  $I_0$  is the initial investment expenditure,  $g$  is the technological progress rate,  $n$  is the population growth rate, and  $\delta$  is the rate of capital depreciation. Following Ferreira et al. (2013) we use the average investment of the first five years as a measure of  $I_0$  in order to minimize the impact of economic fluctuations, with 1950 being the initial year. We assume that  $g$  is equal to 1.53 percent;  $\delta$  is equal to 3.5 percent (as in Ferreira et al., 2013, and FIEL, 2002); and  $n$  is equal to the average annual growth rate of population for each country between 1960 and 2012, using PWT data up to 2010 and WEO data afterwards.

Our labor input series (measured by employment) refers to inputs effectively used in the production process. By considering the employed labor force rather than the entire stock of labor available for production (i.e., labor force), we ensure that changes in the unemployment rate are not reflected into changes in TFP. Employment series are obtained using the labor force series from PWT (up to 2010) and the employment rate (one minus unemployment rate) from WEO. For 2011–12, we assume that the labor force rises in line with United Nation’s (U.N.) Population Projections (constant fertility scenario) for people aged 15 and over. To get quality-adjusted labor, we follow Bils and Klenow (2000) and Ferreira et al. (2013) and model human capital as a function of the average years of schooling:

$$h = \exp \varphi(s) = \exp \left( \frac{\theta}{1-\psi} s^{1-\psi} \right) \quad (3)$$

where  $s$  stands for years of schooling of the population aged 15 years old and over, using data from Barro and Lee (2010).<sup>9</sup>

Using equation (1), we can decompose GDP growth as follows (denoting by  $\hat{x}$  the growth rate of a variable  $x$ ):

$$\hat{Y} = \hat{A} + \alpha \hat{K} + (1 - \alpha) \hat{L} + (1 - \alpha) \hat{h} \quad (4)$$

where changes in GDP are explained by changes in factor accumulation (quality-adjusted labor and capital) and TFP.

A few caveats about the estimation of TFP are worth mentioning, which imply that the results should be interpreted with some caution.<sup>10</sup> The TFP measure is by definition a residual—the difference between output growth and that in the quantity (and quality) of inputs. Thus, any measurement errors in the labor and capital series are automatically imputed to TFP. For instance, (i) changes in the quality of the capital and labor stocks that

<sup>9</sup> Following Bils and Klenow (2000) we set  $\psi = 0.58$  and  $\theta = 0.32$ .

<sup>10</sup> TFP measures how efficiently factors of production are used in the production process, and captures technological progress as well as the efficiency in the allocation of inputs.

we fail to account for,<sup>11</sup> (ii) changes in the level of capital utilization, and/or (iii) changes in the use of land (a factor our methodology does not account for) would be reflected in TFP.

## B. Results

Our key findings are as follows:

***Stylized fact 1.*** *Factor accumulation (especially labor), rather than TFP growth, remains the main driver of output growth.* In Latin America, total factor accumulation explained 3¾ percentage points of annual GDP growth in 2003–12, compared with ¾ percentage points explained by TFP (Figure 2). Although factor accumulation was also the main driver of growth in the Caribbean, growth performance in this region during the recent period has been weaker than in the previous decade.

***Stylized fact 2.*** *The recent growth pickup in Latin America is mainly explained by higher TFP.* Since 2003, TFP has increased in most countries, in contrast to the lukewarm performance of the 1990s. Our estimates suggest that TFP explains about 1–1½ percentage points of the higher growth performance since 2003 compared with the 1990–2002 period (Figure 3). The contribution of physical capital also increased, though to a lesser extent, partly reflecting improved macroeconomic policies, favorable external financial conditions and high investment (including foreign direct investment) in the primary sector associated with the commodity price boom. In fact, the increase in the capital contribution was larger in the commodity exporters of the region (South America) than in non-commodity exporters (Mexico, Central America, and the Caribbean), as illustrated in Figure A.1, and Tables A.1 and A.2 in the Annex. In the Caribbean, the GDP growth deceleration during the last decade has been mainly driven by lower labor input contribution.

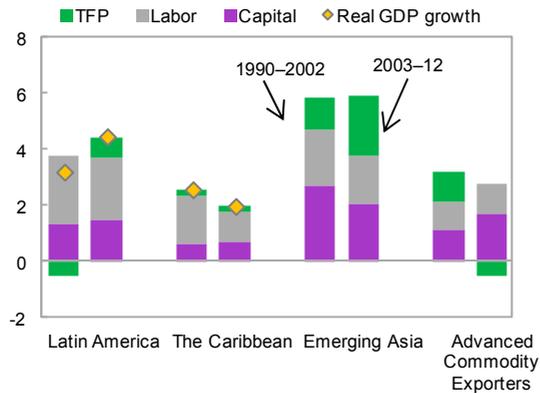
***Stylized fact 3.*** *The contribution of TFP to overall growth is larger in economies with higher growth.* Countries that experienced a stronger pick-up in output growth (Panama, Peru, and Uruguay) exhibited a higher contribution from TFP. In contrast, 2003–12 GDP growth rates in Chile, El Salvador, and Mexico were lower than in the previous decade, partly reflecting negative TFP growth during the last ten years (see Figure A.1 and Table A.1 in the Annex).

***Stylized fact 4.*** *Growth in the LAC region remains below that of emerging Asia, with most of the growth differential being explained by differences in TFP performance.* On the positive side, Latin America’s growth gap vis-à-vis emerging Asia has narrowed in the last decade compared with the 1990s, on account of a reduction in differences in capital contributions (Figure 4). However, large TFP growth differentials remain, accounting for most of the GDP growth gap in the period 2003–12. The labor contribution, in contrast, has historically been larger in Latin America (especially in Central America) than in emerging Asia.

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<sup>11</sup> For example, if the increase in the capital stock is driven mainly by additional machinery and equipments rather than buildings and structures, then a “higher quality” stock of capital should produce higher output—and thus, the contribution from TFP would be lower (see Roldós, 1997).

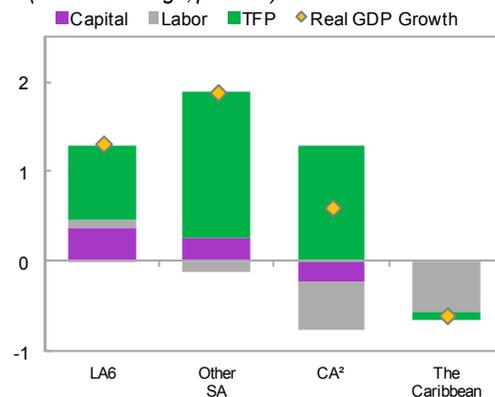
**Figure 2. Contribution to Real GDP Growth**  
(Annual average, percent)<sup>1</sup>



Sources: Penn World Table 7.1; IMF, *World Economic Outlook*; and authors' calculations.

<sup>1</sup> Simple average of countries within each group. Latin America includes all Latin American countries in our sample. Emerging Asia includes Indonesia, Malaysia, Philippines, Thailand, and China. Advanced commodity exporters includes Australia, Canada, New Zealand, and Norway. The Caribbean includes Barbados, Jamaica, and Trinidad and Tobago.

**Figure 3. Growth Decomposition: Gap between 2003-12 and 1990-2002**  
(Annual average, percent)<sup>1</sup>



Sources: Penn World Table 7.1; IMF, *World Economic Outlook*; and authors' calculations.

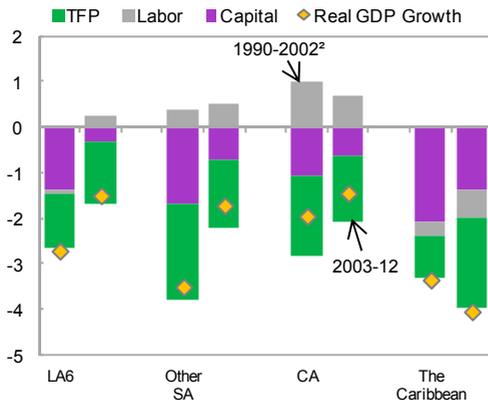
<sup>1</sup> Simple average of countries within each group. LA6 includes Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. Other South America (SA) includes Bolivia, Ecuador, Paraguay, and Venezuela. Central America (CA) includes Costa Rica, Dominican Republic, El Salvador, Honduras, Nicaragua, and Panama. The Caribbean includes Barbados, Jamaica, and Trinidad and Tobago.

<sup>2</sup> For Central America: 1992-2002.

**Stylized fact 5.** *Declining unemployment is behind Latin America's strong labor contribution to growth in recent years.* Much like in the 1990s, labor remains the main contributor to growth during 2003-12. However, the factors explaining this high contribution to growth have changed markedly. While increases in the working-age population and higher participation rates were the main drivers during 1990-2002, their contribution (while still positive) declined significantly during 2003-12 (Figure 5). Instead, increases in the rate of employment—a factor hindering growth in the previous period—played a key role since 2003, consistent with near-record low unemployment levels in many countries.<sup>12</sup> The contribution of improvements in human capital to output growth has typically been positive and broadly stable over time, accounting for about ½ percentage point of annual GDP growth. Labor contribution has declined in the Caribbean since 2003, despite an increase in the working-age share of the population. This deterioration reflects lower employment rates than in the past and further declines in the labor force participation rates.

<sup>12</sup> The decline in unemployment reflects not only cyclical but also structural factors. For instance, the strong performance of the services sector has played an important role. This sector continued to employ an increasing number of workers, with its relative share in total employment increasing significantly in this period. See Sosa and Tsounta (2013) and World Bank (2012).

**Figure 4. Growth Decomposition: Gap between LAC and Emerging Asia**  
(Annual average, percent)<sup>1</sup>

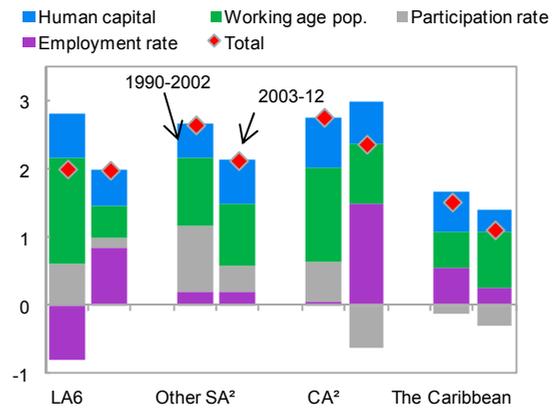


Sources: Penn World Table 7.1; IMF, *World Economic Outlook*; and authors' calculations.

<sup>1</sup> Simple average of countries within each group. See footnote in Figure 3 for details.

<sup>2</sup> For Central America:1992–2002.

**Figure 5. Labor Contribution to Real GDP Growth**  
(Simple average, annual, percent)<sup>1</sup>



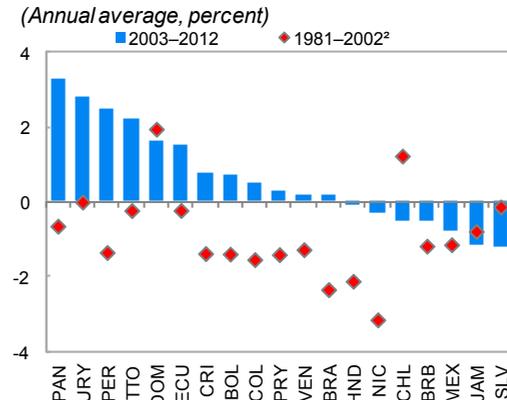
Sources: World Bank, *World Development Indicators*; International Labor Organization; IMF, *World Economic Outlook*; and authors' calculations.

<sup>1</sup> Simple average of countries within each group. See footnote in Figure 3 for details.

<sup>2</sup> Excludes Paraguay and Nicaragua owing to data limitations.

**Stylized fact 6.** TFP performance generally improved in 2003–12, although important differences across countries remain. After exhibiting declines in most of the region in previous decades, TFP growth mostly turned positive (particularly strong growth is recorded in Panama, Peru, and Uruguay) (Figure 6). This partly reflects the expansionary phase of the economic cycle in most of these economies in 2003–12, as well as idiosyncratic factors in some cases (such as the canal expansion in Panama).<sup>13</sup> In Chile—one of the few countries with positive TFP growth in Latin America during the 1980s and 1990s, TFP growth has turned negative in the last decade, partly reflecting declining productivity in the mining sector. This is in line with the experience in commodity-exporting advanced economies (such as Australia, Canada, and Norway) in the recent past, and could be related to the expansion of energy and mining production to areas (fields or mines) of lower marginal productivity—where production has become profitable due to the commodity price boom (Figure 2). Indeed, Sosa and Tsounta (2013), using a sectoral analysis for a large group of

**Figure 6. Latin America and the Caribbean: TFP Growth<sup>1</sup>**  
(Annual average, percent)



Sources: Barro-Lee (2010); Penn World Table 7.1; IMF, *World Economic Outlook*; and author's calculations.

<sup>1</sup> Country names are Barbados (BRB), Bolivia (BOL), Brazil (BRA), Chile (CHL), Colombia (COL), Costa Rica (CRI), Dominican Republic (DOM), Ecuador (ECU), El Salvador (SLV), Honduras (HND), Jamaica (JAM), Mexico (MEX), Nicaragua (NIC), Panama (PAN), Paraguay (PRY), Peru (PER), Trinidad and Tobago (TTO), Uruguay (URY), and Venezuela (VEN).

<sup>2</sup> For Central America:1992–2002.

<sup>13</sup> As discussed in the previous section, our capital stock measure does not capture changes in the level of capital utilization, due to the lack of adequate measures for most of the region. To the extent that capacity utilization has been generally above average in the recent period, our TFP estimates may be an upper bound.

LAC countries, estimate a declining TFP trend in the Chilean mining sector in recent years. In the Caribbean, with the exception of Trinidad and Tobago, TFP performance has been disappointing over the last 30 years.

Our results are generally consistent with those of previous studies. First, our growth decomposition estimates are in line with those in the literature, finding that factor accumulation, rather than TFP, accounts for most of the output growth observed in the region (see Inter-American Development Bank, 2010; Loayza et al., 2005; and Solimano and Soto, 2004). Second, our results suggest that TFP performance in LAC has lagged compared to other regions (in line with Inter-American Development Bank, 2010 and Ferreira et al., 2013, among others). Third, similar to Easterly and Levine (2001) and Loayza et al. (2005), we find that (i) the contribution of TFP to overall growth is larger in economies with higher growth and (ii) regardless of the size of the TFP contribution to growth, its changes account for most of the variation in output growth across periods.

### C. Robustness Tests

We examine the sensitivity of our results by conducting a number of robustness checks. First, we assume that  $\alpha$ , the capital share of output, is equal to 0.4 (as in Ferreira et al., 2013) rather than taking a country-specific value. Second, we assume that  $\delta$  is equal to 5 percent for all countries (as in Bosworth and Collins, 2003) rather than 3.5 percent. Third, as our results could be affected by our measure of the capital stock, we test the sensitivity of the former to an alternative measure. Specifically, for countries where such data were readily available from national sources (Brazil and Chile), we use the capital stock series from that source instead of our own estimates.<sup>14</sup> Our main findings do not change significantly in any of the robustness tests performed (Figure A.2 in the Annex). Finally, we also compare our estimated TFP series with those of the Conference Board *Total Economy Database*<sup>TM</sup>. For most countries in the sample, the TFP series are broadly similar (see lower panel in Figure A.2 in the Annex).

### III. IS THE RECENT STRONG PERFORMANCE SUSTAINABLE?

To address this question, we estimate potential growth rate *ranges* for 2013–17 in LAC countries. Various methodologies have been employed in the literature to estimate potential growth rates, such as constructing measures of the trend in actual GDP that smooth out business cycle fluctuations, or computing the trend of the various subcomponents of GDP—typically using a production function approach, or using econometric models (including structural VARs and Kalman filters). In this paper the production function method was chosen given some important advantages:

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<sup>14</sup> The national sources are the Institute of Applied Economic Research (IPEA) for Brazil and the Central Bank for Chile.

- **Flexibility and intuitiveness.** The production function approach relates inputs to outputs, a quite intuitive and accepted fact by economists. The method is flexible, since it can incorporate different assumptions about technological progress, the importance of capital and labor in the production process and can include changes in quality of inputs (e.g., human capital).
- **Estimating TFP.** During the estimation of potential GDP, TFP estimates can be obtained—an important factor in explaining cross-country growth disparities.

### A. Estimating Potential Growth Rate Ranges

To estimate potential growth rates, we first estimate TFP using equation (1) which can be rewritten as:

$$A = \frac{Y}{K^a (Lh)^{(1-a)}}$$

We then obtain trend series for capital, labor, human capital, and TFP ( $K^T$ ,  $L^T$ ,  $h^T$ ,  $A^T$ ) for the period 1980–2017 using the Hodrick-Prescott (for both  $\lambda = 6.25$  and  $\lambda = 100$ ), Baxter and King, and Christiano and Fitzgerald filters. To avoid the end-of-sample bias we include projections through 2017, based on the following assumptions about  $K$ ,  $L$ ,  $h$ , and  $A$ :

- Both capital and TFP grow at the 2000–12 average annual rate (see Table A.2);<sup>15</sup>
- To project the labor input we use projected unemployment rates (from WEO) and assume that labor force grows in line with working-age population from U.N.’s Population Projections database, while labor force participation rates are assumed to remain constant at their latest observation; and
- Finally, our measure of human capital increases at the 2005–10 average annual rate.

Potential output growth ( $\widehat{Y^P}$ ) is then computed as follows, (where  $\hat{x}$  denotes the growth rate of a variable  $x$ ):

$$\widehat{Y^P} = \widehat{A^T} + \alpha \widehat{K^T} + (1 - \alpha) \widehat{L^T} + (1 - \alpha) \widehat{h^T} \quad (5)$$

Figure 7 presents the average annual potential growth rate *ranges* for the period 2013–17 by estimating equation (5) using all four filtering techniques. We find that potential ranges vary significantly across countries. Panama, Peru, and Dominican Republic exhibit the highest growth potential across the region. On the other hand, some Central American countries and the Caribbean (particularly El Salvador, Barbados, and Jamaica) tend to show a more modest potential growth rate, with upper limits below 1½ percent. While this paper does not attempt to explain cross-country differences in growth potential, these often reflect differences in

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<sup>15</sup> This period covers a full economic cycle in most countries in the region, whereas 2003–12 includes mainly the expansionary phase of the cycle.

economic institutions (e.g., barriers to entry and innovation), natural resource endowments, geography, financial sector deepening, and trade openness.

Is the strong growth momentum sustainable moving forward? We find that, if moving forward, capital and TFP grow at their 2000–12 average annual rates, and given some natural constraints on labor, then the current strong growth momentum is unlikely to be sustainable. While the LAC region has, on average, grown by 4 percent during 2003–12, our estimates suggest that the average potential GDP growth rate in 2013–17 is closer to 3¼ percent. Indeed, the strong GDP growth rates observed in recent years for most of Latin America are higher than (or close to the upper bound of) the potential output growth ranges for 2013–17 in most countries.<sup>16</sup> In addition, the recent disappointing growth performance in much of the Caribbean appears to be in line with the region’s production capacity, implying that significant efforts will be needed to unlock the region’s growth potential.

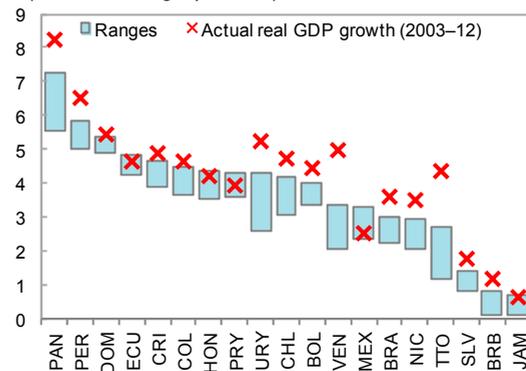
The envisaged growth deceleration in the LAC region (from the recent high growth to projected potential growth rates) reflects lower contributions from all sources, as the growth performance of capital stock and TFP in the last few years has been generally stronger than the 2000–12 average, while labor will be hindered by some natural constraints (see Table A.2 in the Annex). Specifically, in the years ahead:

- Growth of physical capital is expected to moderate somewhat, reflecting a normalization of the easy external financing conditions and the stabilization of commodity prices—both key factors driving the recent strong domestic and foreign direct investment in the region.
- The contribution of labor to output growth will likely decline due to some natural constraints, including: (i) population ageing—the dependency ratio is expected to reach its minimum over the next years in several countries (Figure 8); (ii) limited room to further increase labor force participation rates (including for females), which are already relatively high by international standards (Figure 9);<sup>17</sup> and (iii) limited space for further

<sup>16</sup> Mexico (strongly affected by the 2008–09 global financial crisis given its tight linkages with the U.S. economy) and Paraguay (owing to some idiosyncratic shocks) are exceptions.

<sup>17</sup> In fact, the contributions to output growth of both changes in working-age population and the labor force participation rate have already narrowed significantly in 2003–12 compared with the 1990s. It is worth noting that these constraints on labor are less binding in countries with a large informal sector (e.g., Colombia, Mexico, Peru, and several Central American countries).

**Figure 7. LAC: Potential Output Growth Rate Ranges (2013-17)**  
(Annual average, percent)<sup>1</sup>



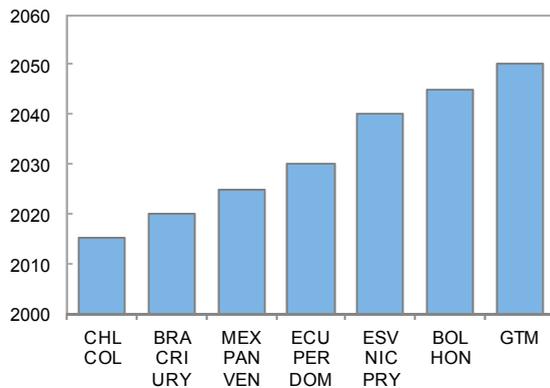
Sources: Penn World Table 7.1; IMF, *World Economic Outlook*; United Nations Population Projections Database; and authors' calculations.

<sup>1</sup> For country names, see figure 6.

increases in employment rates—unemployment rates have declined significantly and now hover near record low levels. Last but not least, stronger contributions from human capital—which would be limited in scope—will require important improvements in the quality of schooling.<sup>18</sup>

- Our baseline projections also entail a slowdown in TFP growth for most countries (down to the 2000–12 average growth rates), consistent with the normalization in the business cycles.<sup>19</sup>

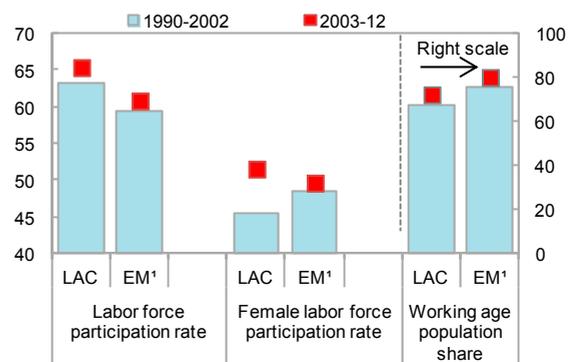
**Figure 8. Selected Latin America: Year with Dependency Ratio at its Minimum**  
(Greatest demographic dividend)<sup>1</sup>



Source: CELADE.

<sup>1</sup> Dependency ratio = (population aged 0-14 + population aged 65 and over) / (population aged 15-64) \* 100. For country names, see figure 6.

**Figure 9. Constraints to Labor Growth**  
(Simple average, percent)



Sources: World Bank, *World Development Indicators*; OECD; and authors' calculations.

<sup>1</sup> Emerging markets (EM) include Czech Republic, China, Estonia, Hungary, India, Indonesia, Poland, Russia, Slovakia, Slovenia, and Turkey. LAC is simple average of all Latin American and the Caribbean countries.

In sum, given the expected moderation of capital accumulation and the existence of natural constraints on labor, the strong growth momentum in the region is unlikely to be sustainable unless TFP performance improves significantly in the future. Thus, TFP performance, which remains a concern despite its recent improvement, will be pivotal to sustain high growth rates in the region in the future.

## B. Alternative Scenarios

As noted earlier, the behavior of TFP going forward is critical to determine growth performance in the years to come. In fact, in case TFP performance proves to be weaker than envisaged in our baseline estimation (i.e., below the 2000–12 average) the impact on potential growth rate could be substantial. To investigate the extent of such impact we consider a counterfactual (downside) scenario where TFP is projected to increase at a lower rate than in the baseline scenario by a margin equal to the difference between the 2005–12

<sup>18</sup> Although LAC's performance in terms of average years of schooling is relatively good compared with countries with similar levels of income per capita, the quality of education has ample room for improvement (the region generally underperforms in terms of standard international tests).

<sup>19</sup> TFP performance is typically procyclical, and—as output gaps close and growth moderate to potential—TFP would grow at rates closer to its 2000–12 average.

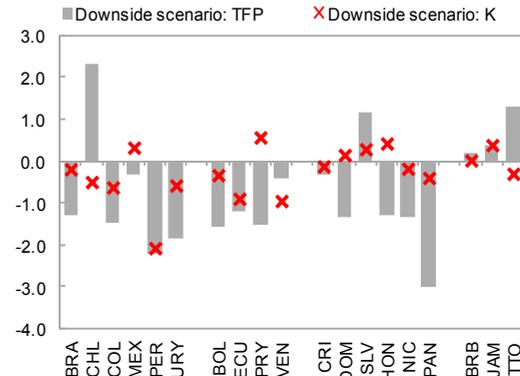
and the 1990–2004 averages (see Table 1). This assumption builds on the idea that the 2005–12 was a period of historically high TFP (and GDP) growth in most countries, while 1990–2004 is characterized by more “normal” TFP growth rates. Similarly, we examine an alternative downside scenario with the stock of capital growing at a lower rate than in the baseline—again we subtract the difference between the 2005–12 and the 1990–2004 average growth rates of capital stock from the baseline growth rates.<sup>20</sup>

**Table 1. Scenario- Assumptions for Potential Growth Projections**  
(2013-2017)

	Capital (K)	Labor (L)	TFP
Baseline Scenario	Average growth rate (2000-12)	UN Population projections for working age population, labor force participation at 2012 rate; unemployment rate based on WEO.	Average growth rate (2000-12)
Downside Scenario: K	Deduct from the baseline growth rate the difference of the average growth rate of 2005-12 and 1990-04.	Baseline scenario	Baseline Scenario
Downside Scenario: TFP	Baseline scenario	Baseline scenario	Deduct from the baseline growth rate the difference of the average growth rate of 2005-12 and 1990-04.

Source: Authors' assumptions.

**Figure 10. Potential Output Growth Rate: Deviation from the Baseline Scenario**  
(Annual average of 2013-2017, percent)<sup>1</sup>



Sources: Penn World Table 7.1; IMF, *World Economic Outlook*; United Nations Population Projections Database; and authors' calculations.

<sup>1</sup> For country names, see figure 6.

Figure 10 illustrates the magnitude of the deviation (from the baseline) of potential growth under the two downside scenarios. The scenario with weaker TFP entails significantly lower potential growth rates for most countries.<sup>21</sup> The impact of a slower accumulation of capital stock on potential growth is also significant, although of smaller magnitude than the negative TFP shock for most countries. This suggests that, if the growth rate of capital decelerates from the recent relatively high levels, TFP performance would need to improve further to reach the baseline potential output growth rates.

### C. Strengthening Capital and TFP Growth

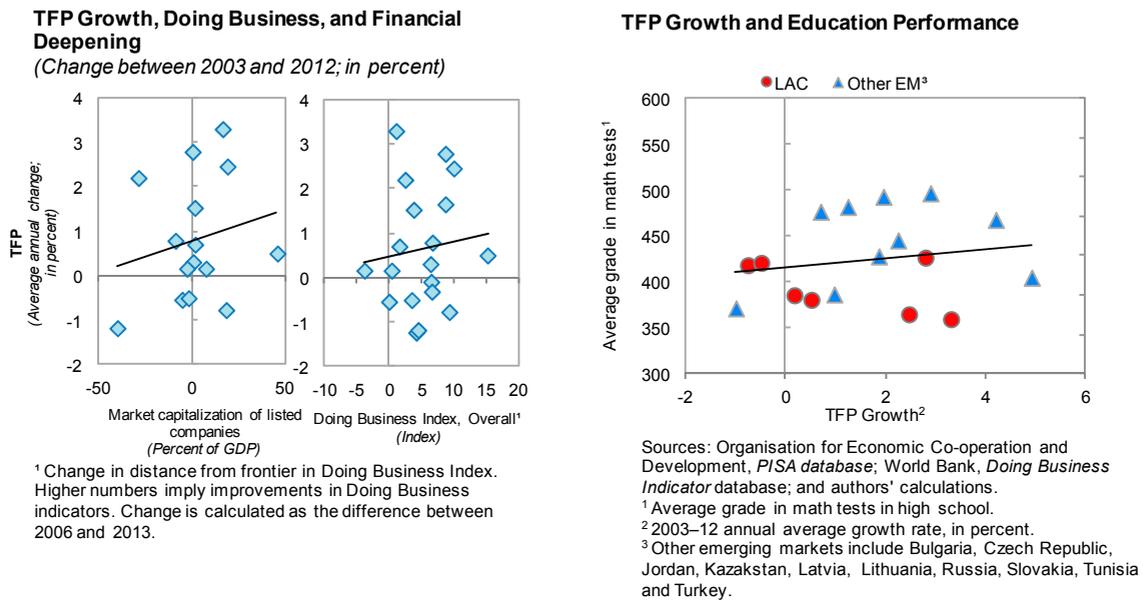
Improvements in the baseline scenario cannot be ruled out if the performance of TFP and capital stock surprise us on the upside. For example, domestic saving (and thus investment) as a share of GDP is low in LAC by international standards, thus mobilizing higher domestic savings could enhance the contribution of capital to long-term growth. Moreover, the region can improve its TFP performance by strengthening further its business climate; enhancing

<sup>20</sup> Capital increased at a strong pace in 2005-12, on account of easy external financing conditions and very high commodity prices.

<sup>21</sup> Exceptions are Chile, El Salvador, and the Caribbean, where TFP performance was actually weaker in recent years compared to the historical average.

competition in product and labor markets; strengthening entry and exit regulation to facilitate the reallocation of resources to new and high-productivity sectors; improving infrastructure; promoting deeper and more efficient financial markets; enhancing research and development and innovation; and strengthening institutions to secure property rights and stamp out corruption (Figure 11). Finally, improving the quality of education would not only affect labor input directly, but also indirectly via its effect on TFP. Designing a policy agenda to unleash productivity is, however, a difficult task and entails country-specific measures. In the Caribbean, efforts are needed to tackle high debt levels and weak competitiveness, which have held back growth.

Figure 11. Institutional Factors and TFP Growth



#### IV. CONCLUDING REMARKS

This paper examines the proximate causes of the recent high GDP growth in the LAC region based on standard growth accounting methodologies. It finds that growth of capital and labor, rather than TFP, remains the main driver of GDP growth. It also shows that higher growth in TFP accounts for most of the recent acceleration in output growth. Despite the recent improvement in TFP performance, its contribution remains modest, especially considering cyclical issues and compared with other regions.

The paper also analyzes the sustainability of the strong growth momentum by estimating potential growth rate *ranges* for the years ahead. The results suggest that, in light of the likely stabilization of the capital contribution to output growth and the existing natural constraints on labor, the current strong growth momentum is unlikely to be sustainable going forward, if TFP performance does not improve significantly. Thus, fostering TFP growth would remain a key challenge and priority for the LAC region.

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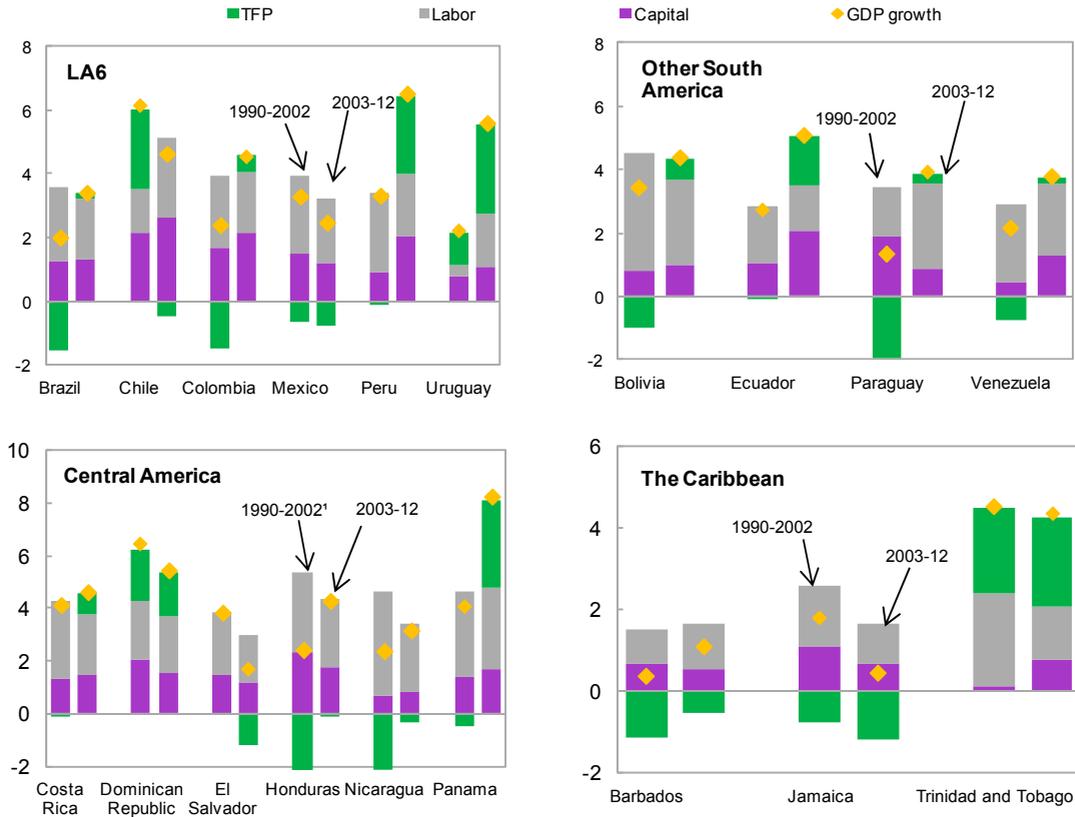
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Annex

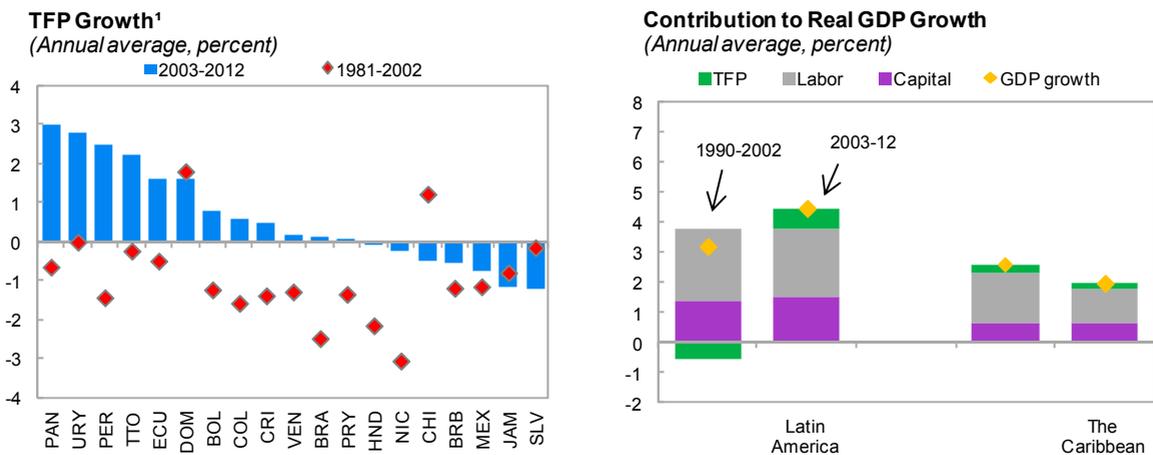
**Figure A.1. Latin America and the Caribbean: Contribution to Real GDP Growth**  
(Annual average; percent)



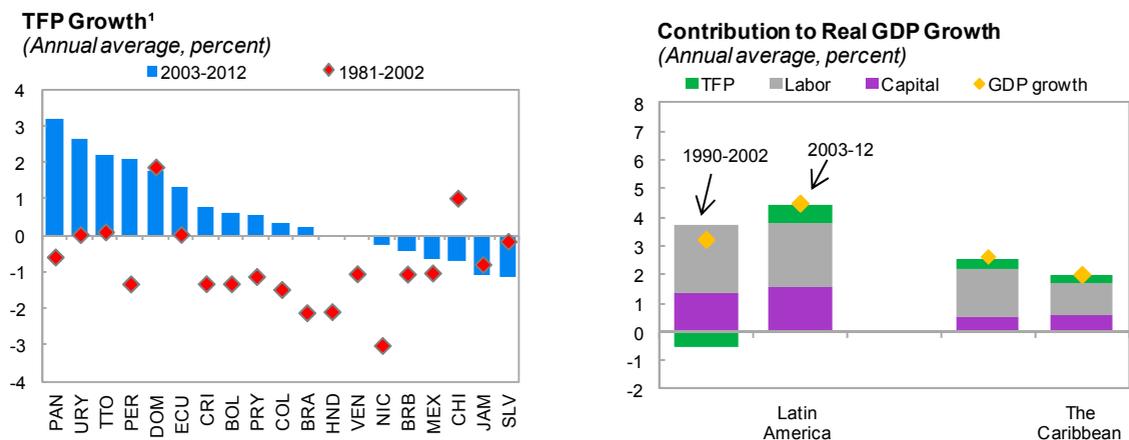
Sources: Penn World Table 7.1; IMF, *World Economic Outlook*; and authors' calculations.  
 \* For Central America: 1992–2002.

Figure A.2. Robustness Checks

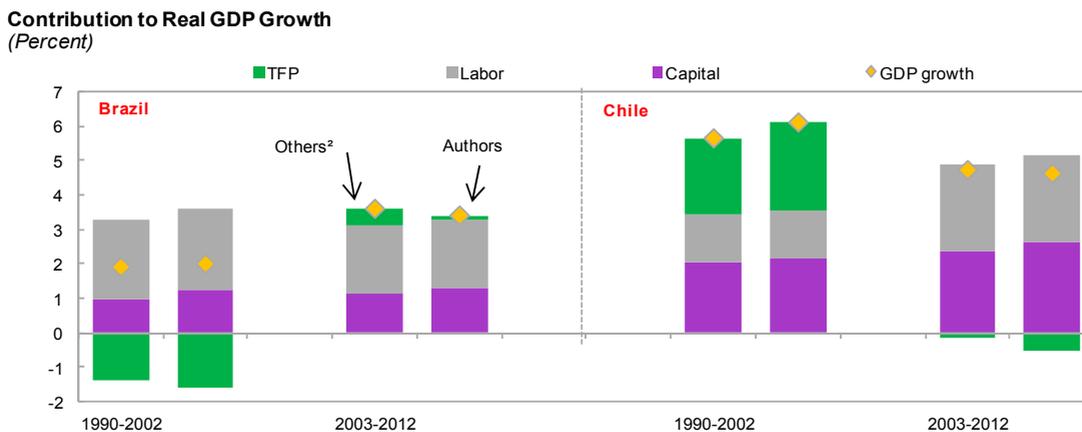
Capital Share = 0.4



Depreciation Rates = 0.05



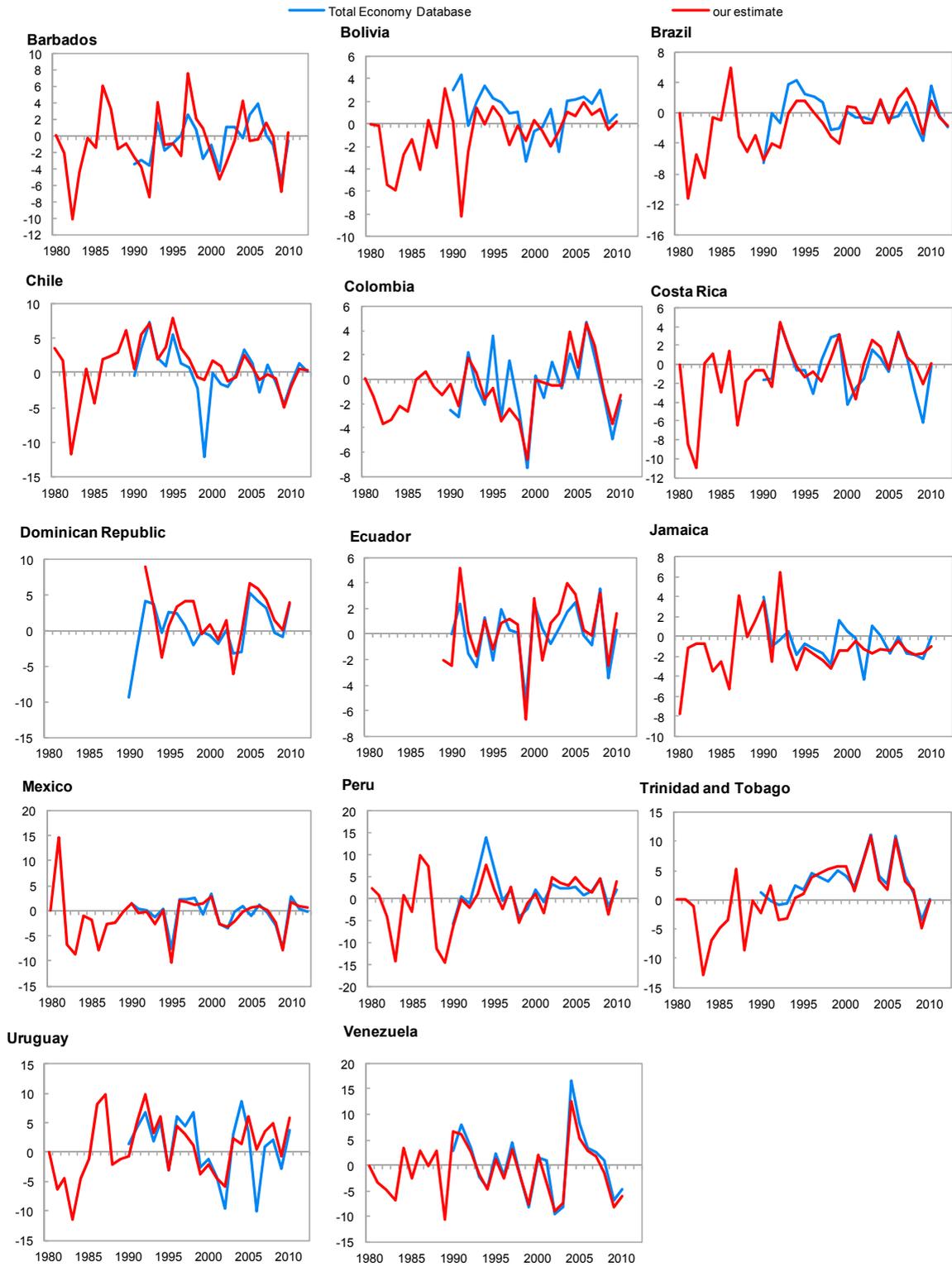
Capital Stock from National Sources



Sources: Penn World Table 7.1; IMF, *World Economic Outlook*; national authorities' and authors' calculations.  
<sup>1</sup> For country names, see figure 6.  
<sup>2</sup> Using capital stock series provided by the authorities; Central Bank for Chile and IPEA for Brazil. GDP from IMF's *World Economic Outlook* is used instead of data from Penn World Table 7.1. Same labor contribution is used as with authors' calculations.

Figure A.2. Robustness Checks (cont.)

Measures of TFP Growth: Comparing Our Estimates vs. Total Economy Database Series<sup>1</sup>



**Table A.1. Contribution to GDP Growth***(Annual average, percent)*

	Capital		Labor, adjusted with education		TFP		Real GDP	
	1990-2002	2003-2012	1990-2002	2003-2012	1990-2002	2003-2012	1990-2002	2003-2012
<b>LA6</b>	<b>1.3</b>	<b>1.7</b>	<b>1.9</b>	<b>2.0</b>	<b>-0.1</b>	<b>0.7</b>	<b>3.1</b>	<b>4.4</b>
Brazil	1.2	1.3	2.3	1.9	-1.6	0.1	2.0	3.3
Chile	2.1	2.5	1.3	2.5	2.4	-0.5	5.9	4.5
Colombia	1.6	2.1	2.2	1.9	-1.5	0.5	2.3	4.4
Mexico	1.4	1.2	2.4	2.0	-0.7	-0.8	3.2	2.4
Peru	0.9	2.0	2.5	1.9	-0.2	2.4	3.2	6.3
Uruguay	0.7	1.1	0.4	1.6	0.9	2.7	2.0	5.4
<b>Other South America</b>	<b>1.0</b>	<b>1.3</b>	<b>2.3</b>	<b>2.2</b>	<b>-1.0</b>	<b>0.6</b>	<b>2.3</b>	<b>4.1</b>
Bolivia	0.8	1.0	3.6	2.6	-1.0	0.7	3.4	4.3
Ecuador	1.1	2.0	1.7	1.4	-0.1	1.5	2.6	5.0
Paraguay	1.8	0.9	1.5	2.7	-2.0	0.2	1.3	3.7
Venezuela	0.4	1.3	2.4	2.3	-0.9	0.0	2.0	3.5
<b>Central America</b>	<b>1.5</b>	<b>1.4</b>	<b>2.9</b>	<b>2.4</b>	<b>-0.7</b>	<b>0.6</b>	<b>3.8</b>	<b>4.4</b>
Costa Rica	1.3	1.5	2.9	2.3	-0.2	0.8	4.0	4.5
Dominican Republic	2.0	1.5	2.2	2.1	1.9	1.6	6.2	5.2
El Salvador	1.5	1.2	2.3	1.7	0.0	-1.2	3.7	1.7
Honduras	2.2	1.7	3.0	2.6	-2.9	-0.1	2.3	4.2
Nicaragua	0.7	0.8	3.9	2.6	-2.2	-0.3	2.3	3.1
Panama	1.3	1.7	3.2	3.0	-0.6	3.2	4.0	7.9
<b>The Caribbean</b>	<b>0.6</b>	<b>0.7</b>	<b>1.5</b>	<b>1.1</b>	<b>0.0</b>	<b>0.1</b>	<b>2.1</b>	<b>1.9</b>
Barbados	0.7	0.6	0.8	1.1	-1.2	-0.6	0.3	1.1
Jamaica	1.1	0.7	1.4	1.0	-0.8	-1.2	1.8	0.5
Trinidad & Tobago	0.1	0.8	2.2	1.3	2.0	2.1	4.4	4.1

Sources: Penn World Table 7.1; IMF *World Economic Outlook* ; and authors' calculations.

**Table A.2. Growth Rates**

(Annual average, percent change)

	Capital			Labor, adjusted with education			TFP			Real GDP		
	1990-2002	2000-2012	2003-2012	1990-2002	2000-2012	2003-2012	1990-2002	2000-2012	2003-2012	1990-2002	2000-2012	2003-2012
<b>LA6</b>	<b>3.2</b>	<b>3.7</b>	<b>4.0</b>	<b>3.3</b>	<b>3.1</b>	<b>3.4</b>	<b>-0.1</b>	<b>0.4</b>	<b>0.7</b>	<b>3.1</b>	<b>3.7</b>	<b>4.4</b>
Brazil	2.7	2.7	2.7	4.3	3.3	3.6	-1.6	0.1	0.1	2.0	3.2	3.3
Chile	5.3	6.0	6.4	2.2	3.6	4.1	2.4	-0.3	-0.5	5.9	4.2	4.5
Colombia	3.6	4.0	4.7	4.0	3.4	3.4	-1.5	0.3	0.5	2.3	4.0	4.4
Mexico	3.6	3.2	2.9	4.1	3.3	3.4	-0.7	-0.8	-0.8	3.2	2.4	2.4
Peru	2.0	3.9	4.6	4.4	3.0	3.3	-0.2	2.0	2.4	3.2	5.5	6.3
Uruguay	1.9	2.3	2.7	0.7	1.8	2.7	0.9	1.1	2.7	2.0	3.1	5.4
<b>Other South America</b>	<b>2.3</b>	<b>2.6</b>	<b>2.9</b>	<b>4.0</b>	<b>4.2</b>	<b>4.0</b>	<b>-1.0</b>	<b>0.1</b>	<b>0.6</b>	<b>2.3</b>	<b>3.6</b>	<b>4.1</b>
Bolivia	2.3	2.8	3.0	5.4	3.9	3.9	-1.0	0.4	0.7	3.4	3.9	4.3
Ecuador	1.9	3.4	3.7	3.8	4.0	3.2	-0.1	1.3	1.5	2.6	4.9	5.0
Paraguay	3.7	1.7	1.8	3.0	4.8	5.2	-2.0	-0.4	0.2	1.3	2.9	3.7
Venezuela	1.1	2.7	3.1	4.0	3.9	3.8	-0.9	-0.9	0.0	2.0	2.6	3.5
<b>Central America</b>	<b>4.4</b>	<b>4.2</b>	<b>4.2</b>	<b>4.5</b>	<b>3.5</b>	<b>3.6</b>	<b>-0.7</b>	<b>0.3</b>	<b>0.6</b>	<b>3.8</b>	<b>4.0</b>	<b>4.4</b>
Costa Rica	4.8	5.3	5.4	4.0	3.2	3.1	-0.2	0.2	0.8	4.0	4.0	4.5
Dominican Republic	5.7	5.0	4.4	3.4	3.1	3.2	1.9	1.3	1.6	6.2	5.0	5.2
El Salvador	3.5	3.0	2.8	4.0	2.9	3.0	0.0	-1.1	-1.2	3.7	1.8	1.7
Honduras	5.3	4.1	4.1	5.2	3.9	4.4	-2.9	0.3	-0.1	2.3	4.2	4.2
Nicaragua	1.8	2.4	2.3	6.0	4.5	4.0	-2.2	-1.0	-0.3	2.3	2.8	3.1
Panama	5.2	5.7	6.4	4.3	3.7	4.1	-0.6	2.3	3.2	4.0	6.5	7.9
<b>The Caribbean</b>	<b>1.6</b>	<b>1.7</b>	<b>1.7</b>	<b>2.5</b>	<b>1.9</b>	<b>1.8</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>2.1</b>	<b>1.9</b>	<b>1.9</b>
Barbados	1.6	1.6	1.4	1.4	1.7	1.8	-1.2	-1.3	-0.6	0.3	0.4	1.1
Jamaica	2.7	1.8	1.7	2.4	1.8	1.6	-0.8	-1.1	-1.2	1.8	0.6	0.5
Trinidad & Tobago	0.3	1.6	1.9	3.7	2.3	2.1	2.0	2.6	2.1	4.4	4.6	4.1

Sources: Penn World Table 7.1; IMF *World Economic Outlook*; and authors' calculations.