

**A Railway Junction in the Americas:
Factor Endowments, Transport Costs and Divergence
in the primary producing regions of the New World, 1850-1914**

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Abstract

The nineteenth century accounts for most of the divergence in per capita GDP in the Americas. Between around mid-century and 1914, some regions in the Americas, but not others, experienced outstanding rates of growth. Previous literature has stressed either colonial origins, terms of trade or institutional factors to explain the differential economic performance across the continent. We argue that the shock of the Transport Revolution –in particular, railways– was asymmetric and depended on the type of exports. Using data for the primary producing regions in the Americas, covering around 90% of the continent's population, we show that economic performance was correlated to product bulkiness: regions exporting heavier products (as measured by weight per unit of value) took more advantage of the technological shock because the decline in transports was larger there. Regions specialized in mining or the high value/weight cash crops typical of the old colonial trade didn't benefit from the transport revolution and lagged behind the American Midwest, the Canadian prairies or the Argentine Pampas, where exports and per capita GDP were highest in the continent on the eve of World War I.

1. Introduction

The economic development of the Americas changed drastically with the transport revolution of 19th century. Before the advent of steamships and —more importantly— railways, regions specialized in mining and tropical crops were by far the most important primary producing regions in the Americas. In the hilly interiors of the viceroyalties of New Spain and Peru, an economy based on gold, silver and copper was during colonial times the backbone of the Spanish Empire in the Americas. In the Caribbean and Brazil, dynamic sugar, cocoa, and coffee exports were the engines of economic activity. By the beginning of 1800, Cuba was the richest economy in per capita terms in the Americas¹. Meanwhile, cotton plantations prospered in the US South (and parts of Brazil) until the mid 19th century, contributing to maybe the crucial manufacturing input of the British Industrial Revolution.

The precipitous decline in transport costs changed the economic evolution in the continent, as it did in the international arena. Table 1 suggests how the new transport technology affected international trade. Commodities such as precious metals, opium, sugar, or coffee (all of them comparatively valuable, in the sense of having a high price/weight ratio²) lost market share. Meanwhile, the more voluminous cereals, vegetable oils and seeds expanded. For example, the value of infusions and spices entering international trade was more than 8 times that of cereals around 1830; but cereals had surpassed them by 1912. Sugar represented 25% of international trade in 1830 and vegetable oils, seeds and fats were 2%, and they were almost on par around 8% of world trade by 1912. If we add meat (benefited by the new refrigeration technology) and fruits & vegetables to cereals and oilseeds, their share of world trade increased from 6.2% in 1830 and 11.4 in 1860 to 29.1 in 1912. Manufacturing trade paled in comparison, representing 8.5% in 1912, a figure comparable to that of 1830.

¹ Coatsworth (2008).

² In the remaining of the paper we use "valuable" to refer to commodities with a relatively high price per unit of weigh and "bulky", "heavy" or "voluminous" to refer to commodities with a relatively high volume per unit of money (or a high price per unit of volume).

Table 1: Sectors Shares in World Trade

Categories	1860	1900	1912	Difference 1912-1860
TOTAL AGRO RAW MATERIALS	31.8	32.1	34.7	2.9
Textile fibers	14.8	17.2	15.5	0.7
Indigo	2.4	0.5	0	-2.4
Metals & Mineral Ores	3.9	3.1	1.8	-2.1
Fuels	0	0.4	2	2
Hides and skins	4	3.3	4.2	0.2
Rubber	0.2	3.5	3.9	3.7
Wood	0.9	0.4	0.9	0
Gum	0.6	0.1	0	-0.6
Other	5	3.6	6.4	1.4
TOTAL FOODSTUFFS	48.2	46.1	50.2	2
Sugar	18.1	8.6	8.2	-9.9
Cereals	5	10.7	13.6	8.6
Coffee, tea, cocoa, spices	18.7	14.2	12.9	-5.8
Vegetable oils, seeds, fats	1.7	5.2	7.7	6.0
Meat and fish	1.2	3.2	3.2	2
Fruit, vegetables, etc.	3.5	4.2	4.6	1.1
TOTAL DRUGS	11.9	5.9	3.9	-8
Tobacco	4	3.9	2.8	-1.2
Opium	7.9	2	1	-6.9
PRECIOUS METALS	4.4	3.8	2.8	-1.6
MANUFACTURES	3.7	12.1	8.5	4.8

Source: Bairoch (1982)

Until well into the 19th century the cost of overseas transport was too high to allow for trade in the bulky primary products that were the comparative advantage of some primary producing economies, particularly in comparison to the more valuable –as measured in price per unit of volume– manufacturing goods. Williamson (2011, 14) contends that this asymmetry implied lower terms of trade, in general, for primary producing countries, and that the transport revolutions of the 19th century helped reverse that disadvantage. But the asymmetric impact of transports costs influenced not only core-periphery relationships, but also had diverse affects within the periphery. The comparative history of the Americas in the late 19th century is better understood by stressing the differential impact that the transport revolution had in the diverse economies of the New World. We show here that railroads played a significant role for the divergent trends within the

Americas that took after 1850. Our hypothesis is that countries and regions with bulky export baskets benefited disproportionately from the decline in transport costs, precisely because transport cost was a larger fraction of total cost in those commodities.

The technological shock of railways had, then, a diverse impact according to an exogenous, geographic factor. In regions well suited to produce cereals, the transport revolution implied a windfall gain in the form of hitherto unexploited natural resources. Exports and per capita incomes shot up in the American Midwest, the Canadian prairies and the Pampas as railroads allowed the integration of those areas into the world economy³. On the contrary, the shock was much milder for mining or cash crop economies, already profitable under the old transport technology. Divergence in exports and per capita income between regions of "bulkier" commodities and "valuable" commodities were only partially attenuated by massive migrations from the Old World, and less so as restrictions to migrations began to take hold in the early 20th century. By 1914, significant differences in wages and per capita incomes prevailed in the countries of the New World.

To the extent that the differential impact of a technological shock taking place in the second half of the 19th century (railways) was behind the diverse experience in economic development of the primary producing regions of the New World, it is natural to wonder whether it can also help explain differences in other social outcomes. Just to mention an example: the very substantial disparity in the extension of slavery across regions in the Americas (eg., Midwest vs South in the U.S. or Argentina vs. Brazil in the Southern Cone) has often been attributed to the fact that group work in the plantation economies was more amenable to slavery than the extensive agriculture of the Pampas or the Midwest. But maybe it was just a question of timing: slavery was basically over in the Americas, for other reasons, when the railway boom untapped the natural wealth of the temperate zones. Maybe labor in those regions came from voluntary rather than forced

³ To the extent that we are considering only primary producing regions, we leave out the American Northeast and include only the Midwest and the South in our analysis.

migration just because slavery was no longer an option, not because of microeconomic differences between the sectors involved. Actually, slaves did work in corn agriculture in the pre-bellum South or in peri urban agriculture of pre-Constitutional Argentina⁴.

This paper is organized as follows: in section II we discuss previous literature on divergence in the Americas and we present evidence for our hypothesis, showing that countries with the heaviest export basket had a more dynamic performance. Our key and explanatory variable is the kilograms of exports per pound sterling, a largely exogenous variable influenced primarily by geography. In section III we discuss some of the implications to contrast our hypothesis. In section IV we conclude.

2. Transports costs: correlations and causes

There are several traditions trying to account for the diverse growth experience of New World economies until the Great Depression. Most of them include one or more of the following determinants, sometimes interacting with each other: colonial origins, endowments, and institutions. Bértola and Williamson (2003) provide a comprehensive summary of some of these explanations. We only mention in what follows some the most influential and related to our period.

Hypotheses stressing colonial origins (whether in the refined dependency view of the Steins (1970) or in a more traditional Anglo versus Iberian colonization divide) all face with uncomfortable cases such as Jamaica (an unsuccessful case of British colonization or Argentina (in our period, a comparatively successful case of Iberian origins). Both in Furtado (1974) and Cardoso and Faletto (1979) are early examples of a the political-economic implications of diverse types of factor endowments and economic structures. This fertile interaction between initial conditions and institutions was also explored by Engerman and Sokoloff (1997, 2000), in their case acting through inequality: small scale property in temperate agriculture tended to produce a more equal and eventually democratic society than big scale tropical

⁴ Harari and Flores (2018).

plantations based on slave labor (such as Brazil or the Caribbean) or large agricultural estates that included exploitation of a large native population, as in Mexico or Peru. Ultimately, it was in the former societies where the institutional preconditions for sustained economic growth (such as universal enfranchisement and high literacy) flourished.

In a similar vein, Acemoglu, Johnson and Robinson (2000) start from initial endowments and end in growth enabling institutions, but through a different mechanism. While Europeans colonized every region in the Americas, only in some places did they set up the "inclusive institutions" that are the backbone of modern economic growth and immigrated on a massive scale. This happened essentially where Europeans did not have a large native population to dominate, a valuable mineral resource to exploit, or a geography suitable for slave-based plantations. In all the latter cases, "extractive institutions" prevailed and became an obstacle to economic growth. Coatsworth (2008), meanwhile, relates the differential performance in Latin America countries to the speed at which elites undertook institutional modernization after independence. In his account, in places such as Brazil, the Caribbean, Mesoamerica and the Andes the strength of a conservative elite heir of the colonial economic regime resisted modernization (typically with the support of the Church and in some cases, such as Cuba, even abstaining from severing the colonial tie); whereas in the Southern Cone and Costa Rica modernization was comparatively faster.

The search for the origin of institutional differences is certainly crucial to understand the subsequent development of the Americas. For the "First Globalization" period⁵, however, it isn't easy to square with the fact that the most successful regions weren't exactly institutional role models – and included a country that endured the bloodiest war in the history of the Americas to this day (the U.S.), a self-governing colony of the British Empire (Canada), and a republic

⁵ O'Rourke and Williamson (1999).

that in the late 19th century "alter[ed] its currency almost as frequently as it chang[ed] its President"⁶ (Argentina).

We propose here an alternative explanation, which emphasizes geographic luck (or endowments) rather than institutions or colonial origins. As Williamson points out, the transport revolution all but closed price gaps between the periphery and Europe, by a larger margin for primary products than for manufactures "simply because primary products had much bigger price differentials to erase when the transport revolution began in 1820" (Williamson, 2011:21). Intercontinental price gaps (between, say, Chicago and London or Buenos Aires and Antwerp), however, are just a part of the story. More importantly, the decline in overland transport costs meant essentially the untapping of lands the exploitation of which was simply uneconomical with the old transport technology. No wonder 19th century Argentine intellectuals such as Sarmiento referred to the (later shown to be fertile) Pampas as "a desert".

Several papers have highlighted the impact of railway in social savings in the Americas (see, for Latin America, Summerhill 2000, 2003, 2005; Cortes Conde, 1979; Coatsworth, 1981; Herrán Loncanz, 2011). But, to the best of our knowledge, the weight of the export basket has never been explicitly considered as an important intermediate variable to account for the contribution of railways.

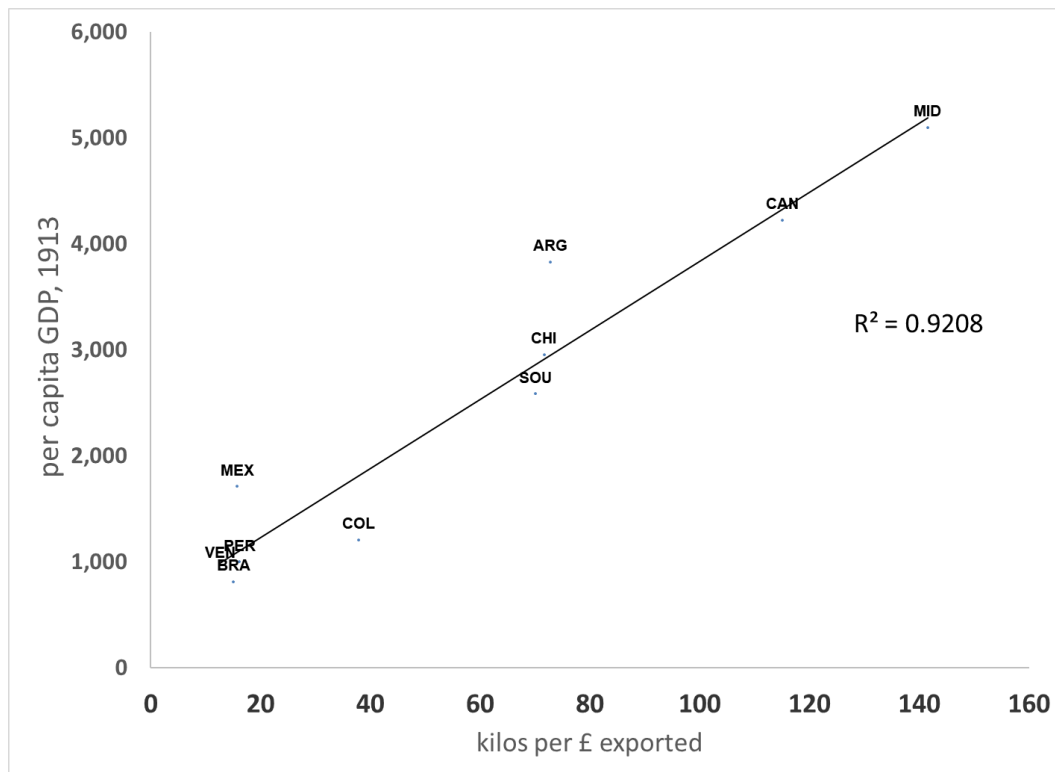
Table II at the end of this document synthesizes the most important explanatory variable in our paper, "export weight"⁷. It is measured in kilos per pound sterling and can be thought of as the average mass of the typical export basket for each country worth one pound sterling. We consider several regions in the Americas; in most cases whole countries (Argentina, Brazil, Canada, Chile, Colombia, Mexico, Peru and Venezuela) and in the case of the U.S. we include only the "primary producing" South and Midwest, leaving aside the Northeast (with a more manufacturing profile and thus a different case altogether) and other regions. These countries and regions accounted for 82% of the population in the Americas around 1850 and 91% around 1914 –the remaining being Central America and the

⁶ Della Paolera and Taylor (2001).

⁷ See appendix for a detailed explanation on how this variable is calculated.

Caribbean, smaller countries in South America and the regions of the U.S. left out of the sample. In the Appendix we also consider as separate cases Yucatán and the rest of Mexico – henequen production there was another characteristic case of "railways made it possible", in contrast with the Mexican mining regions. Figure 1 shows that regions having the heaviest export baskets also attained the highest per capita GDP by World War I.

Figure 1. Export weight and per capita GDP



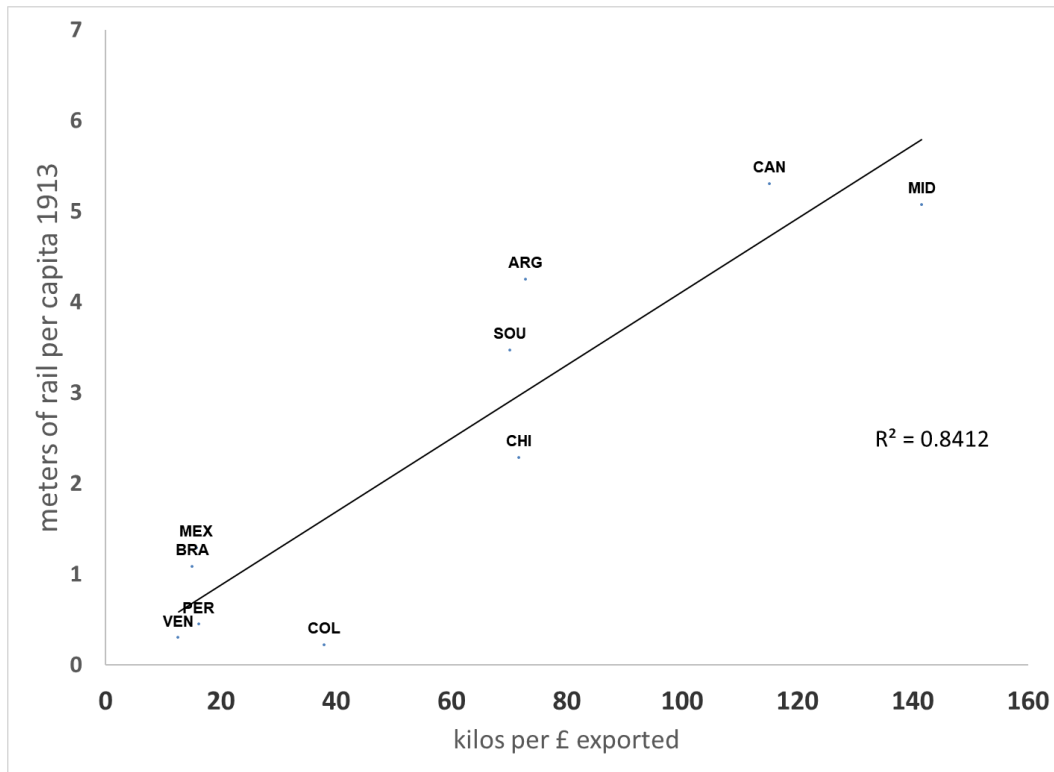
Source: see section 6, Data sources and technical notes

The American Midwest (MID in Figure 1) followed by Canada and then Argentina led in terms of per capita GDP and kilograms of exports per pound sterling. Chile and the South of the US (SOU) followed, in an intermediate range in both export weight and per capita GDP. A larger group composed by Mexico, Colombia, Peru, Venezuela and Brazil (all of them dominated by valuable mining or tropical exports) form a third group. Our hypothesis stresses the relationship between the initial endowments defining the weight of the export basket, the importance of railway development and its immediate consequence on national/regional income.

It was true, as Williamson notes, that "where regions were fragmented by rough topography, poorly endowed with inland rivers, and isolated from coastlines, railroads had a spectacular market integrating impact". But the impact depended on the type of product. Railroad decreases producers' costs in a larger fraction the bulkier the export basket. In the case of the Midwest, major crops were wheat and corn. Wheat was also the main staple in Canada (though timber was still important, and had developed earlier transported through waterways, sometimes by "log driving") and was crucial in Argentina's agricultural revolution along with corn and linseeds. The American South did have wheat and corn but also cotton or tobacco (relatively valuable crops). Chile is an interesting intermediate case with nitrates, a relatively heavy mineral that did benefit significantly from railroads. The rest of the economies exported mostly valuable mineral products (like silver and gold) comparatively expensive crops such as coffee or sugar (more details in the appendix) or technological novelties such as rubber. Pockets taking advantage of the new heavy-load technology of railroads appeared in the late 19th and early 20th century in Colombia (bananas) and Mexico (henequen).

It is not surprising that, once the technology was available, regions with heavier export baskets demanded more railway miles, as shown in Figure 2.

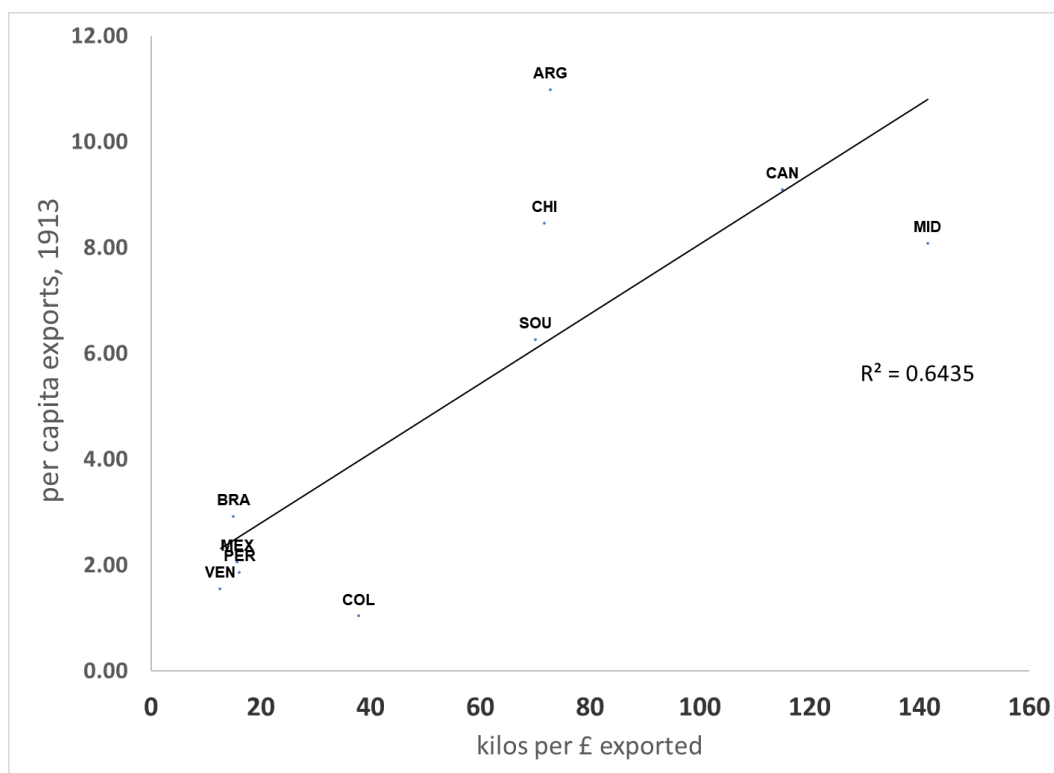
Figure 2. Export weight and railways



Source: see section 6, Data sources and technical notes

Exports per capita are also higher where the export basket was more voluminous. Exports from the two U.S. regions considered here are harder to compute, as we would like to compute exports from the region to both the rest of the U.S. and the rest of the world. We use as an alternative the value of production of the main crops in the cases of the U.S. South and Midwest in Figure 3.

Figure 3. Export weight and per capita exports



Source: see section 6, Data sources and technical notes

3. Railroads and commodities in the New World: some cases

Railroads played a key role connecting periphery and interiors with core markets. Between 1870 and 1914, freight rates on overseas routes connecting Uruguay with Europe fell by 0.7 percent per annum, but the figure is 3.1 annually once railroads savings are computed. According to Donaldson and Hornbeck (2013), removing all railroads in 1890 would have decreased the total value of US agricultural land by 60%, with no room for substitution through canal networks or country roads. Freight from the inland regions to the port made up most of the total transport cost from the productive regions to the European markets (see Williamson 2011: 20).

The case of Argentina. For Herranz Loncán (2011), the social saving of freight railway transport may be estimated as 22.3 percent of the country's GDP in 1913, contributing with more than 20 percent of income per capita growth between the beginning of the railway era and 1913. Summerhill (2000) has estimated that by 1913 the existence of railways represented savings of 7.3 cents of peso oro per ton, per kilometer – the difference between 8.3 cents with carts and 1 cent with

railways. Llach (2003) calculates that for a 400km trip, transporting a ton cost 4 pesos by train and 33 with the old transport technology. By that time, Argentina exported wheat at approximately 36 gold pesos the ton. The producer price net of transport costs by train (32 gold pesos) was, thus, ten times higher than by cart (3 pesos). Any change in external terms of trade would pale compared to this increase in the net price to the producer.

As can be expected, this change in profitability altered the composition of the export basket. Before 1875, exports were dominated by wool and hides, with insignificant amounts of cereals and grains. This situation had drastically changed by the eve of World War I, when agriculture contributed with two thirds of exports. Of course, the transport revolution was not the only technological novelty affecting primary exports, at least for Argentina. Advances in wool-spinning were behind the wool boom (1850s-1870s), and refrigeration that contributed to exports of meat (a development that was particularly important for neighboring Uruguay). But it was the expansion of railways that fueled most of Argentina's export led growth.

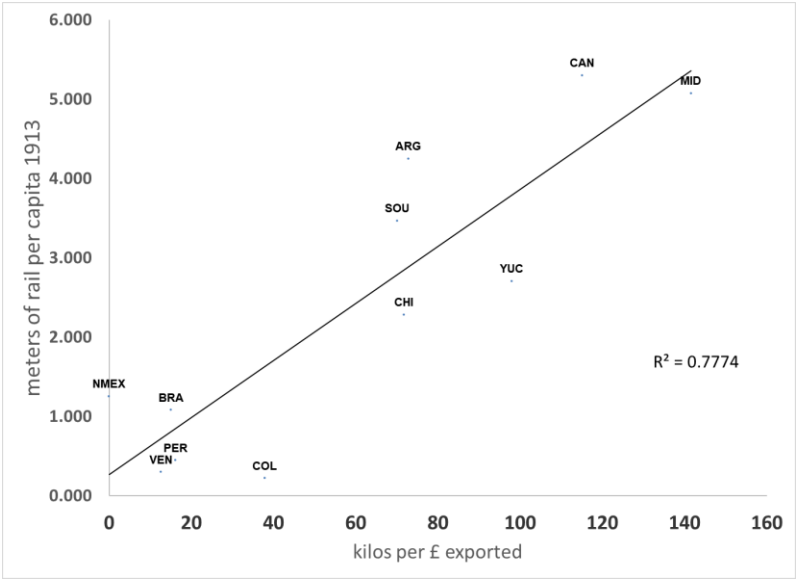
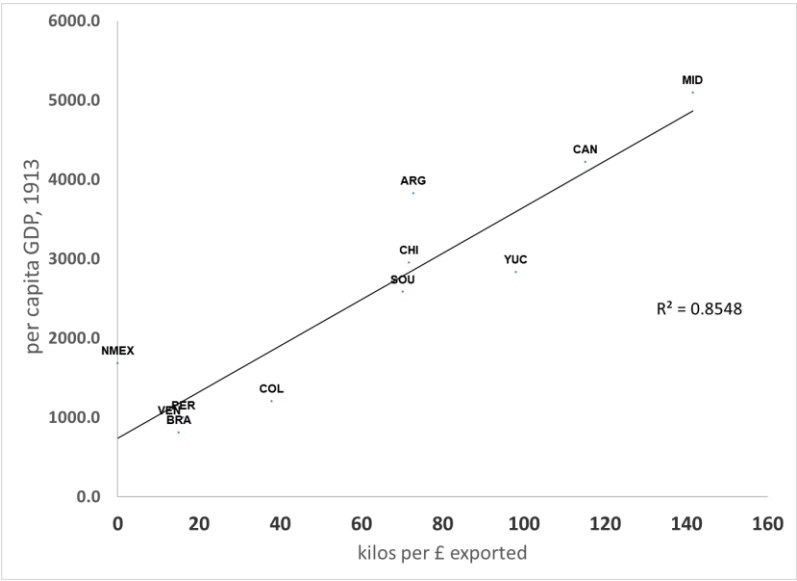
According to Llach (2013), until 1910 the 80% of the accumulated increase in per capita exports since 1876 could be accounted for by changes in per capita stock of land, and only 20% by the increase in agricultural machinery per capita. In other words, there was an extensive expansion, thanks to incorporation of new lands to production that railways allowed for. Of course, other factors or production followed. Argentina had a considerable increase in its population due to the highest per capita immigration in the world during this period (Llach 2013). Migrations were more a consequence than a cause of the Pampas Revolution allowed by the new transport technology. By 1885, the Argentinian government controlled all fertile plains thanks to the military campaigns that were carried out in the previous years. As the frontier expanded (or contracted), new counties opened (or closed) for settlement (see Droller, 2016). Even so, agricultural land per capita grew at 15% annually in the 1880s, close to 5% both in the 1890s and the 1900s, and fluctuated around the 1910 level thereafter.

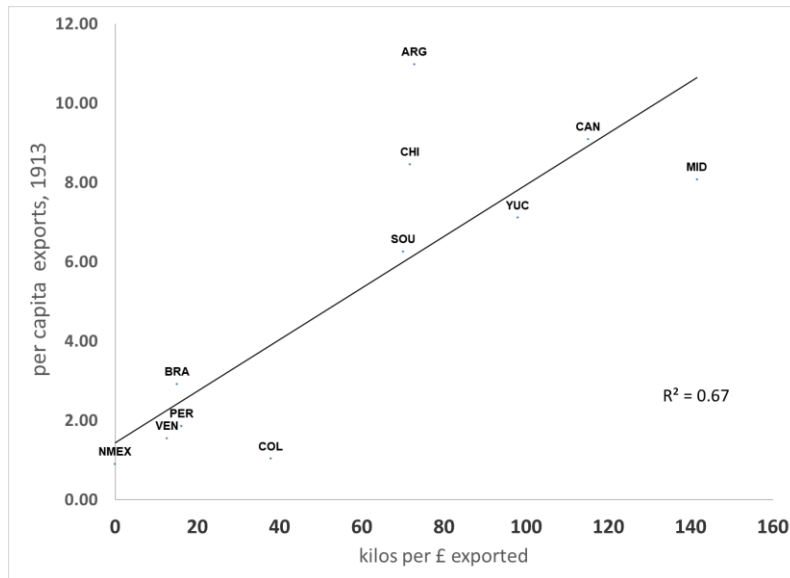
The case of Mexico. While Mexico did lag behind the Southern Cone or the Midwest in terms of per capita GDP, growth was indeed respectable during the

Porfiriato (for example, Coatsworth (1980)). Of course, transport was not the only variable at play. Mexico did manage to increase the production of a diversified mining sector. In addition to silver, other products were exploited on a large-scale basis, like gold (which previously had minor importance), lead, copper and zinc. Crucially to our argument, in the 1890s, a modern metallurgical industry could develop without the presence of an extensive railroad system: as Kuntz Ficker (2014:105) argues, "many exports expanded despite deficient or non-existent modern transportation". Most of the coffee harvested in Veracruz, Oaxaca, and Chiapas was sent by mule to the closest harbor. Some export ventures profited from a good geographic location near the ocean, like rubber, gum, and fine woods, while others—like bananas—used boats to take the fruit to the nearest port through the very few navigable rivers existing in Mexico. All those types of products, according to our measures of weight, are relative inexpensive to move in/out when compare to other products like wheat, corn or timber.

Some parts of Mexico did developed railroads, particularly in those zones of products with a high weight/value ratio. Chickpeas and tomatoes from Sinaloa, for example, benefited from railroads. But the most striking example was probably Yucatán (Kuntz Ficker, 2014). The development of henequen required a railway network carrying production to the port of Progreso (Barceló Quintal, 2011). If we include Yucatán as region on its own, separate from the rest of Mexico (Figure 4) we see that it fits well in the correlation between, on the one hand, export weight, and, on the other hand, markers of growth such as GDP, railways and exports per capita. We believe this is a particularly interesting case because institutional factors are more or less constant within the frontiers of the country. A similar argument can be made for Argentina, where the expansion of railways was much faster in the "voluminous exports" sector in the Pampas than in the Northwest and West, where higher-value wine and sugar were produced (Llach, 2007).

Figure 4. Export weight and measures of growth (Yucatán as a separate region)



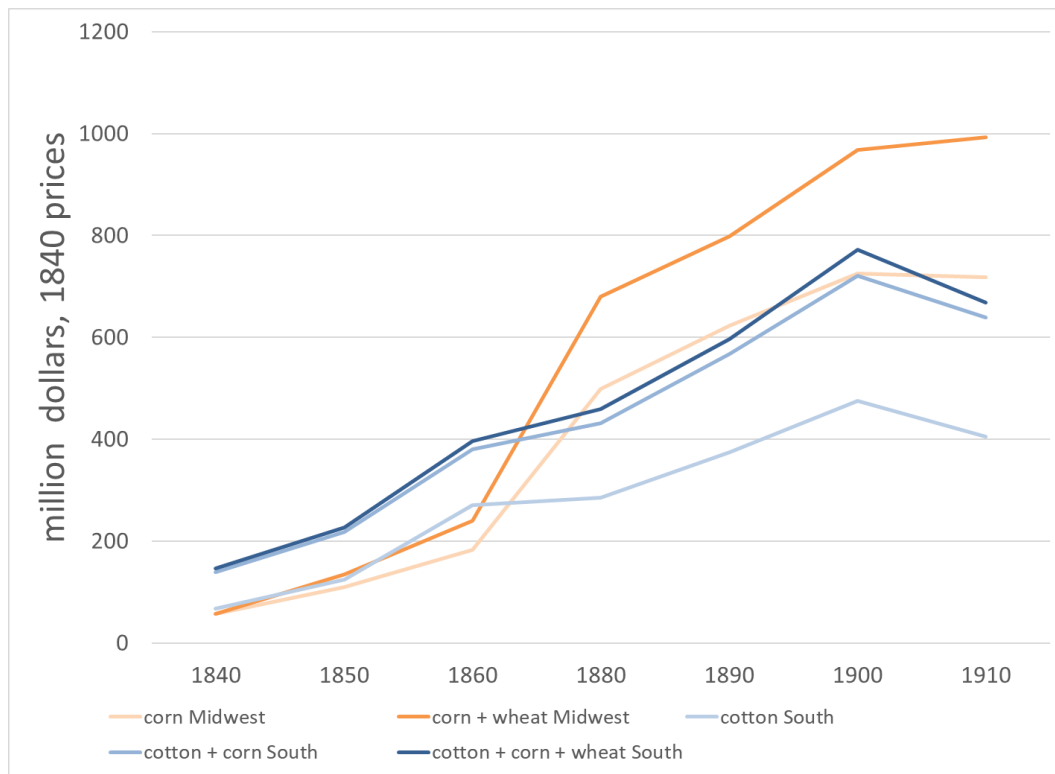


Source: see section 6, Data sources and technical notes

The U.S South and Midwest. Multiple studies have tackled the development of the midwestern and southern United States in 19th century. Midwest development was explosive: between 1850 and 1910, wheat production multiplied by 11. The era of "bonanza farms" in states with significant railroad construction such as Iowa, Nebraska, Minnesota, the Dakotas, and Kansas contributed, according to Fishlow calculations, to "almost half of the 200,000-bushel increment in the output of wheat between 1874 and 1884" (Fishlow, 2000:589). Bordo et al (2007:36) argue that railways made the greatest contribution to price convergence: "while the percentage decline in transatlantic costs was greater, in absolute terms it was the American railways that did most of the work in reducing price gaps between producer and consumer". The transport revolution reduced the spread between the Midwest (Iowa) and East coast (New York) from 69 to 19 percent between 1870 and 1910.

In Figure 5 we show how agricultural production in the Midwest (counting only wheat and corn) soared in comparison with the South's increase in output of those commodities plus cotton.

Figure 5. Agricultural production in the U.S. South and Midwest

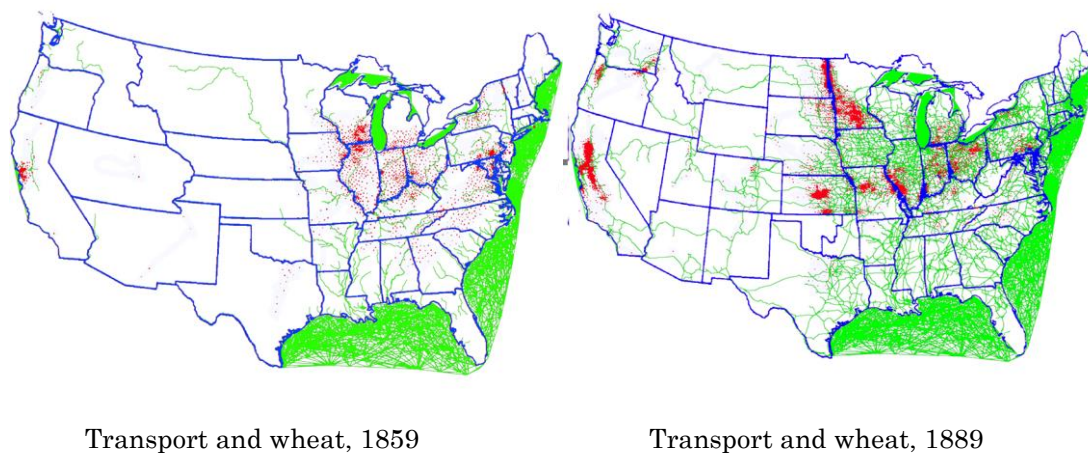


Source: see section 6, Data sources and technical notes

Cotton development in South performed modestly compared to wheat and corn in Midwest. The American South had met in the antebellum period the conditions under which the cotton plant thrived – with the proper climate conditions, large supplies of land, slave labour and a political system able to enforce the production relations (see Beckert, 2014). But after the War the South was past its prime economically, too. In the fifty years after 1860 cotton grew at 0,8% yearly while Midwestern crops did so at 2.9%.

The association between railways and high-volume cereals can be seen in the following maps. Green lines are principal canals natural waterways and railroads calculated by Donaldson and Hornbeck (2013). Each red dot represents 100,000 bushels (extracted from Atack et al., 2000: 256). To the left, prior to the construction of the main railway system, wheat production was more scattered along the map and closer to Lake Michigan (1859). To the right, after the construction of most railroads (1889), wheat production multiplied and moved inland where a high productivity of land prevailed.

Figure 6. Waterways, railways and wheat



4. Conclusions

Deep, structural trends are sometimes the result of accidents. A main driver of the fate of primary producing regions in the Americas during the First Globalization was simply a very asymmetric technological breakthrough. The ample plains of the Canadian prairies, the U.S. Midwest and the Argentine Pampas had been barren lands for a reason: production, except for extensive ranching, was simply not economical there before railways. Conversely, the most dynamic economic action in the Americas under the previous transport technology had occurred either close to the coasts and/or in commodities with a value per kilo high enough to withstand the cost of transport from the interiors. Railroads didn't merely improve the profitability of agriculture: entire economies and societies were created in what were previously empty economic spaces. While the longer term development of those economies would depend on several other factors (among them, human capital accumulation and strong institutions to help them cope with the more difficult economic context of the wars and interwar years), during the First Globalization the main reason for their dynamism was their better material fitness to take advantage of the transport revolution.

5. Appendix

a. "Expor weight" and other selected variables

	Export weight (kilos/£)	Population, c. 1870	Populatoín, c. 1914	GDPpc 1910-13	Exports pc 1910-1913	Railways c.1914	Railways, meters per capita 1914
México	15.79	9219	14960	1706.2	2.05	19205	1.284
Argentina	72.87	1796	7885	3823.8	10.97	33510	4.250
Brasil	15.10	9797	24161	804.5	2.91	26062	1.079
Canadá	115.17	3781	8093	4218.5	9.09	42873	5.298
Chile	71.72	1945	3537	2951.5	8.45	8070	2.282
Colombia	37.96	2392	5330	1199.6	1.03	1166	0.219
Perú	16.18	2606	4384	994.0	1.86	1945	0.444
Venezuela	12.67	1324	2899	928	1.54	858	0.296
Midwest	141.57	12173	29,888	5092.2	8.07	151496	5.069
South	70.16	13179	29,389	2580.1	6.26	101816	3.464
Mex ex Yuc	0.01	8894	14,620	1680.0	0.89	18287	1.251
Mex Yucatán	98.03	325	340	2832.3	7.10	918	2.703

Source: see section 6, Data sources and technical notes

b. Shares in exports and average "export weight"

	Kilos per pound	South	Midwest	Arg	Canada	Colombia	Chile	Brazil	Mexico	Peru	Ven
Corn	154.3	35	73	22.7							
Wheat	107.2	5	27	29.0	34		6				
Cotton	18.0	60						2.3		11.6	
Hides	11.4			15.3		7.25					4.4
Wool	9.8			17.9						5.6	
Lino	24.0			13.4							
Timber	257.0				26.5	3.60					
Cheese	19.8				14						
Bacon	20.6				4.4						
Flour	68.1				10.2		4				
Gold	0.0					23.70			31		7.6
Coffe	21.0					43.10		53			57.9
Bananas	541.3					3.35					
Tobacco	12.3					5.65					
Nitrate	69.5						90				
Sugar	40.3							1.5		20	
Rubber	11.8							25		19.3	
Silver	0.0								52	15	
Henequen	98.0								16.1		
Copper	12.9									24.7	
Cocoa	21.4										13.2
Others		0	0	1.66	10.9	13.35	0	18.2	0.9	3.8	17
Total		100	100	100	100	100	100	100	100	100	100
Average weight, sample		70.16	141.57	72.87	115.17	37.96	71.72	15.10	15.79	16.18	12.67

Source: see section 6, Data sources and technical notes

6. Data sources and technical notes

a. Country/Region Data

Argentina

GDP, Population, Immigration, Products & Export Volumes; Ferreres, Orlando; "Dos Siglos de Economía Argentina", page 611, 636, Ed. El Ateneo, Bs. As., 2005.

Export Value; Cortés Conde, R.; "El Progreso Argentino 1880-1914", page 90, Ed. Sudamericana, Bs. As., 1979.

Exports & Imports; Global Financial Data.

Export Values; Vazquez Presedo; "Estadísticas Históricas Argentinas (comparadas). Primera Parte 1875-1914", pages 69, 71, Ediciones Macchi, Buenos Aires, 1971.

Railways; Vitelli, Guillermo "Los Dos Siglos de la Argentina", page 136.

Wheat; Adelman, Jeremy; "Frontier Development", page 2, Clarendon Press, Oxford, 1994.

Wheat Exports (thousands of tons*); Vazquez Presedo; "Estadísticas Históricas Argentinas (comparadas). Primera Parte 1875-1914", page 84, Ediciones Macchi, Buenos Aires, 1971.

Brazil

Population, annual series Global Financial Data

Exports as % GDP; Cárdenas, Ocampo y Thorp (comp.); "An Economic History of Latin America (Vol. 1)", página 35, Palgrave, St Antony's College, Oxford.

Price and Quantities Index, Terms of Trade & Railroad; Randall, L., "A Comparative Economic History of Latin America 1500 - 1914", University Microfilms International, 1977.

Total Exports and Imports; Global Financial Data

GDP; Maddison 2006

Canada

Products (major) (up to 1906); Canada Year Book 1906, pp. 174-177 & 179.

Products (major) (1902-1906); Canada Year Book 1906, pp. 234-260.

Products (major) (1907-1911); Canada Year Book 1906, pp. 42-47.

Products (major) (1907-1911); Canada Year Book 1906, pp. 101-109.

GDP and Population; Maddison 2006.

Prices and Quantities Oats / Wheat (Canada Yearbook 1911):

www.statcan.ca/english/freepub/11-516-XIE/final_pdf/english/series.pdf

Chile

Population, Exports & Imports Global Financial Data.

Flour, Wheat, Nitrates & Km. Railway; Cortés Conde y Hunt (ed.) "The Latin American Economies", pags. 180, 186, 206, 214, Holmes & Meier Publishers, United States, 1985.

GDP; Maddison 2006.

Colombia

Exports (gold & goods) and imports from McGreevey; "An Economic History of Colombia", pages. 99 & 210.

Population; from 1850 to 1899 & 1905 & 1912, Ocampo (compilador) "Historia Económica de Colombia", page 120, 1900 to 1914 (except 1905 & 1912) Maddison.

Km. Railway; McGreevey "An Economic History of Colombia", page 256.

GDP; Maddison 2006.

Mexico

Population, Exports & Imports; Global Financial Data

Km. Railway; Coatsworth; "El impacto económico de los ferrocarriles en el porfiriato", Ediciones Era, México, 1984, páge. 36

Exports; "Estadísticas Económicas del Porfiriato", El Colegio de México, 1960, pages 152, 154, 390, 456-458.

Peru

Exports from Thorp and Bertram; "Perú 1890-1977. Growth and the policy in an open economy", The MacMillan Press Ltd., 1978, pages 27, 40, 330, 334.

Population, Exports and Imports from Global Financial Data

Km.Railways from Randall; "A Comparative Economic History of Latin America 1500 - 1914", University Microfilms International, 1977, page 197.

Note: there is a difference in total exports according to Global Financial Data and data from Thorp and Berthram Op. Cit.

United States

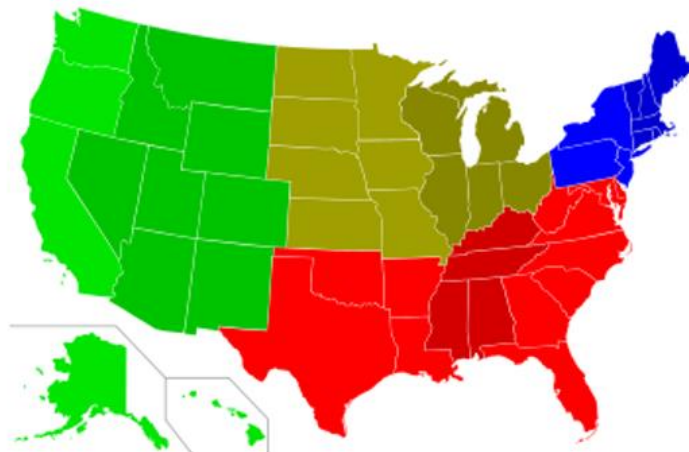
Regions according to this map:

The West consists of 2 divisions called Pacific and Mountain.

The Midwest consists of 2 divisions called West North Central and East North Central.

The South consists of 3 divisions called West South Central, East South Central, and South Atlantic.

The North East consists of Mid Atlantic and New England.



GDP: calculated as income share by Easterlin (1960) of GDP per capita by Maddison 2006.

Population: page 68 at

<https://www.census.gov/population/www/documentation/twps0081/twps0081.pdf>

U.S. Midwest

Quantities in selected products from Figure 5: only wheat & corn.

For corn & wheat, in million of bushels (and then to current USD), between 1880-1910
http://www.agcensus.usda.gov/Publications/Historical_Publications/1920/Individual_Crops.pdf

Then, for 1850-1880, "Agriculture of the United States in 1860: Compiled from the Original Returns of the Eighth Census, Under the Direction of the Secretary of the Interior"

Railways: Page 478, Statistical Abstract of the United States, 1942.

U.S. South

The South consists of 3 divisions called West South Central, East South Central and South Atlantic.

GDP: calculated as income share by Easterlin (1960) of GDP per capita by Maddison 2006.

Population: page 68 at

<https://www.census.gov/population/www/documentation/twps0081/twps0081.pdf>

Quantities in selected products from Figure 5: Only cotton, corn and wheat.

For corn & wheat, in million of bushels (and then to current USD), between 1880-1910

http://www.agcensus.usda.gov/Publications/Historical_Publications/1920/Individual_Crops.pdf

Then, for 1850-1880, "Agriculture of the United States in 1860: Compiled from the Original Returns of the Eighth Census, Under the Direction of the Secretary of the Interior"

For cotton, in million of bales (and then to current USD dollars), between 1850-1910 "Twelfth Census of the United States, taken in the 1900 (Agriculture, Part II, Crops and Irrigation)". Then, after 1900, page 839, Agriculture Census of 1920, Chapter XII "Individual Crops".

Note: For the entire series, Texas was excluded (for data before 1880 of Texas: Handbook of Texas Online, Karen Gerhardt Britton, Fred C. Elliott, and E. A. Miller, "Cotton Culture," accessed July 17, 2016, <http://www.tshaonline.org/handbook/online/articles/afc03>).

Railway: Page 478, Statistical Abstract of the United States, 1942.

b. Definitions

Kilos per British Pound: is the inverse of the commodity price circa 1850, all converted to kilograms. Prices were taken from "Commodity Price Volatility and World Market Integration since 1700" (Kevin H. O'Rourke and Jeffrey G. Williamson) *Review of Economics and Statistics* 93(3), 2011: 800-813

<http://www.sfu.ca/~djacks/data/publications/publications.html>

The price of gold was taken from http://www.nma.org/pdf/gold/his_gold_prices.pdf

The price of cheese was approximated using the price of butter.

The price of henequen from

Countries shares: In the above table, each cell indicates the i -share of the exported product circa 1914. For example, take Argentina: it's says that 15,4% of the total exports was corn, 26% wheat, 15% beef, 21% wool, etc.

Export Weight = \sum Kilos per British Pound of the i -commodity \times Country Share i -commodity

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