



**Extended abstract**

## EXTENDED ABSTRACT

**Title:** Comparing different estimation methodologies of regional GDPs in Latin American countries

**Authors and e-mail of all:** M.Teresa Sanchis Llopis (m.teresa.sanchis@uv.es, Alfonso Diez-Minguela, Alfonso.diez@uv.es)

**Department:** Análisis Económico

**University:** Universitat de València

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**Abstract:** (*minimum 1500 words*)

### 1. Introduction

The recent upsurge of regional income disparities both within developed and developing countries has revived the debate about the sources steering it (Rodríguez-Pose 2018). That is to say, what forces shaped the current scenario and what lies ahead. It should be noted, however, that this process is hardly new and spreads its roots into the further past. The pioneers works of Sidney Pollard stood out the regional character of the industrialization take-off and how its advance worsens disparities on income distribution across territories. More specifically Williamson (1965), after observing handful set of industrialized economies, postulated that disparities would grow in the early stages of industrialization to reverse thereafter. Notwithstanding, the lack of historical data at regional level has constrained for long the empirical test of the Williamson's hypothesis and also prevented a further exploration of the causes that lead regional disparities in the long run.

Hence, this kind of analysis demands a previous effort in terms of data gathering and data construction. Up to the last decade, the available evidence was quite scarce,



disperse and barely concluding. For instance, even in Europe, where national statistical offices have been publishing National Accounts periodically since the 1950s, the publication of official estimates of regional GDP by national offices started in the 1980s or even later. And it was not until the 1990 that the Eurostat Office started to publish regularly a harmonized system of European regional accounts.

Previous to the official statistics era, there is a set of regional historical estimates made for particular countries by different economic historians. There are estimates since mid 19<sup>th</sup> century for Great Britain (Crafts, 2005; Geary and Stark, 2016); for Spain (Martínez-Galarraga et al., 2010 and 2015); for Italy (Felice, 2011); for Portugal (Badia-Miró et al, 2012); for Belgium (Buyst, 2010 and 2011); for Sweden (Enflo and Rosés, 2015) and for France (Combes et al., 2011; Díez and Sanchis, 2019; Caruana-Galitzia, 2013; Bazot, 2014). Additionally, in a recent publication Rosés and Wolf (2019) have gathered up some of these estimations in a regional dataset that runs since 1900 to 2010. This dataset is made up of the above mentioned countries plus Austria, Denmark, Finland, Germany, the Netherlands, Norway, Switzerland and the United States.

The Latin American reality is even more dramatic. Nowadays, only a reduced set of countries produces periodically official regional statistics: the INEGI for México since 1990; the IBGE for Brazil since 1991 and the INEI for Perú since 1970. Hence, the study of the long run evolution of regional disparities in Latin America has required a previous task of data construction that, in most cases, has extended up to date. The countries brought together in this study are Argentina, Bolivia, Brazil, Chile, Colombia, Peru, Mexico, Uruguay and Venezuela. The approach followed in each country to provide an estimation of regional GDPs has depended on data availability and its willingness to be territorialized. Data availability varies not only between countries but also within the same country at different moments or benchmark years. In general, the reference for setting a benchmark year is the publication of population censuses or some sort of agrarian or industrial censuses.

## **2. Historical national GDPs estimates as a source for regional estimates**

In general, official National Accounts in the Latin American countries started to be published in the 1960s or even later. As in other countries, backward historical series of



national GDPs have been constructed by following different methods. In some cases they take a “by product approach” using data from the agrarian or manufacturing censuses, from mining extraction and from power generation and water distribution. The service sector production is usually estimated indirectly. For this purpose different indicators are used. For example, the kilometres of railroads and paved road for transport, the kilometres of telephone or telegraph lines for communications. The “by product approach” also use the rich statistical registers of export trade to complement them. This approach has been used by the countries most involved in the expansion of primary goods exports during the First Globalization, such as Chile or Peru.

Other countries follow a demand side approach using data derived from export registers, public spending and estimates of consumption. This approach was followed by De Corso (2013) to estimate the historical GDP of Venezuela. In this case the information used to construct the national GDP does not let to split it by sectors. Finally, an “income based” approach is used to complement the above estimates in those cases where information about wages (public sector) is available. For instance, this was the methodology followed for Brazil.

Nonetheless, the above evidence says little about the spatial distribution of economic activity over time. But it is interesting to describe how the historical series of GDP were constructed because in most of the countries provide the statistical sources to afterwards distribute the GDPs by region. Hence, the scant evidence about the spatial distribution of income in the past is based on subnational estimates of income and production using in some cases estimates of physical product per inhabitant (and per active person).

### 3. Different ways to estimate regional GDPs



Anyway, the approaches used to obtain the regional GDPs can be classified in two big groups, a bottom-up additive method (direct method) and a top-down or indirect approach (table 1). The bottom-up additive method consist on reconstructing regional estimates by adding up the production of different activities in the region, the incomes of different agents in the region or the total aggregate demand of the region (consumption, investment, public spending and net foreign demand). This approach, independently of the way followed (production, income or demand), is very data demanding. However it is quite used to estimate the value added of the agriculture sector because most of the countries used to have some kind of agrarian census or surveys, basically with a fiscal purpose. Otherwise, the agricultural output could also be estimate indirectly for most of the Latin American countries throughout the export trade registers. The production has also been used to estimate the value added of mining in some countries such as Chile, Peru or Venezuela, or even for manufacturing in Chile for 1945 and 1955.

Table 1. Different methods to estimate regional GDPs

<b>Methodology</b>	<b>Keywords</b>	<b>Countries</b>
Bottom-up	Income Production Demand	Mexico (agriculture, mining, services...)
Top-down	Sectoral employment Land productivity Taxation Wages (Labour productivity) Exports	Peru ; Uruguay (ag) Uruguay (agr); Chile; Uruguay (manuf) Mexico (manufac and other services); Chile (min)

The huge effort in terms of time and resources involved in the direct estimates has inspired the use of alternative methodologies. This is the reason why some indirect



estimation methods have been vastly proposed. Each method has its own strengths and weaknesses.

The indirect methods consist on distributing the national value added of each sector by regions using different indicators: the share in sectoral employment, land productivity, taxation, wages (Geary and Stark, 2002), exports, kilometres of railroads... The indirect approach has been the most vastly used, especially for manufacturing, services and even in agriculture in those countries lacking of agrarian surveys.

That said, this paper offers a survey on the different direct and indirect methods followed to estimate the historical regional GDPs for some Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Peru, Uruguay and Venezuela). Our main target is to take into account potential biases in the comparability across countries.

## References

- Badia-Miró, M., Guilera, J., and Lains, P. (2012). "Regional incomes in Portugal: Industrialization, integration and inequality, 1890-1980". *Revista de Historia Económica/Journal of Iberian and Latin-American Economic History*, 30(2): 225-244.
- Buyst, E. (2010). "Reversal of fortune in a small, open economy: Regional GDP in Belgium, 1896-2000". *Rivista di Storia Economica*, 26: 75-92.
- Buyst, E. (2011). "Continuity and change in regional disparities in Belgium during the twentieth century". *Journal of Historical Geography*, 37: 329-337.
- Combes P-P., Lafourcade M., Thisse J-F. and J-C Toutain. (2011). "The rise and fall of spatial inequalities in France: a long run perspective". *Explorations in Economic History*, 48 (2): 243-271.
- Crafts, N. (2005). "Regional GDP in Britain, 1871-1911: some estimates". *Scottish Journal of Political Economy*, 52: 54-64.
- Enflo, K, and Rosés, J R (2015). "Coping with regional inequality in Sweden: Structural change, migration and policy, 1860-2000". *Economic History Review*, 68(1): 191-217.
- Felice, E. (2011). "Regional Value Added in Italy 1891-2001 and the foundation of a long-term picture". *Economic History Review* 64 (3): 929-950.



- Geary, F., and Stark, T. (2002). “Examining Ireland’s post-famine economic growth performance”. *Economic Journal* 112: 919-935.
- Henning, M., Enflo, K., and Andersson, F.N.G. (2011). “Trends and cycles in regional economic growth How spatial differences shaped the Swedish growth experience from 1860-2009”. *Explorations in Economic History* 48: 538-555.
- Martínez-Galarraga, J., Rosés, J.R., and Tirado, D.A. (2010). “The upswing of regional income inequality in Spain (1860-1930)”. *Explorations in Economic History* 47(2): 244-257.
- Martínez-Galarraga, J., Rosés, J.R. and Tirado, D.A. (2015). “The long-term patterns of regional income inequality in Spain (1860-2000)”. *Regional Studies* 49(4): 502-517.
- Rosés, J.R., and Wolf, N. (2019). “Regional economic development in Europe, 1900-2010: a description of the patterns”. In Wolf, N. and Rosés, R.R. (eds) *The Economic Development of Europe’s regions A quantitative history since 1900*, 3-41. Routledge Explorations in Economic History, Routledge, London.
- Williamson, J. G. (1965). Regional inequality and the process of national development. *Economic Development and Cultural Change* 13: 1-84.

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