

On the Role of Productivity and Factor Accumulation in Economic Development in Latin America and the Caribbean: 2017 Update. Database description.

Eduardo Fernández-Arias*

*Inter-American Development Bank

Citation of the Dataset:

Fernández-Arias, Eduardo. 2017. “Productivity and Factor Accumulation in Latin America and the Caribbean: A Database (2017 Update).” Washington, DC, United States: Research Department, Inter-American Development Bank.

Previous version:

Fernández-Arias, Eduardo. 2014. “Productivity and Factor Accumulation in Latin America and the Caribbean: A Database (2014 Update).” Washington, DC, United States: Research Department, Inter-American Development Bank. Available at: http://www.iadb.org/research/pub_desc.cfm?pub_id=DBA-015

Related Papers:

Fernández-Arias, Eduardo. 2014. “On the Role of Productivity and Factor Accumulation in Economic Development in Latin America and the Caribbean: An Update.” Washington, DC, United States: Inter-American Development Bank. Mimeographed document.

Daude, Christian and Eduardo Fernández-Arias. 2010. “On the Role of Productivity and Factor Accumulation in Economic Development in Latin America and the Caribbean.” Working Paper IDB-WP-155. Washington, DC, United States: Inter-American Development Bank. Available at: http://www.iadb.org/research/pub_desc.cfm?pub_id=IDB-WP-155

Contact info: alejandroi@iadb.org // fernandezariaseduardo@gmail.com

The views and interpretations in this document are those of the authors and should not be attributed to the Inter-American Development Bank or the OECD, or to any individual acting on their behalf.

1. Overview

Low productivity and insufficient productivity growth, as opposed to impediments to factor accumulation, is the key to understanding low income in Latin America and the Caribbean relative to developed economies and its stagnation relative to other developing countries that are catching up. Daude and Fernández-Arias (2010) calculated measures of total factor productivity (*TFP*) for 1960-2005 for a cross-section of countries and showed that *TFP* is the principal driver of the slow development of LAC.

This database provides measures of labor productivity (*LP*), capital and labor productivity (*KLP*) and TFP updated for the period 1960-2014, along with the inputs used to calculate them. We drop information of economies that fail the following criteria: the country population was less than a million in 1960 or at the first observed year. This leaves 109 countries, with a complete data coverage for 79 of them.

2. Description of variables

Variable: isocode

Description: ISO country code

Source: PennWorld Table 9.0

Variable: country

Description: Country name

Source: PennWorld Table 9.0

Variable: year

Description: Year

Source: PennWorld Table 9.0

Variable: Y

Description: Output-side real GDP at current PPPs (*cgdpo*). Not filtered.

Source: PennWorld Table 9.0

Variable: K

Description: Real physical capital stock at current PPPs (*ck*). Not filtered.

Source: PennWorld Table 9.0

Variable: pop

Description: Population, total number of people (*pop*). Not filtered.

Source: PennWorld Table 9.0

Variable: emp

Description: Labor Force. Number of persons engaged (*emp*). Not filtered.

Source: PennWorld Table 9.0

Variable: S

Description: Average years of schooling of population over 15 years. Not filtered.

Source: Barro-Lee database (February 2016 update) and author's calculations.

Variable: h

Description: Human capital index. Not filtered.

We follow Bils and Klenow (2000) and construct the index as a function of the average years of schooling of country i at time t (S_{it}) as:

$$h = e^{\phi(S_{it})} \quad (1)$$

where $\phi'(S_{it})$ is the Mincerian return on education. We approximate the function $\phi(S_{it})$ by the log-linear function proposed by Bils and Klenow:

$$\phi(S_{it}) = \frac{\theta}{1-\psi} S_{it}^{1-\psi} \quad (2)$$

The parameters θ and ψ were estimated using and completing data in Table A2 in Psacharopoulos and Patrinos (2004) and the average years of schooling by Barro and Lee (2013), obtaining $\hat{\theta} \approx 0.188$ and $\hat{\psi} \approx 0.368$. See Fernández-Arias (2014) for details.

Source: Author's calculations.

Variable: *alpha_it, alpha*

Description: Capital share in the production function. Calculated as 1 minus the labor income share (*labsh*). Following Fernández-Arias (2014), we set $\alpha \approx 0.433$ for our TFP calculations, which is the average of the cross-country average of *alpha_it* in 1960, in contrast to the 1/3-standard value in the literature (see Klenow and Rodríguez-Clare, 2005).

Source: Penn World Table 9.0 and author's calculations.

Filtering: We considered the logarithms of the series of output, physical capital, skill level, population and labor headcount (*Y*, *K*, *h*, *pop* and *emp*, respectively), filtered them with a Hodrick-Prescott filter with smoothing parameter $\lambda=7$, and then inverted the logarithmic transformation. Using these filtered series, we computed our measures of productivity, where the bar above each variable (*X*) indicates that it is a filtered series.

Projections: Projections of *Y*, *K*, *pop*, *h* and *emp* between 2015 and 2017 are used to avoid end-point problems in the filtering process. WEO reports projections of real GDP at current ppp, investment as percentage of GDP, population, employment, and unemployment rate. We assume that *Y*, *pop* and *emp* (when available) grow at the same rate as the GDP ppp, population and employment reported on WEO, respectively. For countries without employment projections, we follow two strategies. We use unemployment rate (when available) and then construct the growth rate of *emp* as the sum of the average employment growth rate between 2000 and 2014 and the acceleration of the employment rate implied by the unemployment rate; for the remaining countries we assume that *emp* grows at the same rate as *pop*. We obtain investment by assuming that the ratio (investment / GDP) also holds for ppp; then, using investment, lagged capital and a constant as regressors, we estimate a simple equation for the variation of capital and use the estimated parameters to obtain one-point-ahead projections of the variation of capital. Finally, we assume a constant growth rate for *h*, equal to its average growth rate between 2000 and 2014.

Variable: LP

Description: Measure of structural labor productivity or output per worker

$$LP_{it} = \frac{\bar{Y}_{it}}{\bar{L}_{it}} \quad (3)$$

Source: Author's calculations.

Variable: KLP

Description: Measure of structural raw factors (capital and labor) productivity.

$$KLP_{it} = \frac{\bar{Y}_{it}}{\bar{K}_{it}^{\alpha} \bar{L}_{it}^{1-\alpha}} \quad (4)$$

Source: Author's calculations.

Variable: TFP

Description: Measure of structural total factor productivity (TFP) as

$$TFP_{it} = \frac{\bar{Y}_{it}}{\bar{K}_{it}^{\alpha} (\bar{h}_{it} \bar{L}_{it})^{1-\alpha}} \quad (5)$$

where the human capital index was also filtered like the classical factors of production.

Source: Author's calculations.

Variable: LAC

Description: Dummy = 1 if the country belongs to Latin America and the Caribbean.

Source: Author's calculations.

Variable: ROW

Description: Dummy = 1 if the country does not belong to Latin America and the Caribbean.

Source: Author's calculations.

Variable: DEV

Description: Dummy = 1 if the country belongs to the OECD High Income countries.

Source: Author's calculations.

Variable: EA

Description: Dummy = 1 if the country belongs to the East Asia group.

Source: Author's calculations.

Variable: ind_E1960

Description: Dummy = 1 if TFP data could be constructed since 1960; only these countries were used to construct the regional indexes.

Source: Author's calculations.

3. References

Barro, R., and J. Lee, 2013. "A New Data Set of Educational Attainment in the World, 1950–2010." *Journal of Development Economics* 104: 184-198.

Bils, M., and P. Klenow. 2000. "Does Schooling Cause Growth?" *American Economic Review* 91(4): 1006-1030.

Feenstra, R., R. Inklaar and M. Timmer. 2013. "The Next Generation of the Penn World Table." Available at: <http://www.ggdnet.net/pwt>

- Klenow, P., and A. Rodríguez-Clare. 2005. "Externalities and Growth." In: P. Aghion and S. Durlauf, editors. *Handbook of Economic Growth*. Volume 1A. Amsterdam, The Netherlands: North-Holland.
- Psacharopoulos, G., and H. Patrinos, 2004. "Returns to Investment in Education: A Further Update." *Education Economics* 12(2): 111-134.