

# **(Mis)measuring Argentina's Progress: Industrial Output, 1870s-1913**

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## **Abstract**

Evidence of dramatic industrialisation has been used to support the optimistic, staple theory-inspired account of Argentina's late nineteenth century, which is central to the dominant (neo)liberal narrative of the country's history. This narrative is here challenged by a discussion of the available evidence of industrial output in Argentina from the 1870s to the eve of the First World War. Issue is taken, in particular, with Roberto Cortés Conde's widely used industrial output index, which has suggested an 8-9 per cent annual industrial growth rate during this period. It is argued that he has overestimated the growth rate by relying upon dubious data taken from Argentina's inland revenue service. Rather than reflecting increased production, the rapid growth of Cortés Conde's index is actually due to increased taxation. Alternative indicators suggest a significantly lower annual growth rate of around 5 per cent, although even this should only be considered indicative, given the lack of data. This is illustrated by the case of textile production.



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# **(Mis)measuring Argentina's Progress: Industrial Output, 1870s-1913**

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D.C.M. Platt's warning of the increasing use of 'Mickey Mouse numbers' by his fellow economic historians has largely gone unheeded.<sup>1</sup> Indeed, the triumph of the New Economic History has seen the use of dubious historical statistics become ever more widespread. Determined to empirically test hypotheses derived from neoclassical economics, economic historians have generally worked on the assumption that any number is better than no number at all. Questions relating to the quality of those numbers have tended to go unasked.

This paper uses a case study to demonstrate the kinds of problems that exist in the quantitative data that economic historians routinely use. It focuses on Roberto Cortés Conde's attempts to estimate Argentina's industrial output in the late nineteenth and early twentieth centuries.<sup>2</sup> It begins by describing how they have reinforced an optimistic vision of Argentina's 'golden age' prior to the First World War. How dubious his estimates are is then demonstrated through an examination of the methodology that underlies them. Crucially, Cortés Conde has depended upon data taken from Argentina's internal revenue service. In doing so, he appears to have mistaken a rapid increase in the quantity of goods being taxed for an equivalent growth in the quantity being produced, leading to a considerable upward bias in the growth rate of his index. Other available indicators, by contrast, suggest a significantly lower growth rate, although even this finding should only be considered indicative, given that the data are of poor quality and only provide a fairly narrow coverage of industry. The paper then uses the case of textiles to demonstrate why the lack of data is so problematic for attempts to measure Argentina's industrial output in this period. Finally, the paper concludes by suggesting that this is one example of why economic historians should avoid using numbers of dubious quality.

## **From Pessimism to Optimism**

The rise of the New Economic History has been associated with a swing towards optimism in the historiography of Argentina in the half century prior

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1. D.C.M. Platt, *Mickey Mouse Numbers in World History: The Short View*, Basingstoke, 1989.
  2. R. Cortés Conde, 'Estimaciones del producto bruto interno de Argentina 1875-1935', Documento de Trabajo 3, Departamento de Economía y Matemática, Universidad de San Andres, 1994.

to the First World War.<sup>3</sup> A pessimistic vision of this period had previously reigned. It had been inspired by the 'revisionist' diatribes against foreign domination that had proliferated in the interwar period, as well as 'structuralism', the post-war Latin American critique of neoclassical economic theory.<sup>4</sup> In the 1960s and '70s most historians believed that Argentina had missed an important opportunity in the late nineteenth century because its rapid growth had been unbalanced and had not laid the foundations for more long-term development – a pessimistic vision that was shared by proponents of 'modernisation theory' and 'dependency theory' alike. Nonetheless, by the end of the twentieth century the pendulum had decisively swung towards a far more optimistic, (neo)liberal vision, according to which Argentina had been a successful case of 'export-led development', which had culminated in the country's 'golden age'. Here this swing from pessimism to optimism will be outlined.

The pessimistic historians of nineteenth-century Argentina had pointed towards the country's great regional disparities, its inegalitarian distribution of wealth and income, and its vulnerability to fluctuations in international flows of goods and capital. Aldo Ferrer's *The Argentine Economy* was the most complete expression of this pessimism.<sup>5</sup> In an analysis of the country's development since colonisation, Ferrer argued that technological change, particularly improved shipping and railways, drove the country's integration into the world economy during the nineteenth century. The land-abundant Pampean zone had prospered, as, in his words, the 'useless territories of the colonial period [...] became the nucleus of a rapid process of development',<sup>6</sup> but at the same time integration into the world economy had brought deindustrialisation to the country's Interior,<sup>7</sup> while the increasing concentration of landownership meant that even in the Pampean zone there was widespread underemployment, which

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3. For overviews of this shift in the historiography, see R. Cortés Conde, 'Export-Led Growth in Latin America: 1870-1930', *Journal of Latin American Studies*, 24, Quincentenary Supplement, 1992, pp. 168-72.; and E.J. Míguez, '¿Veinte años no es nada? Balance y perspectivas de la producción reciente sobre la gran expansión agraria, 1850-1914', in J. Gelman, ed., *La historia económica argentina en la encrucijada*, Buenos Aires, 2006.
  4. On Argentine revisionism, see T. Halperín Donghi, *El revisionismo histórico argentino*, Buenos Aires, 1970; and *La Argentina y la tormenta del mundo: Ideas y ideologías entre 1930 y 1945*, Buenos Aires, 2003, ch. 2. On Latin American structuralism, see J.L. Love, 'The Rise and Fall of Structuralism', in V. FitzGerald and R. Thorp, eds., *Economic Doctrines in Latin America: Origins, Embedding and Evolution*, Basingstoke, 2005; and R. Grosfoguel, 'From Cepalismo to Neoliberalism: A World-Systems Approach to Conceptual Shifts in Latin America', *Review (Fernand Braudel Center)*, 19:2, 1996.
  5. A. Ferrer, *The Argentine Economy*, Berkeley, 1967. The original was substantially revised and expanded in *La economía argentina: Desde sus orígenes hasta principios del siglo XXI*, 3rd ed., Buenos Aires, 2004.
  6. Ferrer, *Argentine Economy*, p. 77.
  7. *Ibid.*, p. 241.

depressed living standards.<sup>8</sup> The country's export-led growth was, moreover, vulnerable to its external position, especially because it was heavily dependent upon imports for its supply of manufactured goods, so fluctuations in the terms of trade, a bad harvest, or an interruption of capital inflows could have severely negative consequences for growth.<sup>9</sup>

A similarly pessimistic interpretation was offered by those following the principles of modernisation theory. The case of Roberto Cortés Conde is particularly notable because he would subsequently become one of the most prominent optimists, producing influential accounts of Argentina's progress in the late nineteenth and early twentieth centuries.<sup>10</sup> In the 1960s, by contrast, his work had reflected the consensus that Argentina's rapid growth prior to the First World War had represented a missed opportunity.<sup>11</sup> External circumstances, he claimed, had been highly favourable for the country, allowing it to prosper by bringing new land into production through a rapid expansion of the frontier. Nevertheless, this extensive growth was limited by the closing of the frontier, while it was also vulnerable to changes in the external environment, especially given that the country had failed to industrialise. The result, Cortés Conde concluded, was that Argentina's apparent prosperity was more illusion than reality. He wrote:

Testimonies of the time speak clearly enough of the sudden luxury of the until recently austere society of the River Plate; the ostentatious buildings and a way of life that came close to the [...] richest and most sophisticated capitals of Europe. [...] This fact created the impression that [Argentina] had reached the levels of the most progressive and industrialised countries, and to some extent it had: a European population, extensive education, urban centres, such as Buenos Aires, that had little to envy in those of old Europe. Yet something was lacking. Behind the advanced urban Argentina was a virtually pastoral society. *There was no correlate industrial development.* When circumstances changed and the external impetus disappeared, we found that the castle had been built on air.<sup>12</sup>

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8. Ibid., p. 116.

9. Ibid., pp. 102-03, 122.

10. R. Cortés Conde, *El progreso argentino: 1880-1914*, Buenos Aires, 1979; 'The Export Economy of Argentina 1880-1920', in idem and S.J. Hunt, eds., *The Latin American Economies: Growth and the Export Sector 1880-1930*, New York, 1985; 'The Growth of the Argentine Economy, c. 1870-1914', in L. Bethall, ed., *The Cambridge History of Latin America*, V, c. 1870-1930, Cambridge, 1986; *La economía argentina en el largo plazo: Ensayos de historia económica de los siglos XIX y XX*, Buenos Aires, 1997; and 'The Vicissitudes of an Exporting Economy: Argentina (1875-1930)', in E. Cárdenas, J.A. Ocampo, and R. Thorp, eds., *An Economic History of Twentieth-Century Latin America*, I, *The Export Age*, Oxford, 2000.

11. R. Cortés Conde, 'El 'boom' argentino: ¿Una oportunidad desperdiciada?', in T. di Tella and T. Halperín Donghi, eds., *Los fragmentos del poder*, Buenos Aires, 1969; also 'Problemas del crecimiento industrial de la Argentina (1870-1914)', *Desarrollo Económico*, 3:1/2, 1963; and E. Gallo and R. Cortés Conde, *La formación de la Argentina moderna*, Buenos Aires, 1967.

12. Cortés Conde, 'Boom' argentino', p. 241, my translation and emphasis.

For Cortés Conde, as for others, this pessimistic vision began to change through exposure to 'staple theory'.<sup>13</sup> Inspired by the work of Harold Innis,<sup>14</sup> Canadian historians had argued that the rapid expansion of their country's export sector in the nineteenth century had generated linkages with other sectors, leading to more broad-based growth, including industrialisation.<sup>15</sup> In a highly influential study, Carlos Díaz Alejandro claimed that Argentina's nineteenth-century growth had fitted this pattern<sup>16</sup> – a claim that Ezequiel Gallo reinforced with his observation that industry had also grown rapidly at the beginning of the twentieth century, in the midst of the export sector's great expansion.<sup>17</sup> Staple theory thus allowed these scholars to advance a far more optimistic (re)vision of Argentina's late nineteenth century that was diametrically opposed to the far more pessimistic consensus that had previously prevailed. Cortés Conde would reinforce that (re)vision with a series of studies that portrayed Argentina's prosperous Pampean region in the late nineteenth century as if its experience had been representative of the country as a whole.<sup>18</sup>

Arguably, however, Cortés Conde's most important contribution would be quantitative. In a 1994 working paper he appeared to decisively verify the optimistic (re)vision by producing historical gross domestic product (GDP) statistics that showed rapid industrialisation occurring alongside the export expansion.<sup>19</sup> Cortés Conde showed industry growing at a phenomenal trend rate of 8.4 per cent per year during 1875-1913, compared to an annual growth rate of just 4.4 per cent for agriculture.<sup>20</sup> An apparently revised version of these numbers would then increase the annual trend industrial growth rate to 8.8 per cent. Unfortunately, exactly what changes were made to his original estimates were not specified, but in any case both sets of numbers confirmed the optimistic staple theory-inspired (re)vision, in which rapid industrialisation accompanied export-led growth.

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13. For example, Cortés Conde, 'Export Economy', pp. 170-71; and 'Growth of the Argentine Economy', p. 355.

14. H. Innis, *Essays in Canadian Economic History*, Toronto, 1956.

15. The first major statement came from M.H. Watkins, 'A Staple Theory of Economic Growth', *Canadian Journal of Economics and Political Science*, 29:2, 1963; cf. 'Staples Redux', *Studies in Political Economy*, 79, 2007. Also see A.O. Hirschman, 'A Generalized Linkage Approach to Development, with Special Reference to Staples', *Economic Development and Cultural Change*, 25, Supplement, 1977.

16. C.F. Díaz Alejandro, *Essays on the Economic History of the Argentine Republic*, New Haven, 1970, pp. 9-11.

17. E. Gallo, 'Agrarian Expansion and Industrial Development in Argentina', in R. Carr, ed., *Latin American Affairs*, Oxford, 1970; also L. Geller, 'El crecimiento industrial argentino hasta 1914 y la teoría del bien primario exportable', *Trimestre Económico*, 37:148(4), 1970.

18. Cortés Conde, *Progreso argentino*; 'Export Economy'; and 'Growth of the Argentine Economy'.

19. Cortés Conde, 'Estimaciones del producto'.

20. The trend growth rate is calculated as the coefficient of the exponential trendline.

Cortés Conde's numbers have subsequently become a mainstay of the economic historiography. Their major impact can be understood by placing them within the context of the debate about Argentina's industrialisation as it stood when he released them. At the time, a prominent literature review explained that the debate between pessimists and optimists had been brought to an impasse due to the lack of data:

[T]he discussion ceased before it had finished, probably because it could only go on producing more of the same arguments with the tools available. Thus the estimates of the economic indicators on which many of these studies were based were not revised. Nor did researchers undertake a search of the primary sources that would have allowed them to line up new evidence.<sup>21</sup>

Given this impasse, Cortés Conde's numbers had a major impact. They inspired other researchers to verify his finding of rapid industrialisation using more fragmentary data.<sup>22</sup> Few, nonetheless, appear to have looked at the methodology underlying Cortés Conde's estimates, nor, crucially, have they attempted to replicate them – a task that will be undertaken in this paper. It will be shown that only the lack of such checks has allowed Cortés Conde's numbers to feature so prominently in the more optimistic accounts of Argentina's nineteenth century.

## What Did Cortés Conde Do?

Cortés Conde's industrial output index combines series for nine industries, weighted according to their shares of value added in 1914.<sup>23</sup> Table 1 reproduces the weights assigned to the nine components and summarises the sources that Cortés Conde used to calculate the output for each. As can be seen, his estimates are based on a combination of trade data, official statistics of land in cultivation, and the revenues from the internal taxes that were levied on the production of a variety of goods from the 1890s onwards.<sup>24</sup>

What Cortés Conde has revealed about the evolution of each of these com-

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21. J.C. Korol and H. Sabato, 'Incomplete Industrialization: An Argentine Obsession', *Latin American Research Review*, 25:1, 1990, pp. 23-24.
  22. F. Rocchi, *Chimneys in the Desert: Industrialization in Argentina During the Export Boom Years, 1870-1930*, Stanford, 2006, esp. pp. 21, 24-25, 42; and M.I. Barbero and F. Rocchi, 'Industry', in G. della Paolera and A.M. Taylor, eds., *A New Economic History of Argentina*, Cambridge, 2003, esp. pp. 264-65; also Y. Pineda, *Industrial Development in a Frontier Economy: The Industrialization of Argentina, 1890-1930*, Stanford, 2009.
  23. Cortés Conde based his calculation of industry's value added on the 1914 industrial census, which actually recorded value added in 1913. To that figure he made various adjustments, especially for meat production in abatoirs, together with industrial production outside factories. Cortés Conde, 'Estimaciones del producto', pp. 8-11.
  24. See D.J. Guy, 'Carlos Pellegrini and the Politics of Early Argentine Industrialization, 1873-1906', *Journal of Latin American Studies*, 11:1, 1979, pp. 132-36.

Table 1

## Components of Cortés Conde's Industrial Output Index

|                | Start year <sup>a</sup> | % of total <sup>b</sup> | % of index <sup>c</sup> | Sources for output estimates  |
|----------------|-------------------------|-------------------------|-------------------------|---|
| Beer           | 1876                    | 2.7                     | 6.3                     | During 1876-92, the quantity of hops imports. From 1892, from the internal revenue returns.   |
| Dairy          | 1894                    | 2.2                     | 5.3                     | During 1894 to 1903, a percentage of exports. From 1903, official production statistics from <i>Revista de Economía Argentina</i> .   |
| Flour          | 1875                    | 2.5                     | 6.0                     | During 1875-1907, implicit wheat consumption, calculated as wheat production plus imports minus exports, with wheat production estimated from official statistics of the amount of land in cultivation published in <i>Estadística Agrícola</i> . From 1908, official production statistics published in <i>Estadística Agrícola</i> and <i>Revista de Economía Argentina</i> . |
| Flour products | 1875                    | 4.0                     | 9.6                     | Implicit flour consumption, calculated as flour production plus imports minus exports.  |
| Meat           | 1875                    | 14.7                    | 34.9                    | Exports plus domestic consumption. The latter is estimated as a function of population, the price of meat, and wages.   |
| Sugar          | 1875                    | 5.7                     | 13.5                    | During 1875-92, the area cultivated with sugarcane. From 1892, from the government's internal revenue returns.  |
| Textiles       | 1879                    | 2.2                     | 5.3                     | From 1879, a percentage of the value of dirty wool exports, the value of yarn imports, and the value of raw cotton production, which were summed together and deflated by an index of imported cloth prices.  |
| Tobacco        | 1900                    | 3.8                     | 9.1                     | Apparent consumption of tobacco as a raw material, calculated as tobacco production plus imports, minus exports. Production is from the internal revenue returns.   |
| Wine           | 1892                    | 4.2                     | 10.0                    | During 1892-1903, the internal revenue returns. During 1903-12, production is interpolated using census data on cultivated land or value of output (it is unclear which) for 1908 and 1914. During 1912-13, official production statistics from <i>Estadística Agrícola</i> .   |

<sup>a</sup> First year of output estimates.

<sup>b</sup> Percentage of industry's total value added in 1914.

<sup>c</sup> Percentage of the sample's total value added in 1914.

Source: Cortés Conde, 'Estimaciones del producto', pp. 10-11, 13-14.

ponents is confusing to say the least. As reproduced in Table 2, he has published the average annual growth rates for food and textiles, together with the index as a whole. The most curious aspect of these numbers is that the overall output index has an extremely high growth rate for the 1890s, even though food processing, which was by far the largest sector, grew much more slowly. Thus, food accounted for 69 per cent of the value of the index in its 1914 base year (see Table 1), so in purely mathematical terms it seems unclear how Cortés Conde could have arrived at a 12 per cent growth rate for the 1890s, given that the dominant component of his index grew so slowly.

Table 2

## Cortés Conde's Industrial Growth Rates, 1875-1910

|           | Annual growth rate, % |      |          |
|-----------|-----------------------|------|----------|
|           | Total                 | Food | Textiles |
| 1875-1890 | 5.2                   | 5.6  | 3.9      |
| 1890-1900 | 11.5                  | 4.2  | 12.7     |
| 1900-1910 | 7.8                   | 6.7  | 7.4      |

Source: Cortés Conde, *Economía argentina*, pp. 207, 209, Cuadros 15 and 17.

The high overall industrial growth rate of the 1890s initially appears inexplicable. It could not have been due to the rapid expansion of the textile component, given that the latter made up only 5 per cent of the total index in its 1914 base year (see Table 1). Rapid growth must therefore have been driven by the non-food and non-textile components. Given that tobacco products are only included in the index from 1900 onwards, this only leaves beverages, so it can be assumed that the rapid growth of industrial output in the 1890s was driven by beer and wine, the two beverages that made up 6 and 10 per cent respectively of Cortés Conde's index in 1914. These weights, together with those given to food and textiles, suggest that beverages output must somehow have expanded at around 40 per cent per year during 1890-1900 to produce the overall annual growth rate of 11.5 per cent.

A roughly 40 per cent annual growth rate for beverages seems implausible, until Cortés Conde's original sources are consulted. For both beer and wine, he relied upon data from the internal revenue returns. Those data for beer and wine are reproduced in Tables 3 and 4. They show that the beer being taxed increased at an annual trend rate of 11 per cent during 1891-1900, while wine being taxed grew by an incredible 60 per cent per year during 1892-1900. Wine could, for this reason, account for Cortés Conde's 12 per cent annual industrial growth rate.

If this is correct, the problem is fairly obvious: in reality, there was no such dramatic increase in wine output; rather, the 64-per cent growth rate in the 1890s merely reflected the extension of the taxes being levied. So-called 'natural wines', which made up the vast bulk of production, were only taxed for the first time in 1898, when a levy of four cents per litre was imposed.<sup>25</sup> The quantity of wine taxed thus increased dramatically, but it was not a result of an equivalent growth in production. By contrast, the land cultivated with vines, a more accurate indicator of wine output, grew at an annual rate of roughly 5 per cent

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25. P. Barrio de Villanueva, 'Controles estatales a la industria del vino en Mendoza, 1890-1914', *H-industria: Revista de historia de la industria, los servicios y las empresas en América Latina*, 4:7, 2010, pp. 8-9, available online at [http://www.hindustria.com.ar/images/client\\_gallery/HindustriaNro7Barrio.pdf](http://www.hindustria.com.ar/images/client_gallery/HindustriaNro7Barrio.pdf) (accessed 14 May 2013).



Table 3

## Production Tax Data for Beer, 1891-1900

|      | Production taxed        |             |            | Tax revenues (m\$ <sup>n</sup> ) | Taxes levied (m\$ <sup>n</sup> ) |                        |                             |                             |
|------|-------------------------|-------------|------------|----------------------------------|----------------------------------|------------------------|-----------------------------|-----------------------------|
|      | Total (lts)             | Casks (lts) | Bottles    |                                  | Single extract, per lt           | Double extract, per lt | Per bottle, less than 40 cl | Per bottle, more than 40 cl |
| 1891 | 7,220,680               |             |            | 267,855                          | 0.02                             | 0.05                   |                             |                             |
| 1892 | 10,743,179              |             |            | 267,477                          | 0.01                             | 0.03                   |                             |                             |
| 1893 | 11,887,430              |             |            | 457,680                          | 0.02                             | 0.05                   |                             |                             |
| 1894 | 12,477,070              |             |            | 355,341                          | 0.01                             | 0.03                   |                             |                             |
| 1895 | 15,080,314              |             |            | 427,648                          | 0.03                             | 0.03                   |                             |                             |
| 1896 | 16,085,334              |             |            | 482,560                          | 0.03                             | 0.03                   |                             |                             |
| 1897 | 15,526,721              |             |            | 742,935                          | 0.05                             | 0.05                   |                             |                             |
| 1898 | 15,236,990              |             |            | 761,849                          | 0.05                             | 0.05                   |                             |                             |
| 1899 | 19,697,825              | 8,165,862   | 15,375,950 | 928,693                          |                                  |                        | 0.02                        | 0.035                       |
| 1900 | 26,509,972 <sup>a</sup> | 10,328,365  | 21,575,476 | 1,155,509                        |                                  |                        | 0.02                        | 0.035                       |

<sup>a</sup> Based on the assumption that each bottle equalled 0.75 lt, as in 1899.

Sources: Compiled from Dirección General de la Estadística de la Nación (DGEN), *Anuario*, Buenos Aires, 1897, II, pp. 47-48; 1898, II, p. 102; 1899, II, pp. 73-74; 1900, II, pp. 215-216; 1901, II, pp. 285-86; and E. Tornquist, *The Economic Development of the Argentine Republic in the Last Fifty Years*, Buenos Aires, 1919, pp. 295, 298-99.

*Table 4*  
Production Tax Data for Wine, 1892-1900

|      | Production taxed (lts) |             |            | Tax revenues (m\$ <sup>n</sup> ) | Taxes levied (m\$ <sup>n</sup> ) |                     |                             |                             |                 |                                      |
|------|------------------------|-------------|------------|----------------------------------|----------------------------------|---------------------|-----------------------------|-----------------------------|-----------------|--------------------------------------|
|      | Total                  | Natural     | Others     |                                  | Natural (per lt)                 | Artificial (per lt) | Blended and petiot (per lt) | Watered or altered (per lt) | Raisin (per lt) | Fortified (per degree exceeding 16°) |
| 1892 | 5,597,155              | 0           | 5,597,155  | 560,433                          |                                  | 0.10                |                             |                             |                 |                                      |
| 1893 | 258,849                | 0           | 258,849    | 25,885                           |                                  | 0.10                |                             |                             |                 |                                      |
| 1894 | 1,233,587              | 0           | 1,233,587  | 123,359                          |                                  | 0.10                |                             |                             |                 |                                      |
| 1895 | 15,250,208             | 0           | 15,250,208 | 159,502                          |                                  | 0.10                |                             |                             |                 |                                      |
| 1896 | 5,111,651              | 0           | 5,111,651  | 281,428                          |                                  | 0.12                | 0.04                        | 0.07                        | 0.02            |                                      |
| 1897 | 1,286,155              | 0           | 1,286,155  | 95,211                           |                                  | 0.12                | 0.06                        | 0.07                        | 0.02            | 0.01                                 |
| 1898 | 49,524,723             | 47,815,010  | 1,709,713  | 1,906,745                        | 0.04                             | 0.12                | 0.06                        | 0.07                        | 0.02            | 0.01                                 |
| 1899 | 122,821,727            | 121,200,652 | 1,621,075  | 3,508,963                        | 0.02                             | 0.14                | 0.08                        | 0.09                        | 0.04            |                                      |
| 1900 | 125,910,730            | 125,076,954 | 833,776    | 3,624,805                        | 0.02                             | 0.14                | 0.08                        | 0.09                        | 0.04            |                                      |

Sources: As in Table 3.

during the 1890s.<sup>26</sup> Cortés Conde has thus grossly overestimated the expansion of wine output by mistaking an increase in the quantity of wine *being taxed* with the quantity *being produced*. Moreover, given that the state's capacity to collect these taxes probably increased after they were first introduced, it seems likely that there would be an upward bias in the trend of other output series calculated using internal revenue data. They are, in other words, likely to produce growth rates that are too high.

## Alternative Data

Other data, moreover, support the impression that Cortés Conde has overestimated Argentina's industrial growth. Proxies for output in various industries are summarised in Table 5. With the exception of sugar, they are not direct measures of output but mainly relate to the apparent supply of raw materials and other inputs, which have been compiled from trade and agricultural statistics. Exports are also used for some industries, and crude estimates have been made for domestic consumption in a few cases.

Unfortunately, few of the indicators can be considered highly reliable measures of output. For example, 1919 consumption levels were used throughout, which is unrealistic because they would have changed over time. It is likely that dairy-product consumption increased, so using 1919 levels would give a downward bias to the trend of the output series. On the other hand, meat consumption probably fell, as the growth of chilled and frozen beef exports pushed up prices on the domestic market. The result is likely to be an upward bias in the trend of the meat output series. Similarly, the flour and tobacco yields are based on early twentieth-century data that might not be representative of earlier years. Already, then, it is possible to see some of the considerable margins for error that using such indicators entails.

For what they are worth, the indicators listed in Table 5 suggest a considerably lower growth rate. Some industries did expand at the kind of rates suggested by Cortés Conde: sugar refining, paper making, and metallurgy probably increased by at least 9 per cent annually; flour milling and winemaking by around 8 per cent. Yet, indicators for other industries show far slower growth: meat products grew at roughly 4 per cent per year; tobacco products and clothing by perhaps 3 per cent. With each series turned into a quantity relative with 1913 as their reference year, then weighted by their 1913 value added in the industrial census, they provide an index that suggests a 5 per cent aggregate annual growth rate, which, as shown in Figure 1, is considerably slower than the rates suggested by Cortés Conde.<sup>27</sup>

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26. Dirección General de Economía y Estadística (DGE), *Estadística Agrícola: Año Agrícola 1913-14*, Buenos Aires, 1914, p. 18.

27. For the construction of this index and the underlying series, see the accompanying workbook at [http://www.joefrancis.info/data/Francis\\_Arg\\_ind.xlsx](http://www.joefrancis.info/data/Francis_Arg_ind.xlsx).

Table 5

## Indicators of Industrial Growth for Argentina, 1870s-1913

|                | Start<br>year | Annual<br>trend<br>growth<br>rate, % | % of<br>1913<br>value<br>added <sup>a</sup> | Indicators  |
|----------------|---------------|--------------------------------------|---|---|
| Beef products  | 1875          | 4.9                                  | 4.9   | Exports of dried, frozen, and chilled beef, valued by 1913 export prices.   |
| Beer           | 1876          | 7.0                                  | 3.6   | Hops imported.  |
| Clothing       | 1883          | 2.9                                  | 3.7   | Common sewing thread, reels imported.   |
| Dairy          | 1875          | 4.3                                  | 3.0   | Apparent production: net dairy exports plus assumed consumption based on 1919 consumption levels, with both valued by 1913 export prices. |
| Flour          | 1876          | 8.0                                  | 3.4   | Apparent wheat consumption: wheat production based on cultivated land, minus net exports.   |
| Flour products | 1876          | 7.3                                  | 6.4   | Apparent flour consumption: assuming 600 kg of flour per ton of apparent wheat consumption, minus net wheat exports.                      |
| Iron and steel | 1876          | 7.8                                  | 5.0   | Imports of iron bars, steel bars, and worked iron, by weight.   |
| Pork products  | 1875          | 0.6                                  | 0.5   | Pork exports.   |
| Paper          | 1892          | 10.7                                 | 0.5   | Imports of paper paste.   |
| Sacks          | 1880          | 9.1                                  | 0.8   | Imports of sacking material.  |
| Sugar          | 1872          | 10.2                                 | 7.7   | Official production figures.  |
| Tobacco        | 1876          | 3.1                                  | 5.2   | Apparent consumption of raw tobacco: assuming a yield of 550 kg per ha of land cultivated, minus net exports.                             |
| Wine           | 1873          | 5.9                                  | 5.7   | Grapes: land cultivated.  |

<sup>a</sup> Value added was calculated from the industrial census by subtracting the cost of raw materials from the gross value of output.

Sources:

1919 consumption levels: Tornquist, *Economic Development*, p. 270-71.

550 kg tobacco yield: Comité Nacional de Geografía (CNG), *Anuario geográfico argentino*, Buenos Aires, 1941, p. 245.

600 kg flour yield: Ibid., p. 340.

1913 value added weights: Calculated from Comisión Nacional del Censo (CNC), *Tercer censo nacional, VII, Censo de las industrias*, Buenos Aires, 1917, pp. 27-34.

Cultivated land: DGEE, *Estadística Agrícola: 1913-14*, p. 18; and CNG, *Anuario geográfico*, pp. 207, 227, 245.

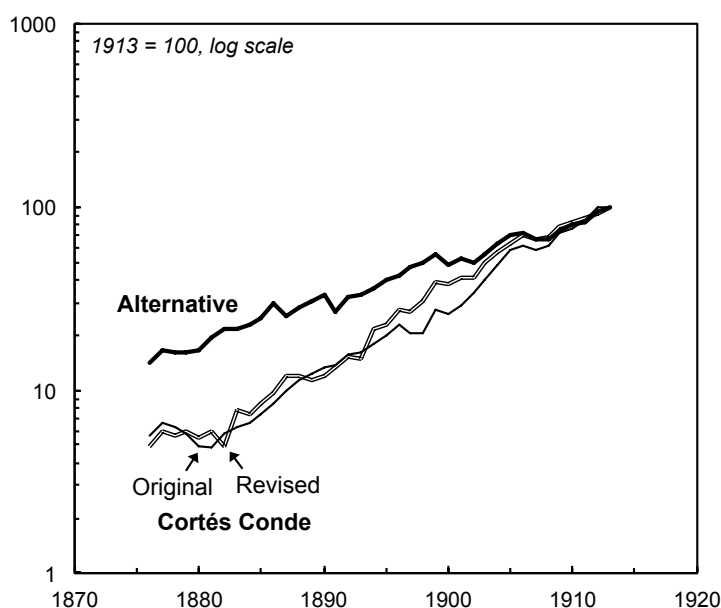
Imports and exports: F. Latzina, *Estadística retrospectiva del comercio exterior argentino 1875-1904*, Buenos Aires, 1905; and DGEN, *Anuario*, various years.

Population: V. Vázquez-Presedo, *El caso argentino: Migración de factores, comercio exterior y desarrollo, 1875-1914*, Buenos Aires, 1971, p. 92.

Sugar production: CNG, *Anuario geográfico*, p. 230.

Figure 1

### Three Estimates of Argentina's Industrial Output, 1876-1913



Sources:

Alternative: see text and Table 5.

Cortés Conde: Original: Cortés Conde, 'Estimaciones del producto'; Revised: Cortés Conde, *Economía argentina*, pp. 230-31, Cuadro A1.

This finding can only be treated as indicative, nonetheless, because the sample still suffers from the fundamental issue of *coverage*. The industries represented in the alternative index accounted for just half of industrial output in the 1913 base year. Cortés Conde, by contrast, claims that his index covers 42 per cent of industrial value added in 1914, although even this figure is only arrived at by inflating the value of meat processing to account for abattoirs, which the census did not include.<sup>28</sup> Hence, Cortés Conde claims that total meat value added was m\$n148 million, while the census reported that meatpacking and pork produced m\$n42 million. He thus seems to suggest that over two thirds of meat processing's value added came from producing for domestic consumption, which is highly improbable.<sup>29</sup> In all likelihood, therefore, the coverage of Cortés Conde's index is below 42 per cent. The alternative index shown in Figure 1 is preferable, then, but it still provides far from the 70-80 per cent coverage that a reliable index would need. In this, it reflects the basic lack of data on industrial output in Argentina in this period.

28. Cortés Conde, 'Estimaciones del producto', p. 8.

29. The government's estimates suggested that 47 per cent of the physical volume of beef produced in Argentina was exported in 1914. Junta Nacional de Carnes, *Estadísticas básicas*, Buenos Aires, 1966, p. 7. Exports' share of value added would presumably have been even greater, given the greater amount of work involved in preparing and packaging the meat.

## The Missing Textile Producers

The case of textiles illustrates why the lack of data is so problematic for any attempt to construct a reliable industrial output index. It is important because textile production was one of Argentina's largest industrial sectors for much of the nineteenth century. Indeed, textiles production had been an important activity for many peasant communities in the Interior since the colonial era and continued to be so into the 1870s.<sup>30</sup> There are, nonetheless, virtually no data on textile output and little even on inputs.

Such is the lack of data that estimates of textiles output must rely on assumptions that are so heroic that they appear quixotic on closer examination. Hence, Cortés Conde calculates textile production by summing a percentage of the value of dirty wool exports, the value of raw cotton production, and the value of yarn imports, then deflating the total by an index of imported wool and cotton cloth prices.<sup>31</sup> In practice, this means assigning roughly equal weights to dirty wool exports and yarn imports, given that raw cotton production was minimal. The problem is that there is not even a remotely credible estimate of the domestic processing of wool prior to 1908,<sup>32</sup> so Cortés Conde cannot have used any reliable series for this part of his calculations. Most likely, he simply took a fixed percentage of dirty wool exports, which says nothing about the growth and fluctuations in the amount of wool processed domestically. As a result, there is no reason to suppose that he has measured textile output.

Cortés Conde's estimates of textile output are worrying because the optimistic picture they paint – 13 per cent annual growth in the 1890s!<sup>33</sup> – flies in the face of one of the few reliable data sources for nineteenth-century Argentina. The national censuses show a dramatic decline in the number of textile producers, as shown in Table 6. In 1869 the first national census found 94,882 textile producers, with 95 per cent of them located in the Interior regions, where they made up fully 19 per cent of the labour force. Their numbers then fell dramatically following the arrival of the railways in the 1880s, as cheaper factory-made fabrics, both imported and produced in the Littoral using imported yarns, flooded the Interior's markets. As can be seen in Table 6, the number of textile producers fell to just 30,980 in 1914.<sup>34</sup> One of the few reliable data sources thus

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30. P. Santos Martínez, *Las industrias durante el Virreinato (1776-1810)*, Buenos Aires, 1969, pp. 38-50; and D.J. Guy, 'Women, Peonage, and Industrialization: Argentina, 1810-1914', *Latin American Research Review*, 16:3, 1981.

31. Cortés Conde, 'Estimaciones del producto', p. 14.

32. CNG, *Anuario geográfico*, pp. 273-75.

33. See Table 2.

34. This fall is slightly exaggerated because the 1869 census includes child workers, whereas the 1895 and 1914 only recorded the occupations of those aged 14 and over. However, only 6 per cent of textile workers in the smaller sample were below 14 years old, so applying that percentage to the figure of 94,882 textile workers would still suggest a fall from 89,189 in 1869.

Table 6

## Argentina's Textile Producers, 1869-1914

|                            | Total  | Federal Capital | Other Littoral | Centre | West   | North  | South |
|----------------------------|--------|-----------------|----------------|--------|--------|--------|-------|
| (a) Number of producers    |        |                 |                |        |        |        |       |
| 1869                       | 94,882 | 78              | 4,759          | 49,256 | 17,562 | 23,227 | n.a.  |
| 1895                       | 39,725 | 538             | 1,101          | 18,574 | 11,140 | 8,246  | 126   |
| 1914                       | 30,980 | 2,528           | 1,018          | 14,860 | 5,836  | 6,610  | 128   |
| (b) % of total occupations |        |                 |                |        |        |        |       |
| 1869                       | 11.1   | 0.1             | 1.6            | 22.6   | 14.1   | 18.4   | n.a.  |
| 1895                       | 2.4    | 0.2             | 0.2            | 7.3    | 6.7    | 4.3    | 2.0   |
| 1914                       | 1.0    | 0.2             | 0.1            | 3.1    | 2.6    | 2.2    | 0.4   |

Note: In 1869, the figures are for all those who declared occupations. In 1895 and 1914 they are for those aged 14 and above. Textile workers include the following census occupations:

1869: blanqueadores; cordeleros, hiladores é hiladoras; tejedores y tejedoras; pelloneros; tintoreros; torcedores de lana, seda, etc.

1895: cordeleros, cabulleros, etc; tejedores; tintoreros.

1914: cardadores de lana; cordeleros; fabricantes de tejidos; hiladores, tejedores, telaristas; tintoreros.

The composition of the regions is based on the classifications in the censuses.

Sources: Calculated from Superintendente del Censo, *Primer censo de la República Argentina*, Buenos Aires, 1872, pp. 642-669; Comisión Directiva, *Segundo censo de la República Argentina*, II, *Población*, Buenos Aires, 1898, pp. 47-50, 139-142, 183-186, 216-219, 257-60, 297-300, 326-29, 365-68,

shows a dramatic decline in Argentina's textile sector, which directly contradicts Cortés Conde's findings. In fact, the rapid growth found by Cortés Conde is likely to be a symptom of that decline, given that increasing yarn imports reflected the displacement of the Interior's peasant producers by factories processing imported yarns in the Littoral.

Ideally, it would be possible to present an alternative, more reliable estimate of Argentina's textile production that could be incorporated into an aggregate industrial output index. Such a task would be particularly important because textiles were Argentina's most important (proto)industry at the beginning of the period and subsequently appear to have declined. Yet, it is difficult to imagine *any* methodology that could be used to construct a sufficiently reliable estimate. Unfortunately, the required data simply do not exist.

### Any Number or No Number?

This paper has discussed why it is difficult, if not impossible, to measure Argentina's industrial output in the late nineteenth century. Particular attention has been given to Cortés Conde's industrial output index because only he has

been sufficiently bold to construct one going back to the 1870s. It has been argued that the high annual growth rate found by Cortés Conde is mainly the result of his mistaking an increase in the amount of goods being taxed with the amount actually being produced, particularly for the case of wine. A range of alternative data suggest a lower annual growth rate of around 5 per cent. Even this, nonetheless, can only be considered indicative, given the issues of data quality and, even more importantly, coverage. The series that do exist only cover around half of industrial value added, with important industries, such as textiles, impossible to adequately measure.

Why this matters for Argentina's historiography can be seen in the impact of Cortés Conde's estimates on the subsequent literature. His high growth rates give the impression that there must have been virtually no industrial activity in Argentina prior to the 1870s. Hence, in his detailed study of Argentina's industrialisation, Fernando Rocchi has evocatively claimed that 'Argentine industry [...] started almost from scratch, and its factories rose like chimneys in a desert'.<sup>35</sup> In this way, Rocchi returns to the imagery of Argentina's nineteenth-century statebuilders, who saw the Pampean and Patagonian lands to the south and west of Buenos Aires as a desert to be settled by European colonists, irrespective of the wishes of their gaucho and indian inhabitants.<sup>36</sup> Rocchi's version of this narrative portrays the Interior as a market to be conquered by modern manufactured goods, with little mention of the widespread (proto)industry that persisted through the 1870s but then declined. Rocchi states, for instance, that Córdoba 'did not have a large handicraft tradition',<sup>37</sup> yet the 1869 census showed that textiles producers alone made up 13 per cent of the province's workforce. They then fell to just 1 per cent in 1914.<sup>38</sup> Worse still, even when Rocchi does acknowledge that there was deindustrialisation in the Interior, he implies that it was a result of competition with the Littoral's burgeoning industrial sector, with imports playing only a minor role.<sup>39</sup> Textiles again illustrate why this is misleading: the 1914 census report estimated that less than a quarter of the country's demand for textiles was being met by domestic production,<sup>40</sup> so the Interior's textile production had been predominantly replaced by imports. This suggests a more pessimistic view of Argentina's late nineteenth-century industrialisation than has prevailed since Cortés Conde's numbers appeared.

Looking beyond Argentina's historiography, this paper also has implications for the wider study of economic history. Since the 'cliometric revolution'

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35. Rocchi, *Chimneys in the Desert*, p. 26.

36. See, for example, N. Shumway, *The Invention of Argentina*, Berkeley, 1991.

37. Rocchi, *Chimneys in the Desert*, p. 138.

38. Sources as in Table 6.

39. F. Rocchi, 'El péndulo de la riqueza: La economía argentina en el período 1880-1916', in M. Zaido Lobato, ed., *Nueva historia argentina*, V, *El progreso, la modernización y sus límites (1880-1916)*, Buenos Aires, 2000, p. 49.

40. CNC, *Tercer censo nacional*, VII, p. 69.



of the 1970s, the demand for historical statistics has increased dramatically, so it has become imperative to produce more numbers, with few raising concerns about the margins of error that they contain.<sup>41</sup> As Angus Maddison reportedly put it, the general attitude has been that 'Any number is better than no number'.<sup>42</sup> Some have defended this attitude by arguing that the margins of error are so small that they will not effect the analysis,<sup>43</sup> yet the case of Argentina's industrial output in the late nineteenth century clearly demonstrates how bad numbers can lead to conclusions that would otherwise be difficult to sustain. It seems safe to assume that similar 'Mickey Mouse numbers' must have proliferated in the historiographies of other countries due to a lack of scrutiny of their sources and methodologies.

A possible rebuttal is that it is only through the use of bad numbers that good numbers will ever be produced,<sup>44</sup> but it seems likely that sometimes it will *never* be possible to produce good numbers. It is hard to conceive how it would be possible to construct a reliable estimate of Argentina's industrial output from the 1870s to 1913, given that the raw data simply do not exist. It may be, then, that economic historians have to accept the limitations of their discipline, as their ambition to quantify history meets the reality of a lack of data. Otherwise, they run the risk of flying too close to the sun, as their craft will be seen to involve too much invention for their conclusions to be considered viable. For their own sake, therefore, they may have to admit that no number can sometimes be better than any number.

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41. The canary in the mine was Platt, *Mickey Mouse Numbers*.

42. Reported by P. O'Brien, 'Myths of Eurocentrism and Material Progress', Institute of Historical Research Global History Seminar, 17 February 2010, online at: <http://www.history.ac.uk/podcasts/global-history-external/myths-eurocentrism-and-material-progress> (accessed 15 August 2015).

43. N.F.R. Crafts, 'Mickey Mouse Numbers in World History: The Short View. By D.C.M. Platt', *Journal of Economic Literature*, 30:1, 1992.

44. R. Middleton, 'Mickey Mouse Numbers in World History: The Short View by D.C.M. Platt', *English Historical Review*, 106:421, 1991.

## References

- Barrio de Villanueva, P., 'Controles estatales a la industria del vino en Mendoza, 1890-1914', *H-industri@: Revista de historia de la industria, los servicios y las empresas en América Latina*, 4:7, 2010, available online at [http://www.hindustria.com.ar/images/client\\_gallery/HindustriaNro7Barrio.pdf](http://www.hindustria.com.ar/images/client_gallery/HindustriaNro7Barrio.pdf) (accessed 14 May 2013).
- Comisión Directiva, *Segundo censo de la República Argentina*, II, *Población*, Buenos Aires, 1898.
- Comisión Nacional del Censo (CNC), *Tercer censo nacional*, VII, *Censo de las industrias*, Buenos Aires, 1917.
- Comité Nacional de Geografía (CNG), *Anuario geográfico argentino*, Buenos Aires, 1941.
- Cortés Conde, R., 'Problemas del crecimiento industrial de la Argentina (1870-1914)', *Desarrollo Económico*, 3:1/2, 1963, pp. 143-71.
- \_\_\_\_\_, 'El 'boom' argentino: ¿Una oportunidad desperdiciada?', in T. di Tella and T. Halperín Donghi, eds., *Los fragmentos del poder*, Buenos Aires, 1969, pp. 217-42.
- \_\_\_\_\_, *El progreso argentino: 1880-1914*, Buenos Aires, 1979.
- \_\_\_\_\_, 'The Export Economy of Argentina 1880-1920', in idem and S.J. Hunt, eds., *The Latin American Economies: Growth and the Export Sector 1880-1930*, New York, 1985, pp. 319-91.
- \_\_\_\_\_, 'The Growth of the Argentine Economy, c. 1870-1914', in L. Bethall, ed., *The Cambridge History of Latin America*, V, c. 1870-1930, Cambridge, 1986, pp. 47-78.
- \_\_\_\_\_, 'Export-Led Growth in Latin America: 1870-1930', *Journal of Latin American Studies*, 24, Quincentenary Supplement, 1992, pp. 163-79.
- \_\_\_\_\_, 'Estimaciones del producto bruto interno de Argentina 1875-1935', Documento de Trabajo 3, Departamento de Economía y Matemática, Universidad de San Andrés, 1994.
- \_\_\_\_\_, *La economía argentina en el largo plazo: Ensayos de historia económica de los siglos XIX y XX*, Buenos Aires, 1997.
- \_\_\_\_\_, 'The Vicissitudes of an Exporting Economy: Argentina (1875-1930)', in E. Cárdenas, J.A. Ocampo, and R. Thorp, eds., *An Economic History of Twentieth-Century Latin America*, I, *The Export Age*, Oxford, 2000, pp. 265-98.
- Crafts, N.F.R., 'Mickey Mouse Numbers in World History: The Short View. By D.C.M. Platt', *Journal of Economic Literature*, 30:1, 1992, pp. 223-24.
- Díaz Alejandro, C.F., *Essays on the Economic History of the Argentine Republic*, New Haven, 1970.
- Dirección General de Economía y Estadística (DGEE), *Estadística Agrícola: Año Agrícola 1913-14*, Buenos Aires, 1914.
- Dirección General de la Estadística de la Nación (DGEN), *Anuario*, Buenos Aires, various years.
- Ferrer, A., *The Argentine Economy*, Berkeley, 1967.
- \_\_\_\_\_, *La economía argentina: Desde sus orígenes hasta principios del siglo XXI*, 3rd ed., Buenos Aires, 2004.
- Gallo, E., 'Agrarian Expansion and Industrial Development in Argentina', in R. Carr, ed., *Latin American Affairs*, Oxford, 1970, pp. 45-61.
- Gallo, E., and R. Cortés Conde, *La formación de la Argentina moderna*, Buenos Aires, 1967.
- Geller, L., 'El crecimiento industrial argentino hasta 1914 y la teoría del bien primario exportable', *Trimestre Económico*, 37:148(4), 1970, pp. 763-811.
- Grosfoguel, R., 'From Cepalismo to Neoliberalism: A World-Systems Approach to Conceptual Shifts in Latin America', *Review (Fernand Braudel Center)*, 19:2, 1996, pp. 131-54.
- Guy, D.J., 'Carlos Pellegrini and the Politics of Early Argentine Industrialization, 1873-1906', *Journal of Latin American Studies*, 11:1, 1979, pp. 123-44.
- \_\_\_\_\_, 'Women, Peonage, and Industrialization: Argentina, 1810-1914', *Latin American Research Review*, 16:3, 1981, pp. 65-89.
- Halperín Donghi, T., *El revisionismo histórico argentino*, Buenos Aires, 1970.
- \_\_\_\_\_, *La Argentina y la tormenta del mundo: Ideas y ideologías entre 1930 y 1945*, Buenos Aires, 2003.
- Hirschman, A.O., 'A Generalized Linkage Approach to Development, with Special Reference to

- Staples', *Economic Development and Cultural Change*, 25, Supplement, 1977, pp. 67-98.
- Innis, H., *Essays in Canadian Economic History*, Toronto, 1956.
- Junta Nacional de Carnes, *Estadísticas básicas*, Buenos Aires, 1966.
- Korol, J.C., and H. Sabato, 'Incomplete Industrialization: An Argentine Obsession', *Latin American Research Review*, 25:1, 1990, pp. 7-30.
- Latzina, F., *Estadística retrospectiva del comercio exterior argentino 1875-1904*, Buenos Aires, 1905.
- Love, J.L., 'The Rise and Fall of Structuralism', in V. FitzGerald and R. Thorp, eds., *Economic Doctrines in Latin America: Origins, Embedding and Evolution*, Basingstoke, 2005, pp. 157-81.
- Middleton, R., 'Mickey Mouse Numbers in World History: The Short View by D.C.M. Platt', *English Historical Review*, 106:421, 1991, pp. 1079-80.
- Míguez, E.J., '¿Veinte años no es nada? Balance y perspectivas de la producción reciente sobre la gran expansión agraria, 1850-1914', in J. Gelman, ed., *La historia económica argentina en la encrucijada*, Buenos Aires, 2006, pp. 209-29.
- O'Brien, P., 'Myths of Eurocentrism and Material Progress', Institute of Historical Research Global History Seminar, 17 February 2010, online at: <http://www.history.ac.uk/podcasts/global-history-external/myths-eurocentrism-and-material-progress> (accessed 15 August 2015).
- Platt, D.C.M., *Mickey Mouse Numbers in World History: The Short View*, Basingstoke, 1989.
- Rocchi, F., 'El péndulo de la riqueza: La economía argentina en el período 1880-1916', in M. Zaido Lobato, ed., *Nueva historia argentina*, V, *El progreso, la modernización y sus límites (1880-1916)*, Buenos Aires, 2000, pp. 15-70.
- \_\_\_\_\_, *Chimneys in the Desert: Industrialization in Argentina During the Export Boom Years, 1870-1930*, Stanford, 2006.
- Santos Martínez, P., *Las industrias durante el Virreinato (1776-1810)*, Buenos Aires, 1969.
- Shumway, N., *The Invention of Argentina*, Berkeley, 1991.
- Superintendente del Censo, *Primer censo de la República Argentina*, Buenos Aires, 1872.
- Tornquist, E., *The Economic Development of the Argentine Republic in the Last Fifty Years*, Buenos Aires, 1919.
- Vázquez-Presedo, V., *El caso argentino: Migración de factores, comercio exterior y desarrollo, 1875-1914*, Buenos Aires, 1971.
- Watkins, M.H., 'A Staple Theory of Economic Growth', *Canadian Journal of Economics and Political Science*, 29:2, 1963.
- \_\_\_\_\_, 'Staples Redux', *Studies in Political Economy*, 79, 2007.