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International Competition in the First Wave of Globalization:

New Evidence on the Margins of Trade

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We pose a seemingly ageless question in economic history. To what extent did new entrants in the late nineteenth-century cotton-textile industry endanger the customary markets of the European core? Exploiting a newly constructed data set on textile imports to Spain, we find that as trade costs fell new rivals began to sell a greater variety of products. Along this dimension, competition can be said to have increased. In response, producers in the European modified the type and number of goods exported. By 1914, specialization mapped onto endowments of skilled labour, capital, and access to raw materials. While firms in new industrializing countries exported low-end varieties, incumbents in the core shipped high-end goods, unit values increasing with levels of development.

Key words: globalization, cotton-textile industry, Spain, international trade models with heterogeneous firms

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The long debate on the supposed failure of the British cotton-textile industry, and the decline of the European industry more generally, seems to have reached closure. The question ‘why Lancashire failed’ has been turned on its head. In recent studies, the puzzle to be explained is how the industry, despite the challenges of low-wage competition, continued to prosper into the twentieth century. To Clark, the answer lay in the inferior effort levels of low-wage labour: to Broadberry and Marrison, and Crafts and Wolf, Lancashire prospered because of the benefits induced by agglomeration, its productivity advantage procuring long years of export success.<sup>1</sup> As for continental manufacturers, their longevity was based on niche markets for medium and high-value goods.

The literature tends to draw a direct link between industry size, productivity, and export success. There is theoretical support for this line of reasoning. A Krugman-type international trade model predicts that large countries produce and export more varieties, and that countries will export to all markets, if they export to any markets in a category. But this is in fact where the model breaks down.<sup>2</sup> The number of varieties exported by large countries in the current wave of globalization is incommensurate with their size, productivity, or levels of development. Business and economic historians of the first wave would concur. Even the largest and most successful producers, France, Germany, and the UK, fared better in some markets than others and, across destinations, the range of goods they sold varied considerably.<sup>3</sup>

This paper gives a novel perspective on international competition in the cotton-textile and related industries. We do so in two ways. First, we introduce explicitly barriers to international trade that drove a wedge between technological leadership and exports. The fixed and variable costs of selling abroad were not trivial and they varied by market and by item. There was a threshold below which unproductive firms did not export.<sup>4</sup> The collapse in trade barriers altered the competitive landscape. To be certain, productive firms continued to thrive, but the decline in trade costs prompted other firms, which were previously shut out from foreign markets, to enter trade. As a result, the number of countries engaged in international trade rose, as did the range of

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<sup>1</sup> Clark, ‘Why isn’t the world developed’; ‘Broadberry and Marrison, ‘External economies’; Crafts and Wolf, ‘Location of UK cotton’.

<sup>2</sup> Krugman, ‘Imperfect competition’; Hummels and Klenow, ‘Variety and quality’, p. 705, remarked that the Krugman model is ‘strikingly at odds with the evidence’.

<sup>3</sup> Marrison, ‘Indian summer’, summarizes the British case, for Germany, see Brown, ‘Imperfect competition’; on France, Becuwe, Blancheton, and Charles, ‘Decline of French trade’.

<sup>4</sup> This is the starting point for new trade models with heterogeneous firms. See Melitz, ‘Impact of trade’. For a primer, see Bernard et al., ‘Firms’. Krugman models a representative firm having variable trade costs only.

goods exported. The result was a patchwork in trade patterns. Because trade costs were idiosyncratic, specific to trading pairs and to the type of goods, productive concerns did not ship their items everywhere, and even less productive firms achieved a foothold in foreign markets.

Our second contribution is at the level of detail we study international trade. Conventional histories of international competition, using coarse or aggregate data, rely on trade shares to indicate export success, a measure that can obscure the nature and sources of competition.<sup>5</sup> We introduce the numbers of new entrants and new products as dimensions of competition in foreign markets.<sup>6</sup> Exploiting finer or granular trade data, we decompose the change in trade into its two margins. At the most general level, the extensive margin is the increase in trade attributed to new partners and varieties; the intensive side is the increase in trade resulting from the contribution of established countries and products.<sup>7</sup> Contemporaries interpreted the expansion in goods as a sign of the new capacities of producers around the world to innovate, a harbinger of changes in the competitive landscape, even if the value traded did not increase measurably in the short term. The upshot is that what you export mattered as how much.

We study the effects of declining trade costs on the margins of trade through the prism of a new dataset on Spanish imports of cotton textiles and related goods.<sup>8</sup> We ask whether the decline in trade costs which enabled the entry of new products and new exporters attenuated the initial advantages accruing to producers in the European core because of their superior levels of productivity. We answer in the affirmative. We then proceed to explain how incumbents responded to the challenges posed by declining trade costs.

Why Spain? Aside from data availability, it was a representative middle-income country with a large domestic market. The country had a sizeable textile industry of its own. To be sure, custom barriers safeguarded the industry, but differences in tariff protection between Spain and the rest of Europe were more a matter of degree than of design. And while textile imports

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<sup>5</sup> According to Leamer, *Craft of economics*, pp. 114-16, the level of aggregation dictates the framework of study. ‘The problem of aggregation has to be one of the biggest headaches confronting anyone who studies international comparative advantage’.

<sup>6</sup> Aside from their significance for the study of competition, an increase in product varieties means greater choice for consumers and producers. In this paper, we focus on the increase in the number of varieties as a measure of heightened competition.

<sup>7</sup> We offer formal definitions of the extensive and intensive margins below.

<sup>8</sup> Tena-Junguito, ‘New series’, reports that Spain’s degree of openness doubled between 1870 and 1914, much of the increase occurring in the first half of this period which was then followed by a period of levelling off; on Spain and globalization, see Sabaté, Fillat, and Gracia, ‘The protectionist backlash’; Prados de la Escosura and Rosés, ‘Sources of growth’, on Spain’s general economic performance in the period.

comprised a small fraction of the value of total Spanish consumption, outcomes were not the same as processes. Hardly remote or landlocked, the industry's fortunes, at least in manufacturing, were tied to the international context. In markets for cotton textiles, Spain exported and imported different items with countries of varying sizes and levels of productivity.<sup>9</sup> By the mid nineteenth century, the movement of Spanish textile prices corresponded to that of international goods.<sup>10</sup>

The country had several additional features that provide insights on international competition before 1914. First, it had and lost Empire. Imperial connections are believed to have reduced trade costs for the metropolis.<sup>11</sup> Conversely, the end of Empire lowered trade barriers of rivals, entry in the Iberian market being considered the first step in a larger strategy of gaining access to Spain's former overseas colonies. The second feature was that the tariff structure which relied on specific duties was typical of that found in other parts of continental Europe. As elsewhere, Spain initiated substantive changes in commercial policy in the period, the so-called backlash to globalization. But given the nature of tariffs, the change in commercial policy had different implications for the relative prices of imports of high and low-end goods.<sup>12</sup> The response of established and new entrants to tariff changes provides a window on the innate strengths and weakness of different exporters, the role of trade costs, and, more generally, the nature of product-variety competition in international trade before 1914.

We find that trade costs accounted for roughly 40 per cent of the value of trade, the remainder being due to the innate advantages of exporters, such as market size, productivity, and level of development. As trade barriers fell, new entrants shipped new and established goods. Along this dimension, global competition can be said to have intensified. Belgium and Switzerland, as did the US, expanded their presence, because they were the most productive of newcomers and overcame obstacles to trade. However, other competitors had only partial success in increasing average sales, because of their lack of experience in marketing and distribution. Nonetheless, the emergence of new exporters and new products in markets like Spain was

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<sup>9</sup> In 1913, trade in manufactures comprised about 35 % of European trade, the share of cotton textiles being about half of this figure. Findlay and O'Rourke, *Trade and empire*, p. 412; On Spain's participation in intraindustry trade, see Kertesz, *Die Textilindustrie*.

<sup>10</sup> Prat-Sabartés and Soler, 'Weaving the Network', p. 227.

<sup>11</sup> Mitchener and Weidenmier, 'Trade and empire'. On Spanish imperial trade, Prados de la Escosura, *De Imperio a Nación*.

<sup>12</sup> On the importance of specific duties in Europe, see Tena-Junguito, Lampe, and Tâmega Fernandes, 'Trade liberalization', pp. 724-26; Bairoch, 'European trade policy,' pp. 52-3.

perceived as a challenge to established industries in the European core, as well as to local producers, let alone because comparable waves of entry occurred in other destinations.

The response of established producers to the new competitive order varied. Whereas British producers retreated from the Spanish market, the French, Germans, and to a lesser extent Belgians and Swiss, drew on their innate capacities and upgraded the quality of goods they sold. Spanish manufacturers were not insulated from these changes. All manufacturers seem to have narrowed their product ranges in line with endowments of capital, skilled labour, and raw materials, an outcome that was mediated by exporters' abilities to overcome trade barriers. The surprising US performance turned on its high productivity and its capacity to reduce trade costs. Overall, by 1914, a new pattern of exports had emerged that was shaped by technology and geography.

The paper is organized as follows. We first present a portrait of the global cotton-textile industry, levels of productivity and the trade costs of conducting business in Spain. We then consider the entry costs posed by the Spanish domestic industry and commercial policy. Next we introduce our data source and information on trading partners, and the number and type of products imported. We proceed to estimate the contributions of the extensive and intensive margins in total imports, before turning our attention to the response of firms in the European core to the new entrants and changes in commercial policy. We conclude with some implications of our findings for the history of international trade before 1914.

## I

The main lines of the development of the global cotton-textile industry are well known to economic historians. Table 1 presents a snapshot of industries around 1914. The industries are ranked by their number of spindles. The British industry commanded a greater proportion of workers, spindles, and looms than its share in world GDP dictated (columns 1-7). In Marshallian fashion, Lancashire's competitive edge was based on the agglomeration of a deep pool of skilled labour, merchants, bankers, insurance agents, and satellite industries in and around Manchester.<sup>13</sup> While Lancashire exploited almost exclusively spinning mules, the US industry achieved high

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<sup>13</sup> Broadberry and Marrison, 'External economies'; also, Crafts and Wolf, 'Location of UK cotton'.

productivity using ring frames.<sup>14</sup> Wages were lower on the European continent, but so was productivity (column 8 and 9). Into the 1880s, France and Germany, which also relied on mules, did not pose a threat to Lancashire's supremacy in Europe, their industries being more dispersed than that of the British, but they did benefit from 'home-market' effects associated with scale.<sup>15</sup> By the turn of the century, the French and Germans had begun exploiting foreign niche markets for their own brand items. Intra-European trade was the mainstay of continental producers (column 11).

It would be rash to conclude, however, that export activity was increasingly concentrated in the largest and richest domestic markets. The rankings in productivity did not map onto those of export performance. Whereas Britain was the world's leading exporter, its share of the European market was steadily declining.<sup>16</sup> Competition in Spain was representative. Lancashire's segment of the market was slightly less than its share of European exports (column 13). The French had fewer exports (columns 12 and 13) to Spain than elsewhere in Europe; the Germans seem to have had greater success, exporting twice as much as their continental share.<sup>17</sup> Manufacturers in large countries may have benefited from economies of scale, but small countries were clearly punching above their weight. Belgium housed one per cent of the world's spindles, but was responsible for 13 per cent of European exports, and less than 10 per cent of Spanish imports. Neither technological advance nor low-cost production guaranteed market access. The US representative in Barcelona provided an explanation of the poor fit between the size of industries and exports. 'England predominates in the trade in cotton fabrics and yarns, Germany in velvets, ribbons, and knit goods, and Switzerland in tulles and laces'.<sup>18</sup> On the demand side, firms had to expend resources on marketing and distribution in order to distinguish their brands from close substitutes, failing which they could see sales contract suddenly.

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<sup>14</sup> Leunig, 'British industrial success', compared US and British industries. Lancashire had superior productivity in mule spinning on all yarn counts; in New England, ring spinning had higher productivity on medium counts (no. 50s) and below.

<sup>15</sup> On geographical dispersion in Europe, see A'Hearn, 'Institutions', and Balderston, 'Economics of abundance'. A simple test of the presence of home-market effects in an industry is that exports exceed imports. For an application to Spain, see Rosès, 'Why isn't Spain industrialized'.

<sup>16</sup> For summary of the debate on the timing and causes of British decline, see Marrison, 'Indian summer'.

<sup>17</sup> The export figures to Spain in tab. 1 are from Kertesz, *Die Textilindustrie*, who uses a broader definition of textile goods than we have in the empirical sections of this paper. That said, Kertesz's estimates conform to ours, Germany being the leader in 1914, followed by the UK and France.

<sup>18</sup> Odell, *Cotton goods in Spain*, p. 12. The Belgian trade consul in Barcelona wrote similarly (*Recueil*, 1885, pp. 138-71).

Along with pressures to establish and expand market presence, developments in spinning technology before the end of the century eroded the hegemony of established manufacturers in their customary markets. Mule-spinning operations required a high-skill and high-wage workforce and inferior cotton, the combination of factors found in the European core (table 1 column 4). The mule's specialty was medium to fine-yarn counts. The diffusion of ring frames altered the competitive landscape. Commonly used in the manufacture of coarse grades, rings were dominant in the US, and in certain middle and low-wage economies in Europe and elsewhere, with certain exceptions like India. By the 1880s, improvements in ring frames, and to some extent mules, made possible a greater overlap in types of yarn spun.<sup>19</sup> It was in this period that Spain, as we discuss below, also adopted ring spinning. In foreign markets, medium and low-wage producers using rings, from Belgium and Italy through to Japan, began to expand sales. Although the quality of the new export lines was a continuous source of contention, these goods were price competitive. Belgium and Italy exported more than 40 per cent of their production of piece goods (column 10).

The decline in geographic barriers reconfigured the distribution of global production. Adopting the language of Eaton and Kortum, competitive advantage was the outcome of a 'race between technology and geography'.<sup>20</sup> Beginning in 1870, the fall in geographic barriers prompted a shift in manufacturing to large countries in the core because of their concentration of inputs, like skilled labour, raw materials, energy, and managerial talent. As trade barriers continued to shrink, manufacturing output increased in developing and newly industrialized countries and that of incumbents contracted. But while the trajectory in world production favoured low-wage producers, high-skill countries in the core could stave off competition if they proceeded to lower their trade costs, move up the product ladder, or improve technology. And even among low-wage producers there was pressure to reduce trade costs because of stiff competition from comparable manufacturers.

It is difficult to generalize about trade costs because they were not uniform across countries and products. Trade costs comprised fixed and variable components. Of the latter, the collapse in transport costs has been well documented. Shipping costs from Hamburg, Liverpool, and New York to Barcelona declined by about 30 per cent between 1870 and 1914, most of the

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<sup>19</sup> Saxonhouse and Wright, 'Technological evolution'; idem., 'National leadership'.

<sup>20</sup> Eaton and Kortum, 'Technology,' p. 1771.

change occurring before 1900.<sup>21</sup> Generally, landlocked and less developed countries did not share in the full extent of the decline in transport costs because of their poorer infrastructures. But all exporters benefited from the completion Spanish railway network and the expansion of the Barcelona harbor in the early 1900s, although countries with larger ships did gain more.<sup>22</sup> At the margin, these changes may have been decisive, but on average transport costs did not bulk large, Bairoch estimated that freight costs (overland and maritime) of manufactured cotton goods amounted to no more than 2 to 3 per cent of their value in 1910.<sup>23</sup>

More than transport, transaction costs varied considerably across exporters because they were discretionary. There were the sunk or beachhead costs of entry which included collecting primary information on local preferences and setting up marketing networks; the fixed costs of shipment, such as altering packaging to meet changes in demand, or converting prices and measurements into local units; and variable costs, in addition to freight rates, such as administrative fees.<sup>24</sup> Market information of this nature was often imperfect, and exporters had only an approximate idea of transaction costs before goods were actually shipped. Moreover, exporters could not always rely on local intermediaries, since Spain had ‘no large independent importers who buy goods in the best market...[O]rders come from dealers who style themselves as wholesalers and retailers, but who purchase in comparatively small quantities’.<sup>25</sup> Under these circumstances, exporters developed informal networks and nurtured personal relations with customers. To be sure, trade obstacles came down because of the extension of the most favoured nation (MFN) treaty network, the pegging of exchange rates, and empire connections, but, again, not all countries shared equally in these arrangements. Typically, the British trade delegate implored London to renew its trade treaty with Spain as to avoid an uneven playing field.<sup>26</sup>

Aside from their wielding their political muscle, exporters originating in big and rich countries had discrete advantages in reducing marketing and related costs. On the demand side, firms gained experience in catering to local markets for high-value goods. On the supply side, big

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<sup>21</sup> These figures are from Jacks and Pendakur, ‘Global trade’. They conclude that transport costs are ultimately related to changes in demand and supply. Our claim that all countries benefitted from the broader changes in transport costs which are comparable across countries at different levels of development. On the slower fall in trade costs after 1900, see Jacks, Meissner, and Novy, ‘Trade costs’.

<sup>22</sup> The British trade delegate to Barcelona recorded the size and type of boats that were permitted to unload. UK *Consular Reports*, 1902 (Cd. 786-160), p. 9.

<sup>23</sup> Bairoch, ‘European trade policy,’ pp. 56-7.

<sup>24</sup> On these type of fixed costs, see UK *Consular Reports*, 1900 (Cd. 1-44), p. 18.

<sup>25</sup> Odell, *Cotton goods in Spain*, p. 14. On informal networks in manufacturing, see Rauch, ‘Networks’.

<sup>26</sup> UK *Consular Reports*, 1887 (Cd. 4923-20), p. 13.



and rich countries had a talented pool of human capital to support the manufacture of goods across the quality spectrum. Because they were first on the ground, firms in the core had developed marketing channels and gathered information on tastes and customs, previous export experience having a recognizable effect on the probability of future activity in identical and new items.<sup>27</sup>

Still, there was great diversity in strategies across and within countries to manage trade costs. Exploiting the benefits of agglomeration, Lancashire firms tended to outsource retailing to merchant houses or resident buyers.<sup>28</sup> Refreshingly candid, trade delegates commented on their own poor language skills, the absence of weights in metric equivalents in catalogues, and the general failure to know the needs of clients.<sup>29</sup> On occasion the British allowed the local buyer to use his own private brand and have a say in the design and colour of the fabric.<sup>30</sup> This proved problematic because it jeopardized the Lancashire label. ‘In Barcelona the shops display so-called English wares which are imported from Germany and Belgium, so that superior English goods cannot be sold for the prices asked’.<sup>31</sup>

German firms had higher unit costs of production than the British, but they tended to be larger and vertically integrated which moderated, to some extent, the fixed costs of entry. Contemporaries commented on German investments in related party trade networks. They lauded the system of commercial travelers who had ‘thorough knowledge of Spanish’, taking special orders often considered too small by Lancashire standards.<sup>32</sup> They also provided financing, an exorbitant privilege generally untapped by rivals. As for France, in the wake of its trade war with Spain, shipments lapsed for several years after 1891.<sup>33</sup> Manufacturers, whose concerns were smaller on average than their German rivals, lambasted government authorities for their lackluster manner in engaging foreign-trade diplomats. French firms depended on their own

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<sup>27</sup> On hysteresis and trade, see Eichengreen and Irwin, ‘Role of history’.

<sup>28</sup> Farnie, ‘Role of Merchants’; Marrison, Broadberry, and Leunig, ‘Selling English cotton’. For a comparison of international marketing practices, including Spain, see Prat-Sabartés, ‘Between firms and market’.

<sup>29</sup> UK *Consular Reports*, 1900 (Cd. 1-44), p. 16.

<sup>30</sup> Pratt, *Cotton textiles*, p. 12.

<sup>31</sup> UK *Consular Reports*, 1887 (Cd. 4923-20), p. 2.

<sup>32</sup> Odell, *Cotton goods in Spain*, p. 14; Brown ‘Imperfect competition’, p. 512.

<sup>33</sup> The France-Spain trade war in the early 1890s pivoted on Spanish wine exports to France. The trade war led to the application of the maximum tariff by both parties. The trade war effectively ended the classic period of unconditional MFN treaties and the adoption of the stricter double tariff system. Fernandez, ‘Théorie et pratique’; Stone, ‘Double tariff’. For Spanish treaties before 1895, see Serrano-Sanz, *El viraje*, p. 49.

initiatives.<sup>34</sup> In general, French success leaned heavily on its reputation in selective brands, and, in the case of Spain, its close distance.<sup>35</sup> Unlike its major continental rivals, France shipped goods by rail.

In the absence of large domestic markets in which to develop and try out goods, small countries developed their own strategies to reduce trade costs. The Belgians extended credit like the Germans. More distinctively, they expended considerable resources in establishing a network of trade diplomats to gain intelligence about consumer preferences and business practices. By 1900, the Belgians had 25 delegates across Spain providing information to manufacturers.<sup>36</sup> At home, the Belgians deepened the port in Ghent, the hub of the local textile industry, and they had inside knowledge about the Spanish transport system because they oversaw the construction and management of several rail lines.<sup>37</sup>

Certain new entrants did not have the resources to expend on marketing or extending credit, and, as a result, the presence of some of their products was shortlived. In this regard, US trade was distinct, the probability of persistence being greater since firms had the resources to establish and develop marketing networks. The success of the US industry was built on its large domestic market. By 1914 around 10 per cent of production of southern mills was exported, the north shipping goods on a smaller scale.<sup>38</sup> Like other new competitors, firms tended to specialize in coarse and medium goods. Among new entrants, US mills had a productivity advantage, but exports were ‘greatly handicapped by lack of proper representation’.<sup>39</sup> Manufacturers depended on New York selling agencies that, in turn, relied on field reports of trade delegates. Goods were ‘made to stock’ and sold in a fixed assortment that was not subject to change. American factories stamped their goods with the mill brand.<sup>40</sup> This strategy made sense in markets in which US goods were unknown and had to be demarcated. Whereas distance remained a barrier, exporters benefitted from the large holds of U.S vessels and quality of packaging. Finally, US manufacturers took a long-term perspective. The fixed costs of entry would be attenuated since

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<sup>34</sup> On government support for French exporters, see Petitpas, ‘Industrie et industriels’, pp. 341-43.

<sup>35</sup> Becuwe, Blancheton, and Charles, ‘Decline of French trade’, report that, in the decades before 1914, French producers were increasingly shut out from long-distance trade, exports being directed to markets of close neighbours.

<sup>36</sup> Belgium, *Recueil*, 1903, p. 15.

<sup>37</sup> Belgium, *Recueil*, 1895, p. 144.

<sup>38</sup> Rose, *Firms, Networks*, p. 187

<sup>39</sup> Odell, *Cotton goods in Spain*, p.14. Unlike the British, American mills rarely gave exclusive agency to one importer, but sold to anyone who applied.

<sup>40</sup> Pratt, *Cotton textiles*, p. 12.

Spain was projected to serve as the basis for future expansion in Latin America.<sup>41</sup> Ever confident, the American trade consul in Barcelona forecast a bright future, because of the price competitiveness and the ‘superior quality’ of its products.<sup>42</sup>

## II

Exporters faced particular challenges in Spain because of the fluid domestic landscape. Offsetting the collapse in transport costs, was the rise in entry costs caused by exchange rate instability and shifts in commercial policy. Exporters also had to contend with a domestic industry whose shifting fortunes were altered by these same forces.<sup>43</sup> Highly concentrated in and around Barcelona, the industry was dominated by integrated spinning and weaving mills, many of which were small, employing a high proportion of women. Plagued by high-energy costs, low speeds of operation, and overstaffing, industry wages in 1910 were about half that of Britain’s (see table 1). Until the 1880s, Spanish firms relied on mules to manufacture medium counts. Thereafter, the industry adopted frames in increasing numbers.<sup>44</sup> Labour productivity was low into the Belle Époque. Still, while growth was incremental growth, the industry, if not vibrant, posed an obstacle to entry.

The local industry benefited from natural advantages, but their hold on domestic markets was incomplete. Financial institutions were not well developed and cotton manufacturers acted as their clients’ bankers.<sup>45</sup> Establishing a customer base could not be taken for granted. Although wholesalers visited Barcelona, Catalan manufacturers, following the German example, came to involve themselves directly in marketing goods via agents in the field.<sup>46</sup> In terms of both finance

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<sup>41</sup> Odell, *Cotton goods in Spain*, p. 15. The Belgians pursued the same strategy before the demise of the Spanish empire. They permitted Spanish firms to undertake the last stages of production before goods were shipped abroad (Belgium, *Recueil*, 1885, p. 169).

<sup>42</sup> Odell, *Cotton goods in Spain*, p. 14.

<sup>43</sup> On the fortunes of the Spanish cotton-textile industry, see Domenech, ‘Labour market’. For an optimistic view of the industry’s fortunes, see Nadal and Sudrià, ‘La controversia’.

<sup>44</sup> While technological change in mule spinning was on going, improvements in ring frames were more pronounced. Developed in Spain in 1913, the Casablanca’s method of drawing out fibres in preparation for spinning supported much higher levels of fibre control on ring frames than was previously possible. Saxonhouse and Wright, ‘National leadership’, p. 555, insist the ‘the impact of the innovation was still in doubt in the early 1920s’.

<sup>45</sup> Prat-Sabartés, ‘Textile trade’.

<sup>46</sup> Prat-Sabartés and Soler, ‘Weaving the network’.

and distribution, the practices of foreign and domestic firms appear to have converged. According to the Belgian consul, they often shared agents and distribution networks.<sup>47</sup>

Throughout the period, Spain, like other European producers, was both an exporter and importer of cotton goods. The trade balance in textiles was actually positive. The Spanish-American War was detrimental to the export trade. Certain producers specializing in printed and dyed goods rebounded from the collapse in sales to the Philippines and extended markets in Argentina—to the chagrin of the Americans.<sup>48</sup> But, overall, beginning in 1900, activity in the industry declined, a contraction that was exacerbated by the workers' strike of 1902. To some extent, imports from Europe filled the breach (table 2 and figure 2). Imports had risen in the late 1880s, falling in the 1890s with the devaluation of the peseta and the adoption of tariffs. Imports recovered in the early 1900s and continued to increase after the tariff changes of 1906. We return to the trends in imports below.

The industry demanded and received tariff protection to roll back the forces of globalization.<sup>49</sup> The backlash was only partial. Into, the 1890s, the drop in transport costs offset the increase in trade costs caused by the depreciation of the currency and the tightening of import tariffs.<sup>50</sup> Trade policy became more restrictive beginning with the tariff of 189 which increased protection across the board; the 1906 tariff adjustment was part of an industrial strategy to protect, ostensibly, the manufacture of high-value goods. The 1891 tariff did cut into imports, but that of 1906 had more mixed results, even as ad valorem rates amounted to as much as 30 per cent. The anticipation was that the restrictive commercial policy would give Catalan producers more leeway in the home market and they would begin to encroach on foreign competitors. The evidence on this score is mixed. On the one hand, the tariff was believed to have encouraged local mills to manufacture a wide range of goods on short production runs.<sup>51</sup> On the other, foreign products, owing to their name brands, retained a hold on markets. The US trade representative summarized the problem:

A close comparison of these [foreign] goods and the native zephyrs does not reveal any great difference as regards quality, weave, texture, and finish...Any existing preference for foreign goods

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<sup>47</sup> Belgium, *Recueil*, 1895, p. 144.

<sup>48</sup> Sudrià, 'La exportación', presents a pessimistic view of Spanish trade in Latin America. On the Argentinian revival, see Odell, *Cotton goods in Spain*, p. 15.

<sup>49</sup> On trade policy, see Sabaté, *El proteccionismo*; idem., 'La impronta industrial'; Serrano-Sanz, *El viraje*.

<sup>50</sup> This is the evaluation of Sabaté, Fillat, and Gracia, 'The protectionist backlash'.

<sup>51</sup> Odell, *Cotton goods in Spain*, p. 22.

would seem to be founded on prejudice and a feeling that articles from abroad possess a particular excellence rather than on any real difference in quality.<sup>52</sup>

The presence of foreign varieties cast a long shadow on the local producers, despite the tariff wall. Moreover, foreign competitors, to anticipate our findings below, responded to changes in commercial policy, altering the mix of goods they shipped. At issue was the nature of the tariff itself. Since duties were specific, a general tariff adjustment like that of 1891 was the equivalent to an equal rise in transport costs across the product spectrum, thereby affecting low-value items disproportionately.<sup>53</sup> The designers of the 1906 tariff seemed to be aware of this, because they introduced new categories of goods, all categories having a new higher specific rate. But the changes in 1906 were insufficient.<sup>54</sup> Thus, the new tariff schedule embedded the paradoxical effect of changing relative prices in favor of more expensive items, and, as a result, new entrants shipping mainly low-end items assumed the burden of the tariff. As for the Spanish industry despite the lofty intentions of its architects, the tariff lowered trade barriers and intensified competition at the high end.

### III

Our objective in the remainder of this paper is twofold. First, we appraise whether the challenge posed by new entrants and new products caused by the collapse in trade costs was real or imagined; second, we evaluate how established manufacturers in the European core responded to the new competitive threat and how they adjusted to the increase in trade costs related to the tariff of 1906. To address these issues, we constructed a granular dataset taken from the *Estadísticas de Comercio Exterior de España* which gives information on products traded, countries of origin and shipping, and prices.<sup>55</sup> The product information provides more detail than the 5-digit level of the Standard International Trade Classification. For instance, we have information on cotton woven (printed) fabrics, containing more than 85 per cent cotton, and weighing less than 200 g/m, which are embroidered (our category 24), embroidered with a mixture of metal (25), and embroidered in relief (26). The SITC code for all three is 65234; we

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<sup>52</sup> Ibid, p. 11. Tena-Junguito, ‘Tariff history’, finds little evidence that the 1906 tariff had infant-industry effects.

<sup>53</sup> This is the classic Alchian-Allen result. For an exposition, see Hummels and Skiba, ‘Shipping’.

<sup>54</sup> Sabaté, ‘La impronta industrial’, gives examples. Thus, for unprinted and unbleached white or dyed textiles, the equivalent ad valorem 1906 tariff was 42 % for coarse grades, and that for the medium grade, 39 %.

<sup>55</sup> Our work expands on that of Tena-Junguito, ‘New series’.

consider each a separate item so as not to lose information on product types. The appendix gives full details on products and countries.<sup>56</sup>

The data have several flaws. For the entire period, we have information on the number of products and countries involved in trade. However, before 1897, with the exception of the period from 1885 to 1889, authorities conflated the import good's origin and country of shipment. Thus, we restrict our study at the country level to the period 1885-1889 and after 1897. Second, with the adoption of the 1906 tariff, the Spanish authorities added several new product categories and changed demarcations of older products. To address this problem, we have standardized the classification across periods (pre- and post 1906). All together, we have 90 potential import categories until 1909, and 100 from 1910 to 1913, and 40 possible trading partners. In this paper, we use both a crude 14-group classification and a finer 100-product classification. A complete listing of items in the 14 product groups is given in the appendix.

The price information poses a different sort of problem. The custom officers gave identical prices to imports from all countries. To calculate unit values, we divided export values by physical quantities (in kg) of the 90 or 100 items.<sup>57</sup> To obtain annual average unit values per country, we weighted the prices of items by the export share of each item per year. For some purposes in this paper, and using the same procedure, we also construct average unit values by country per year based on the 14-group classification. We recognize the limits of our series, but our method conforms to modern studies, and the trend in prices mirrors that reported for Belgium, Germany, and the UK.<sup>58</sup>

Figures 1 and 2 trace the evolution of aggregate imports and the numbers of exporting countries and products, the extensive margin.<sup>59</sup> To be clear, these are net entries of products and countries. Total imports contracted after the 1891 tariff, with the bottom in 1898. In the aftermath of the 1906 tariff, the real value of imports increased, even as the quantity shipped showed a

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<sup>56</sup> The SITC codes in the app. are from Revision 4. As a check on our procedures, we compared import figures from our Spanish source with export values for Belgium. In the case of cotton yarn, category 2 in the app., the difference in volume between 1900 and 1910 never exceeded more than 10 per cent.

<sup>57</sup> More precisely, we calculate values by country  $j = \frac{\sum_{i=1}^n (p_i * q_i)}{\sum_{i=1}^n q_i}$ , where  $n = 90$  or  $100$ , or the number of items included in each 14-group classification.

<sup>58</sup> For German and the UK, see Brown, 'Imperfect competition'; for Belgium, Huberman, *Odd couple*; Halak, 'Product quality', is a recent study. As a check, the import price index for Spain moves in the same direction. It doubled from 1890, the terms of trade moving decidedly against the country (Tena-Junguito, 'New series', pp. 34-5). Because duties were based on quantities, the degree of protection decreased when imported goods rose in price.

<sup>59</sup> For 1880-1884 and 1890-1896, we infer the number of countries of origin using the ratio of number of countries of shipment to number of countries of origin after 1897 (which was stable).

more modest improvement. The breakdown into products and countries provides a clearer picture of the shifting in the market. In line with the greater fall in transport cost before the end of the century, the number of countries participating in trade increased in the 1880s, from 11 to 23 partners, after which the number stabilized. The number of foreign goods rose from 20 to 45 between 1880 and 1890, peaking at 65 in 1906. The partial shutdown of the Spanish industry because of the 1902 worker's strike seems to have caused a spike in the number of varieties imported. The effects of the tariff varied, a point that we stress below. The 1891 tariff reduced the number of countries implicated in trade; that of 1906 reduced the number of products. Fluctuations of this type in the extensive margin of products and countries are consistent with changes in the fixed costs of entry.<sup>60</sup>

By 1900, Spain imported from a range of high and low-income countries. Table 2 gives the relative shares of exports by country. The UK was the leading exporter until 1908, when it was replaced by Germany. Contemporaries' flattering commentary on German linguistic skills, financing, and overall abilities to nurture commercial relations seems to have been on the mark. The relative share of Swiss and French imports more than doubled. The UK, Germany, France, and Switzerland shipped the most popular items, cotton yarn (categories 1-6 in the appendix), and cotton woven fabrics, printed and plain (categories 7-14).<sup>61</sup> Big and rich countries, it would seem, exported larger volumes of each good, but not necessarily in proportion to their size and wealth. The effects of technology and geography are difficult to separate in these cases. France's expansion seems to have based on investments in new equipment and its close proximity.<sup>62</sup> Export success of all firms, even productive ones, was conditional on their ability to manage trade costs. Consider the Belgium example. The country doubled its share of Spanish exports, even though there were few large firms in its industry and industry productivity stagnated. Still, the country underwent a major trade boom. Plummeting trade costs, caused by, among other factors, investments in the country's rail grid and port facilities, and the development of an extensive diplomatic network, were an important part of the story.<sup>63</sup>

Table 3 gives number of goods by country. Once established, countries shipping more than five separate items, with the exception of Puerto Rico, maintained their presence. The persistence

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<sup>60</sup> On the fixed costs and the extensive margin, see Dutt, Mihov, and Van Zandt, 'The effect of the WTO'.

<sup>61</sup> From 1905 on, the most popular items were cotton gauze, tulle, and lace (categories 39, 61, and 69). The leading exporters of these items were France, Germany, and Switzerland.

<sup>62</sup> On French investments in new equipment, see Petitpas, 'Industrie et industriels', p. 373.

<sup>63</sup> Huberman, *Odd couple*.

of commercial ties is typical of markets with substantial trade costs.<sup>64</sup> The availability of US goods during the Spanish-American War is a particular example of perseverance. There was greater volatility in the number of products each country sold. With imperfect information, a firm may have entered export markets, incurred beachhead costs, and exited shortly after evaluating its per-period fixed costs.<sup>65</sup> Big and rich countries sold a greater number varieties, although again, not in proportion to their size and wealth. One possible explanation of table 3 is that for established exporters product diversification over time had a U-shape: an early phase of specialization, followed by diversification, and, finally, a return to specialization.<sup>66</sup> Perhaps a more compelling reading of the table relates the downward trend in products to the adoption of the 1906 tariff, the number of goods declining from 65 to 39 by 1913 as trade costs increased. Before the tariff, France exported a variety of products, from coarse and fine yarn to printed fabrics (categories 1-6 in the 14 product grouping in the appendix). But the number of products peaked in 1906, firms concentrating in a narrower range of high-end goods, mainly laces, tulle, and high end printed fabrics (categories 4, 9, 10). Among low-wage countries, the number of products exported by Italy and Portugal also topped out around the enactment of the 1906 tariff.

The arc of US exports was different. The number of categories expanded throughout the period. In 1897, it exported mainly coarser materials, like cotton yarn and unbleached woven fabrics (categories 1 and 2), but by 1914 the country was also exporting cotton gauze, and a variety of miscellaneous goods, including hunting nets and hammocks, textile wall coverings and fabrics, and painting canvases (categories 6 and 14). Was it technology or geography driving US exports? The answer is both. The US industry was characteristically on the technological frontier. The fall in trade costs relaxed the ‘tyranny of distance’, manufacturers making their first successful inroads abroad. The tariff increase of 1906 did not cause a decline in varieties sold. The US industry had other margins of adjustment, like larger shipping holds and improved packaging, and they also signed a special trade treaty.<sup>67</sup>

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<sup>64</sup> Besedeš and Prusa, ‘Ins, outs’, refer to this pattern as negative duration dependence, meaning that if a country is able to survive in the exporting market for the first few years, it will face a very small probability of failure and export the product for a long period of time.

<sup>65</sup> Besedeš and Prusa, ‘Extensive and intensive margins’.

<sup>66</sup> Imbs and Wacziarg, ‘Stages’, reported a similar pattern for a large sample of exporters after 1945. They surmised that, in the initial stage, specialization provided a foothold in foreign markets; an intermediate stage of diversification was the outcome of broader productivity change in the exporting country; the final phase saw a return to specialization as a result of agglomeration economies.

<sup>67</sup> Stone, ‘Double tariff’. See app.



The relationship between the number of varieties shipped and level of development evolved over the period. To see this, we divide exporting countries into low, middle, and high-income countries in figure 3.<sup>68</sup> (The US is included in the high-income group.) While big and rich countries (High Wage in the figure) exported exclusively the largest number of varieties, relatively poorer countries began exporting many of the same types of goods. The exclusive exports of the club of poor countries (Low Wage) were few. But the overlap in products was increasing. In 1900, low and high-income countries (LMH) exported 25 per cent of all varieties; by the end of the period, the figure was 35 per cent. By this yardstick, global competition between countries was real and intensifying.

In response to competition in similar product lines (horizontal differentiation), producers sought to improve the quality of goods exported (vertical differentiation). Big and rich countries sold a larger volume of each item and a greater variety of products, and they also shipped goods of higher quality. Figure 4 tracks the annual unit values of exports by country. Although these measures do not provide information on upgrading within product categories, they are a reasonable proxy for average quality. The top panel depicts the rivalry between Germany and France in more expensive goods, a development that was already in place before the adoption of the 1906 tariff. Since these countries had high productivity on spinning mules, it is reasonable to assume that the increase in prices reflected an improvement in quality. Specialization was fluid. Belgian firms initially exported cheap goods, but by 1913 emerged as producers of higher quality items. The bottom panel confirms that Portugal, Italy, and the US sold low and medium quality goods whose value was about the same at the beginning and end of the period.<sup>69</sup> These goods resembled those manufactured by Spanish industry. The outlier was the UK that, despite its early start, or perhaps because of it, specialized in a range of medium-value goods.

The emergence of new products and new competitors, along with the movement to higher-valued imports, had ramifications for Spanish producers. As firms installed ring frames, itself an outcome of international forces, the range of products narrowed. The accounts of several leading manufacturers reveal a history of increased specialization in the face of competition. La España Industrial, a large firm whose early reputation was based on the wide range of its product line, began installing ring frames in 1887. Within ten years all yarn was spun on rings, the proportion

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<sup>68</sup> Our approach follows Schott, 'Across-product'.

<sup>69</sup> To illustrate, France's chief export in 1910, lace, commanded a price of 14.10 pesetas per kg; the leading US export was unbleached woven fabrics at 6.12 per kg.

of nos. 15-24 in total production rising from 30 to 90 per cent between 1890 and 1913.<sup>70</sup> At the same time, the range of products contracted. Corduroy comprised 3 per cent of production around 1900; by 1912 it was in the order of 50 per cent. The story was not much different at La Fábrica la Rambla, a large Catalan business adopting ring frames around 1895.<sup>71</sup> For many years, the firm manufactured a wide range of white and coloured textiles for sheeting, but the years after 1909, in the aftermath of the tariff revision—a development we explain more fully below—saw a concentration in patterned towels. The average price of the firm's goods fell considerably, by about 30 per cent around 1890, after which prices moved in a very small band. In the face of competition, both firms made a concerted effort in establishing networks of sales agents across Spain.<sup>72</sup> Overall, the collapse in trade costs prompted greater specialization of Spanish producers in low to middle-end items, with the result that some domestic varieties were displaced by imports.

#### IV

So far we have documented the emergence of new products and new exporters in the Spanish market. In this section, we consider how trade costs affected trade via the margins of trade. To do so, we decompose the value of trade into intensive and extensive margins.<sup>73</sup> Since our data are limited to countries and products, we study the extensive and intensive margins at the country level. For this exercise, we define the extensive margin as the relative importance of each exporter's good set relative to that of all other exporters; the intensive margin as the size of each country's export share relative that of its rivals. Our analysis proceeds in two steps. We first provide estimates of the size of the two margins; we then study their determinants.

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<sup>70</sup> These figures are calculated from Calvo, 'Estrategia'. p. 255.

<sup>71</sup> This paragraph draws on Soler, 'Réditos'; idem., 'Estratègies?'; and Prat-Sabartés and Soler, 'Weaving the network'.

<sup>72</sup> Unfortunately, information on Spanish exports is not as detailed as that for imports. According to the trade accounts, the proportion of specialized dyed and printed goods rose from 1900 on at the expense of more broadly defined white goods.

<sup>73</sup> The unit of analysis in recent 'new trade theory' is the firm. In essence, a new product can be thought of as a new exporting firm. Thus, the decline in trade costs is observed in the entry of new products of established countries and in new products of new countries. This procedure follows Lawless, 'Deconstructing gravity', and Dutt, Milhov, and Van Zandt, 'The effect of the WTO'.

We use the methodology of Hummels and Klenow to derive estimates of the two margins for 1900 and 1910.<sup>74</sup> The method of calculation is described in detail in the appendix. Our expectation is that the extensive margin of big and rich core producers was large, but that the decline in trade costs would have precipitated an increase in the extensive side of new exporters as well. The intensive side of the new entrants would be small because, relative to incumbents, they did not have a long history of trade in Spain.

For the entire sample of countries, the contribution of the extensive margin was about five times greater than the intensive one (table 4). Big and rich countries had a relatively larger extensive margin than producers in the European periphery, in the order of between 2 and 3 to 1. The extensive margin of the core exporters indicates their innate capacity to sell a large variety of differentiated products.<sup>75</sup> But trade costs mattered too. The extensive margin of the US more than doubled between 1900 and 1910, while that of new competitors increased by more than 50 per cent (last row of table). Since productivity levels of many latecomers remained far below that of the European core, it is reasonable to suppose that entry costs had fallen. The intensive margin of core countries was relatively larger, an expected result since seasoned exporters like the Germans had well developed relationships with their Spanish clients. With the exception of the British whose intensive margin contracts, core manufacturers sold highly differentiated goods that faced less stiff competition, and hence commanded large market shares. In contrast, the intensive margin for new entrants remained small. The inference is that new rivals encountered difficulties in extending market share upon introducing new product lines.

Our next step was to study the effects of trade costs on trade. Table 5 presents estimates for aggregate trade. We are interested in separating the innate and acquired advantages of core countries from other factors affecting trade, consisting of distance to the Spanish market, and specific trade relations, like the existence of most favored nation treaties and diplomatic representation in Spain. To be sure, the procedure is marred because of omitted and poorly measured variables, but our specification, and for that matter findings, do not differ from that of more recent studies.<sup>76</sup> We use population, wages, and GDP per capita to capture, respectively, the advantages of exporters' domestic market size, level of productivity, and more generally, stage of

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<sup>74</sup> Hummel and Klenow, 'Variety and quality'. We have also calculated the two margins on a five-year basis from 1885. The results are similar to those reported in tab. 4.

<sup>75</sup> Chaney, 'Distorted gravity', presents a model in which the extensive margin increases with the degree of product differentiation.

<sup>76</sup> Lawless, 'Deconstructing gravity'; and Dutt, Milhov, and Van Zandt, 'The effect of the WTO'.

development. The other independent variables are intended to represent trade costs. Distance is a proxy for transport costs, but it also stands in for familiarity about local preferences, a larger estimated coefficient increasing with the degree of ignorance of foreign markets.<sup>77</sup> The tariff is calculated as the annual ad valorem equivalent. The other variables can be seen to reduce the degree of uncertainty exporters faced in the Spanish market. The results are in line with expectations. Big, productive, and rich countries had larger market access. Again trade costs mattered. Countries closer to Spain, those having a MFN or special treaty, and on the gold standard did export more.<sup>78</sup> The adoption of changes in the tariff was inconsequential.<sup>79</sup> Diplomatic representation in Spain as well as Spanish representation abroad did grow trade volumes.

Using the coefficients from the regressions in table 5, we compare in table 6 the relative contributions of trade costs and that of exporters' domestic market size (population), level of productivity (wages), and more generally, stage of development (GDP per capita). The contribution of trade costs varied, being of the order of 15-20 per cent when GDP using the broadest measure of development, and 50-60 per cent when the comparison is made using the contribution of market size or population of exporting countries.<sup>80</sup> On average, trade costs explain roughly 40 per cent of trade. There was also variability across countries. Using wages, the contribution of trade costs for Italy was about 45 per cent and that for the UK about 30 per cent. Relative to the UK, Germany's export success was less dependent on its productivity. Our reading of these results is that new low-productivity entrants were not shut out from the Spanish market; neither were the export shares of core countries secured exclusively by their level of development or market size. In accord with table 1, geography cut a wedge between technology and exports.

To get a better idea of how new entrants succeeded to introduce and sell their export lines, we decompose trade into its two margins. Trade costs have different effects on the two margins.

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<sup>77</sup> Disdier and Head, 'Puzzling persistence', for various interpretations of distance. Common language was highly correlated with distance and we have eliminated it as a trade cost.

<sup>78</sup> Lampe, 'Explaining bilateralism'. MFN treaties were typical into the early 1890s, after which Spain adopted a two-tier tariff structure, countries negotiating special treaties to avoid paying the maximum tariff. See app. for countries.

<sup>79</sup> The ad valorem rate =  $\frac{\sum_{i=1}^{n=100} Duties_i}{\sum_{i=1}^{n=100} unit\ value_i * q_i}$ , where  $q_i$  are the quantities traded of the 14-item grouping.

<sup>80</sup> These are net trade costs, the negative effect of distance offsetting that of the remaining trade cost variables. The figures in tab. 6 report the absolute values of the contribution of trade costs.

In theory, the extensive margin is negatively related to a decrease in fixed trade costs; the intensive side positively related, the intuition being that incumbent exporters sell less because of the presence of new, less productive entrants.<sup>81</sup> In table 7, the dependent variables are the two margins as calculated using Hummels and Klenow's procedure. As before, in both cases, GDP per capita is positive and significant, big and rich countries selling a larger value of each good and greater variety of goods. Being on the gold standard contributes to selling more and new goods, while the tariff is insignificant in both cases. But there are also differences of the effects of trade costs on the two margins. Having a diplomatic representation in Spain and a trade treaty seem to have a positive effect on expanding sales of previously traded goods, a decided advantage for countries in the European core that had deeper pockets to spend on consuls and were more actively engaged in the treaty network. The extensive side is less responsive to distance than the intensive margin.<sup>82</sup> Farflung countries were disadvantaged in expanding sales, the US having to work hard to expand sales, whereas France had the luxury of a common border. However, on the extensive side, as long as countries positioned themselves in markets for differentiated goods, distance was less of a handicap. The Belgium consul in Barcelona gave an illustration of this strategy. He observed that, while Belgian wages lagged those of the British, the productivity gap was considerably larger. The British dominated in sheetings and shirtings, but markets for towings and dyed yarn remained unexploited. The consul went on to urge Belgian manufacturers to showcase these goods at the upcoming international trade fair in Antwerp where Spain would send representatives. Information of this type would diminish the distance between producers and customers.<sup>83</sup>

## V

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<sup>81</sup> To be clear, the extensive margin exists because new entrants that cannot cover their fixed costs will not export at all. The extensive margin is negatively related to changes in variable costs. The effect of changes in variable costs on the intensive side is ambiguous. Incumbents sell more, but the decline in marginal costs pulls in less productive exporters, and depending on the relative importance of incumbent and new firms, average sales per country may rise or fall. Because of the ambiguous effects on the intensive side, studies have found that the contribution of the extensive margin is much larger.

<sup>82</sup> As a check, we standardized the coefficients. For the regression of the intensive margin with GDP per capita, the standardized coefficient for distance is -4.566, that for the extensive margin, -1.047. We thank a referee for suggesting this procedure.

<sup>83</sup> Belgium, *Recueil*, 1895, p. 144.

The arrival of new entrants and new goods in Spain was not loss on foreign representatives and local manufacturers. Contemporaries were as concerned with number of goods unloaded in Barcelona as with their volume. The response of manufacturers in the industrial core took two forms. First, they narrowed the product range of goods sold; second, they upgraded the quality of goods. The adoption of the Spanish tariff did not slow down this process. If anything, it had the effect of encouraging further changes along these lines. By the eve of the war, exporters to Spain as well as domestic manufactures, exhibited greater specialization in product ranges.

Beginning in the mid-1900s, manufacturers cut back on their export lines. With the exception of Belgium and the US, the major producers sold fewer varieties in 1913 than in 1900 (table 3). To get an idea of the trend toward specialization, table 8 calculates the degree of overlap, or similarity score, for the 100 product varieties exported in 1913. The index takes into account the share of each product in each country's exports.<sup>84</sup> It ranges between 0 (perfect dissimilarity) and 1 (perfect similarity). The figures in bold are similarity scores that declined between 1897 and 1913.

The turn of the century seems to have been a period of heightened competition. In response to this challenge, exporters actively sought to differentiate their products, 74/132 or 56 per cent of possible country pairs becoming more dissimilar.<sup>85</sup> For instance, by the end of the period, the Portuguese distinguished themselves at the low end of the product spectrum; their major competitor seems to have been the US and local Spanish manufacturers. Overall, the US appears to have established itself as an exporter of medium-value items. As for France, it had a sizeable overlap with Germany, but also competed against the Swiss and Belgians. The UK seems to have been the least successful in separating itself from its rivals. Because of agglomeration economies, it produced a variety of goods, leaving itself most open to international competition. Its declining share of the Spanish market indicates that Lancashire could not count on its superior level of productivity to compensate for deficiencies in marketing and distribution. Spanish manufacturers were not isolated from these changes. In these years, La España Industrial and La Fábrica la

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<sup>84</sup> Following Fontagné, Gaulier, and Zignago, 'North-south', the similarity score between country A (column) and B (row) is calculated as one minus half the sum of the absolute value of the differences between the product or variety shares in manufacturing exports of country A and those of country B.

<sup>85</sup> We conducted a similar exercise for the cruder 14-product grouping. As expected, there was greater similarity at this level.

Rambla reduced the number of their product lines. Thus greater specialization and may have left Spanish consumers with the same or even a smaller number of varieties to choose from.<sup>86</sup>

The tariff of 1906 reinforced the changes in the number and type of export products we have identified. Recall that the tariff aimed to restrict imports of high-value goods, but despite the intention of its designers it had the effect of favoring high-end goods that seem to have had a stable if not growing market. In fact, the value of imports kept on rising after 1906 (see figure 1). For France, the number of products peaked in 1906, but the value of sales continued to expand. The irony is that the adoption of stiffer tariffs which aimed to harm manufacturers in the core had the opposite outcome, postponing catch-up in less developed countries and giving a second breath to the industries of rich economies. The anti-globalization backlash was incomplete.

The narrowing in product lines after 1900 gives credence to this paper's claim that product variety was a dimension of international competition. In table 9, we report results of a regression on the determinants of exporter specialization.<sup>87</sup> The dependent variable is unit values by exporting country for the 14-group classification. The independent variables are pretty much the same as before. We use GDP per capita and wages to capture the advantages of exporters' level of development and productivity. The regressions control for capital-labour ratios and cost structures in 1910. Across all regressions, rich and productive countries exported more high-end goods. As expected, the value of goods sold increased as Spanish income rose, a tendency favouring exporters in the European core because of their experience in catering to wealthier markets. Signing a trade treaty with Spain seems to have encouraged the export of lower-end goods, as did the gold standard. The tariff appears to have promoted further specialization, the negative coefficient indicating that unit values increased as a result of the 1906 changes.<sup>88</sup> We find that distance was not a constraint on the delivery of high-end goods. The positive coefficient, reported elsewhere for differentiated goods, is consistent with a strategy of pricing to market.<sup>89</sup> Controlling for distance, border countries did ship high-value goods. This may reflect the French exporters familiarity with the Spanish market and their ability to respond because shipping by rail

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<sup>86</sup> Baldwin and Forslid, 'Trade liberalization', refer to this phenomenon as the anti-variety effect.

<sup>87</sup> Our regression setup follows Fontagné, Gaulier, and Zignago, 'North-south', p. 72.

<sup>88</sup> Recall that import values rose after the adoption of the 1906 tariff. So, if the increase in the denominator exceeded that of the numerator, ad valorem rates would have fallen. The negative sign of the tariff coefficient indicates that unit values increased as a result of the 1906 changes.

<sup>89</sup> Using recent data on Chinese exports, Manova and Zhang, 'Export prices', report that unit values of high-end goods increased with distance; the opposite held for low-end goods.

was more flexible than maritime transport. The bottom line is that established exporters concentrated in high-valued goods, and new entrants and Spain in low-end ones, a sector in which competition was stiffer. An emerging global division of output was taking shape in which firms across the core, the periphery, and in Spain specialized in products corresponding to endowments of skilled labour, capital, and raw materials. But even in this new conjuncture, geography continued to matter, because exporters needed to manage trade costs to access markets.

## VI

During the great wave of globalization before 1914, contemporaries routinely delivered warnings about the pending invasion of cheap textile goods in the customary markets of manufacturers in the European core. These claims are difficult to justify using aggregate or coarse trade data. In this paper, exploiting highly disaggregated information on Spanish imports, we have given credence to contemporary statements on international competition. The type and number of products was a dimension of competitiveness as much as the share of exports. To see this, we have decomposed trade into its extensive and intensive margins. As trade costs collapsed, new competitors accessed foreign markets, the number of products they shipped increasing as a result.

Newcomers faced serious constraints in the Spanish market. They did not have the experience of incumbents in marketing or resources to extend credit. With the exception of the US, their productivity levels were inferior to producers in the European core. Moreover, the goods they sold had close substitutes. Altogether, the new entrants had difficulty in growing their markets, export sales of these countries being relatively smaller as a result. That said, established producers recognized the challenge posed by new rivals, and responded by upgrading product lines, adjusting prices accordingly. By 1914 countries' export specialization was pinned down by endowments of skilled labour, capital, and access to raw materials. While firms in new industrializing countries exported low-end varieties, those in the rich industrial core shipped high-end goods, unit values increasing with levels of development. The implication is that certain products formerly produced by Spanish firms were now imported.



While these findings are limited to bilateral trade for a single country, our approach casts a fresh perspective on the nature and consequences of globalization before 1914 in two ways. First, invoking Heckscher-Ohlin, O'Rourke and Williamson claim that declining transport in interindustry trade resulted in real-wage convergence before 1914.<sup>90</sup> Assuming perfect competition and homogenous goods, these types of models operate at high level of aggregation and ignore the roles of firms and products. Using granular trade data, we have found that declining trade costs in intraindustry trade triggered the export of new products. If home and foreign goods were not identical, pressures on wages would have been moderated, all the more since intraindustry trade comprised a large share of the period's trade. In this regard, the Spanish case was representative because of its position in the European commercial network. Second, our study suggests that the relationship between globalization and productivity growth may not have been as tight as we have come to accept. The decline in trade costs pulled in firms in low-productivity countries that survived because entry costs kept on falling or because the goods market became increasingly differentiated. Whether or not the Spanish case holds more generally serves as a starting point for an ample research agenda.

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<sup>90</sup> O'Rourke and Williamson, *Globalization and history*.

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## Appendix

## Exporting Countries

1) Algeria	2) Andorra	3) Arabia,	4) Argentina	5) Austria-Hungary
6) Belgium	7) Bolivia	8) Brazil	9) Bulgaria	10) Chile
11) China	12) Colombia	13) Cuba	14) Denmark	15) Egypt
16) Eq. Guinea	17) Finland	18) France	19) Germany	20) Guatemala
21) Italy	22) Japan	23) Mexico	24) Morocco	25) Netherlands
26) Norway	27) Panama	28) Paraguay	29) Peru	30) Philippines
31) Portugal	32) Puerto Rico	33) Russia	34) Sweden	35) Switzerland
36) Turkey	37) Uruguay	38) UK	39) USA	40) Venezuela

## List of products and SITC classification

Num.	SITC Classification
1	65122 Cotton sewing thread, packaged for retail sale
2	65133 Cotton yarn, one or two threads, count <35
3	65133 Cotton yarn , one or two threads, count >36
4	65133 Cotton yarn , three threads, count <35
5	65133 Cotton yarn, three threads, count >36
6	65133 Cotton yarn , twisted, three or more threads
7	65221, 65231, 65232, 65233 Cotton woven fabrics, unbleached, bleached, dyed, of yarns of different colours, not under 85% cotton, weighing not over 200 g/m2
8	65221, 65231, 65232, 65233 ... embroidered
9	65221, 65231, 65232, 65233 ... clothing or finished
10	65221, 65231, 65232, 65233 ... embroidered and clothing
11	65221, 65231, 65232, 65233 ... embroidered with mixture of metal
12	65221, 65231, 65232, 65233 ... embroidered in chain stitched
13	65221, 65231, 65232, 65233 ... embroidered in relief
14	65221, 65231, 65232, 65233 ... embroidered and clothing with mixture of metal
15	65222, 65241, 65242, 65244 Cotton woven fabrics, unbleached, bleached, dyed, of yarns of different colours, not under 85% cotton, weighing over 200 g/m2
16	65222, 65241, 65242, 65244 ...embroidered
17	65222, 65241, 65242, 65244 ...clothing or finished
18	65222, 65241, 65242, 65244 ...embroidered and clothing
19	65222, 65241, 65242, 65244 ...embroidered with mixture of metal
20	65222, 65241, 65242, 65244 ... embroidered in chain stitched
21	65222, 65241, 65242, 65244 ... embroidered in relief
22	65222, 65241, 65242, 65244 ... embroidered with mixture of metal and clothing
23	65234 Cotton woven fabrics printed, not under 85% (weight cotton) weighing not over 200 g./m2
24	65234 ... embroidered
25	65234 ...embroidered with mixture of metal
26	65234 ...embroidered in relief
27	65234 ... embroidered in chain stitched
28	65234 ... clothing or finished
29	65234 ... embroidered and clothing
30	65234 ...embroidered and clothing with mixture of metal
31	65245 Cotton woven fabrics printed, not under 85% (weight cotton) weighing over 200 g./m2
32	65245 ... embroidered
33	65245 ... embroidered in relief
34	65245 ... embroidered in chain stitched
35	65245 ... embroidered with mixture of metal
36	65245 ... clothing or finished

37	65245	... embroidered and clothing
38	65245	... embroidered and clothing with mixture of metal
39	65211	Cotton gauze (we include woven diaphanous, muslins, gauze)
40	65211	... embroidered
41	65211	... embroidered with mixture of metal
42	65211	... embroidered in relief
43	65211	... embroidered in chain stitched
44	65211	... clothing or finished
45	65211	... embroidered and clothing or finishing
46	65211	...embroidered and clothing with mixture of metal
47	65497	Woven tufted textile fabrics (other than narrow or special fabrics)
48	65497	... embroidered
49	65497	... embroidered with mixture of metal
50	65497	... clothing or finished
51	65497	... embroidered and clothing
52	65497	... embroidered and clothing with mixture of metal
53	65214, 65215	Cotton pile and chenille woven fabric
54	65214, 65215	...embroidered
55	65214, 65215	...embroidered with mixture of metal
56	65214, 65215	...embroidered in relief
57	65214, 65215	...embroidered in chain stitched
58	65214, 65215	...clothing or finished
59	65214, 65215	...embroidered and clothing
60	65214, 65215	...embroidered with mixture of metal and clothing
61	65641	Tulles and other net fabrics (not including woven, knitted or crocheted fabrics)
62	65641	...embroidered with mixture of metal
63	65641	...embroidered
64	65641	...embroidered in relief
65	65641	...embroidered in chain stitched
66	65641	...clothing or finishing
67	65641	...embroidered and clothing
68	65641	...embroidered with mixture of metal and clothing
69	65642, 65643	Lace (mechanically made and hand-made)
70	65642, 65643	...embroidered
71	65642, 65643	... embroidered with mixture of metal
72	65642, 65643	... clothing or finished
73	65642, 65643	... embroidered and clothing
74	65511, 65512, 65519, 65529	Knitted or crocheted
75	65511, 65512, 65519, 65529	...embroidered
76	65511, 65512, 65519, 65529	Socks, gloves embroidered with mixture of metal
77	65511, 65512, 65519, 65529	... clothing or finished
78	65511, 65512, 65519, 65529	... clothing or finished
79	65511, 65512, 65519, 65529	In pieces, T-shirts, pants
80	65511, 65512, 65519, 65529	... in pieces, T-shirts, pants embroidered
81	65511, 65512, 65519, 65529	...in pieces, T-shirts, pants embroidered with mixture of metal
82	65511, 65512, 65519, 65529	...in pieces, T-shirts, pants, clothing
83	65511, 65512, 65519, 65529	... in pieces, T-shirts, pants, clothing with mixture of metal
84	65511, 65512, 65519, 65529	...in pieces, T-shirts, pants, clothing and embroidered
85	65511, 65512, 65519, 65529	Socks, gloves
86	65511, 65512, 65519, 65529	...socks, gloves embroidered
87	65511, 65512, 65519, 65529	... socks, gloves embroidered with mixture of metal
88	65511, 65512, 65519, 65529	... socks, gloves finished
89	65511, 65512, 65519, 65529	... socks, gloves finished embroidered
90	65511, 65512, 65519, 65529	... socks, gloves embroidered and finished with mixture of metal
91	65953	Carpets and other textile floor
92		...clothing or finished



93	65735	Textile wall covering
94	65761	Hats forms, hat bodies and hoods of felt
95		...clothing or finished
96	65731	Textile fabrics coated gum, for book covers, prepared painting canvas,
97		Towels and similar textiles
98		Wicks for lamps and candles
99		Nets for hunting and hammocks
100		Corduroy

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#### Product Groups

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The 14-product grouping is composed of: 1) Cotton yarn (from 1-6 variety number); 2) cotton woven fabrics weighing not over 200 gr./m<sup>2</sup> (7-14); 3) cotton woven fabrics weighing over 200 gr./m (15-22); 4) Cotton woven fabrics printed not over 200 gr./m<sup>2</sup> (23-30); 5) cotton woven fabrics printed over 200 gr./m<sup>2</sup> (31-38); 6) cotton gauze (woven diaphanous, muslins, gauze (39-46); 7) woven tufted textile fabrics (47-52); 8) cotton pile and chenille woven fabric (53-60); 9) tulle and other net fabrics (61-68); 10) lace (mechanically made and hand-made)(69-73); 11) knitted or crocheted fabrics (74-78); 12) knitted or crocheted in pieces, T-shirts, pants (79-84); 13) knitted or crocheted socks and gloves (85-90); 14) other cotton textiles (91-100), only for 1910 and 1913. The finer product grouping consists of 90 products for all years before 1910; and 100 for 1910 and 1913.

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#### Extensive and Intensive Margins

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To start, define country  $j$  = exporter;  $k$  = all other exporters or the reference country;  $m$  = Spain;  $I$  is total available product categories; and  $I_{jm}$  the set of observable categories in which country  $j$  has positive exports to  $m$ . The ratio of country  $j$  to country  $k$  exports to  $m$ , or the share of country  $j$  exports to total exports to  $m$ , equals the product of the extensive and intensive margins. The *extensive margin* gives an idea of the relative importance of each exporter's good set relative to the reference group, or the weighted count of  $j$ 's categories relative to country  $k$ 's categories.<sup>91</sup> The idea is that if all categories are of equal importance, the extensive margin is simply the fraction of categories in which  $j$  exports to  $m$  (Spain). Hummel and Klenow's setup prevents a category from appearing to be important only because country  $j$  and no other country exports a lot of this category to  $m$ . More formally, the extensive margin is the ratio of country  $k$  exports to country  $m$  in  $I_{jm}$  (or the set of observable categories of which country  $j$  has positive exports to  $m$ ), relative to country  $k$ 's exports to  $m$  in  $I$  categories (or all available categories). In our case, the total number of available categories in 1910 is 48.

$$EM_{jm} = \frac{\sum_{i \in I_{jm}} p_{kmi} \cdot x_{kmi}}{\sum_{i \in I} p_{kmi} \cdot x_{kmi}} .$$

The *intensive margin* compares the nominal trade values of  $j$  and  $k$ , defined as the ratio of  $j$ 's nominal exports relative to  $k$ 's exports in the categories in which  $j$  exports to country  $m$  ( $I_{jm}$ ):

$$IM_{jm} = \frac{\sum_{i \in I_{jm}} p_{jmi} \cdot x_{jmi}}{\sum_{i \in I_{jm}} p_{kmi} \cdot x_{kmi}} .$$

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<sup>91</sup> Hummels and Klenow's definition gives weights to individual products. A country that exports cars and computers will have a larger extensive margin than a country that exports carrots and potatoes, although both export just two goods.

The ratio of country  $j$  to country  $k$  exports to  $m$  is the product of both margins:

$$EM_{jm} \cdot IM_{jm} = \frac{\sum_{i=1}^I p_{jmi} \cdot x_{kmi}}{\sum_{i=1}^I p_{kmi} \cdot x_{kmi}} .$$

Consider the following example. Before the war, Germany's overall share of trade (last column in Table x) with Spain was 2.11 larger than Switzerland's (36 vs 17 per cent). As befitting its size, some of this difference originated with the greater number of categories Germany exported. In 1910, Germany shipped  $37/48 = 77$  per cent of all categories, and Switzerland  $26/48 = 54$  per cent. If all categories were of equal weight, the extensive margin of Germany would be 1.42 (=  $77/54$ ) times greater, resulting in an intensive margin (exports per product) for Germany of 1.48 (=  $2.11/1.42$ ) times larger than Switzerland's. But not all categories are of equal weight, Switzerland shipping categories that comprised a larger share of all countries' exports to Spain. After adjustment, Germany's extensive margin was therefore only 1.05 greater than Switzerland's, and its intensive margin 2.05 times larger as a result.

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#### Variable definitions and sources

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Diplomatic representation: Almanach de Gotha, *Annuaire généalogique*.

Distance: Great circle distance in km between Barcelona and capital of exporter.

GDP per capita: Geary-Kamis international dollars 1990. Maddison, *Historical statistics*.

Gold standard: Officer, 'Gold standard'.

K/L ratios, capital and labor costs: Clark, 'Why isn't the world developed'.

MFN: Until 1891, MFN treaties; afterward, special treaties. Austria-Hungary: 1880-1892; Belgium: 1892-1905; France: 1882-1892; Germany: 1884-1892; Italy: 1884-1894; Portugal: 1893-1905; Switzerland: 1892-1913; UK: 1884-1894; US: 1906-1913. Sources: Sabaté-Sort, *El proteccionismo*; Serrano-Sanz, *El viraje*; Stone, 'Double tariff'.

Population: Maddison, *Historical statistics*.

Real exchange rate: Trade weighted index of the product of the nominal exchange rate and relative price indexes. López Córdova and Meissner, 'Exchange rate regimes'.

Wages: Williamson, 'Evolution of global labor'.

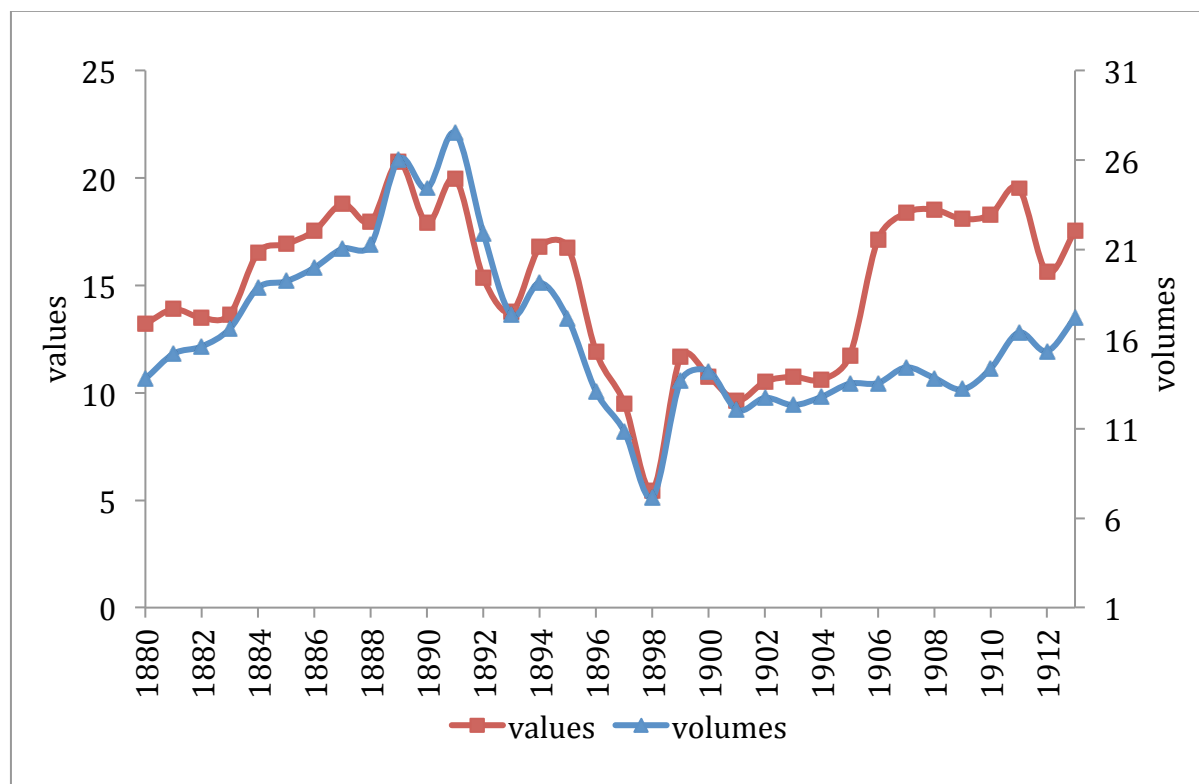


Figure 1. Cotton textiles imports: values and volumes, 1880-1913

Notes: Volume in 100 metric tons; real values in 1905 million pesetas.

Sources: Import values and quantities from *Estadísticas de Comercio Exterior de España*. Import price deflator from Prados de la Escosura, *El progreso económico*.

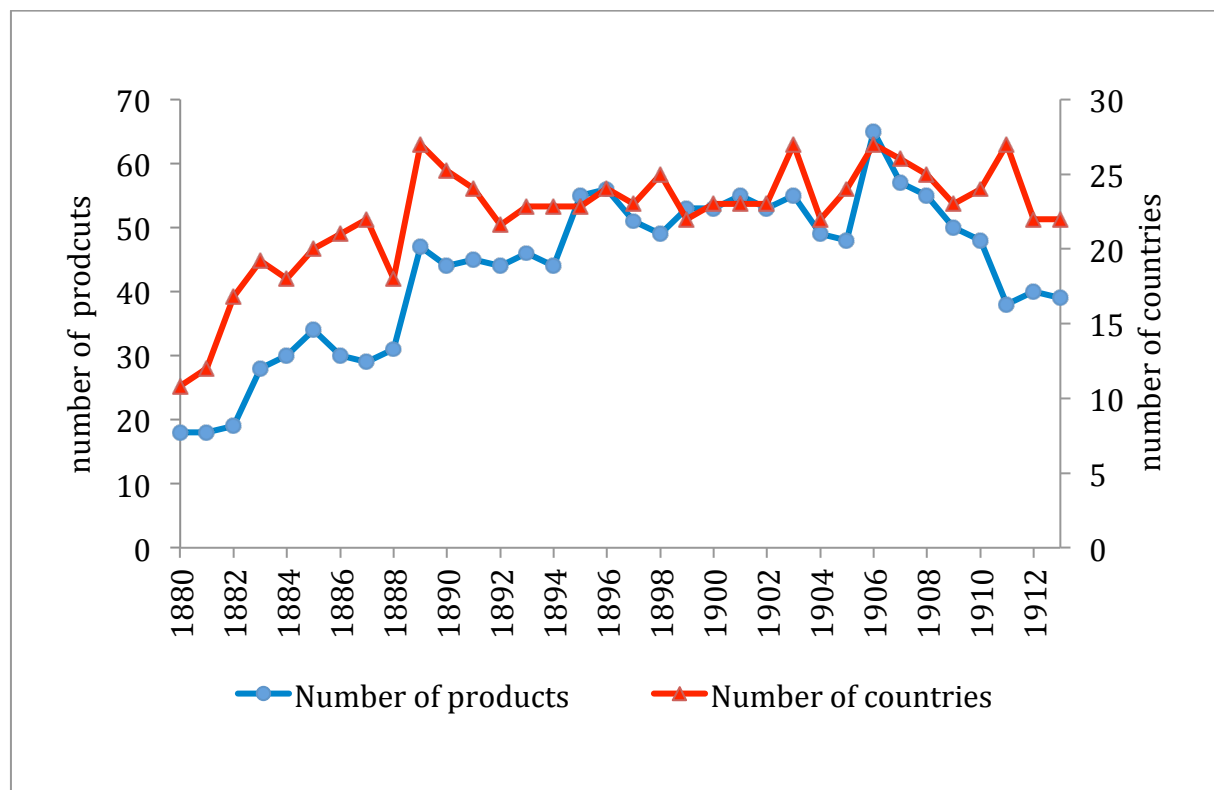


Figure 2. Cotton textile import: products and countries, 1880-1913

Note: Net entries of products and countries.

Source: *Estadísticas de Comercio Exterior de España*.

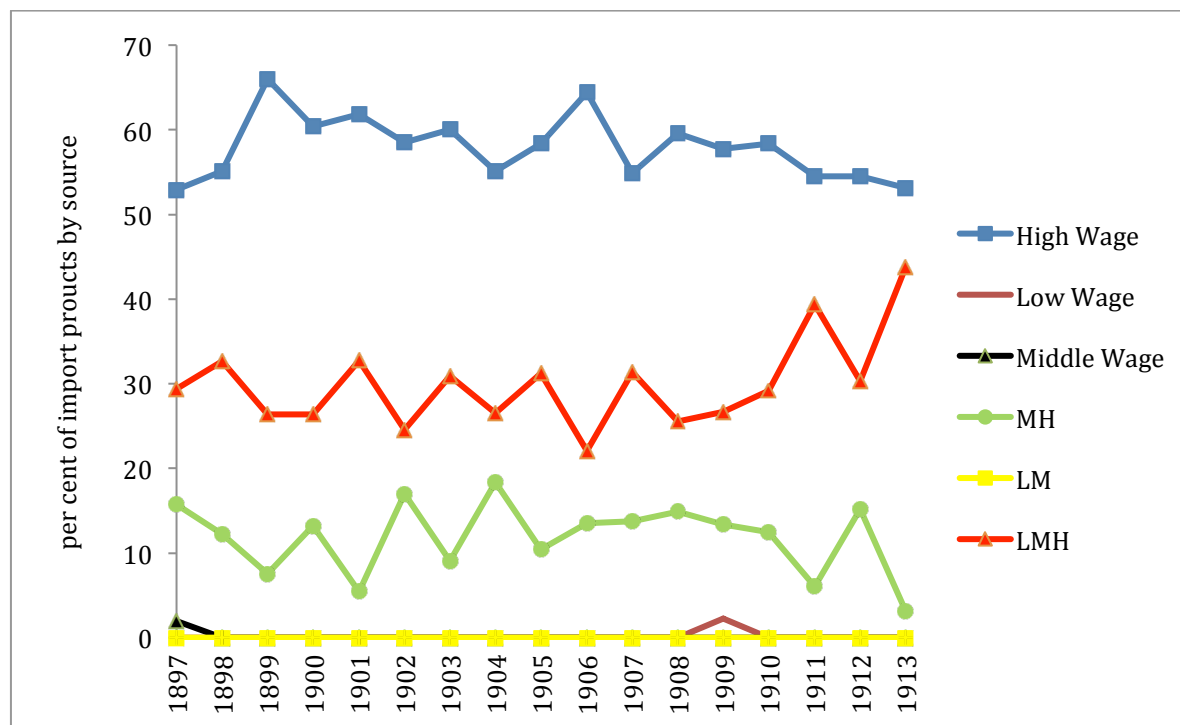


Figure 3. *Share of import products by source, 1897-1913*

*Notes:* We classified countries, following Schott, 'Across-product', as low, middle, and high wage if GDP per capita was less than that of the 30th percentile, between the 30th and 70th, or greater than the 70th percentile of the world distribution of GDP per capita in 1913. *High Wage:* Argentina, Belgium, France, Germany, Switzerland, U.K., and U.S.; *Middle Wage:* Austria-Hungary, Chile, Cuba, Italy, Norway, Sweden, and Uruguay; *Low Wage:* all remaining countries. Products are classified, following Schott (2004), into six mutually exclusive groups based on GDP per capita: *L*, *M*, and *H* refer to products originating in low, middle, or high-wage countries; *LM* and *MH*, products from at least one country of each type; *LMH*, products originating in a least one low-wage and one high-wage country.

*Sources:* *Estadísticas de Comercio Exterior de España*; Maddison, *Historical statistics*.

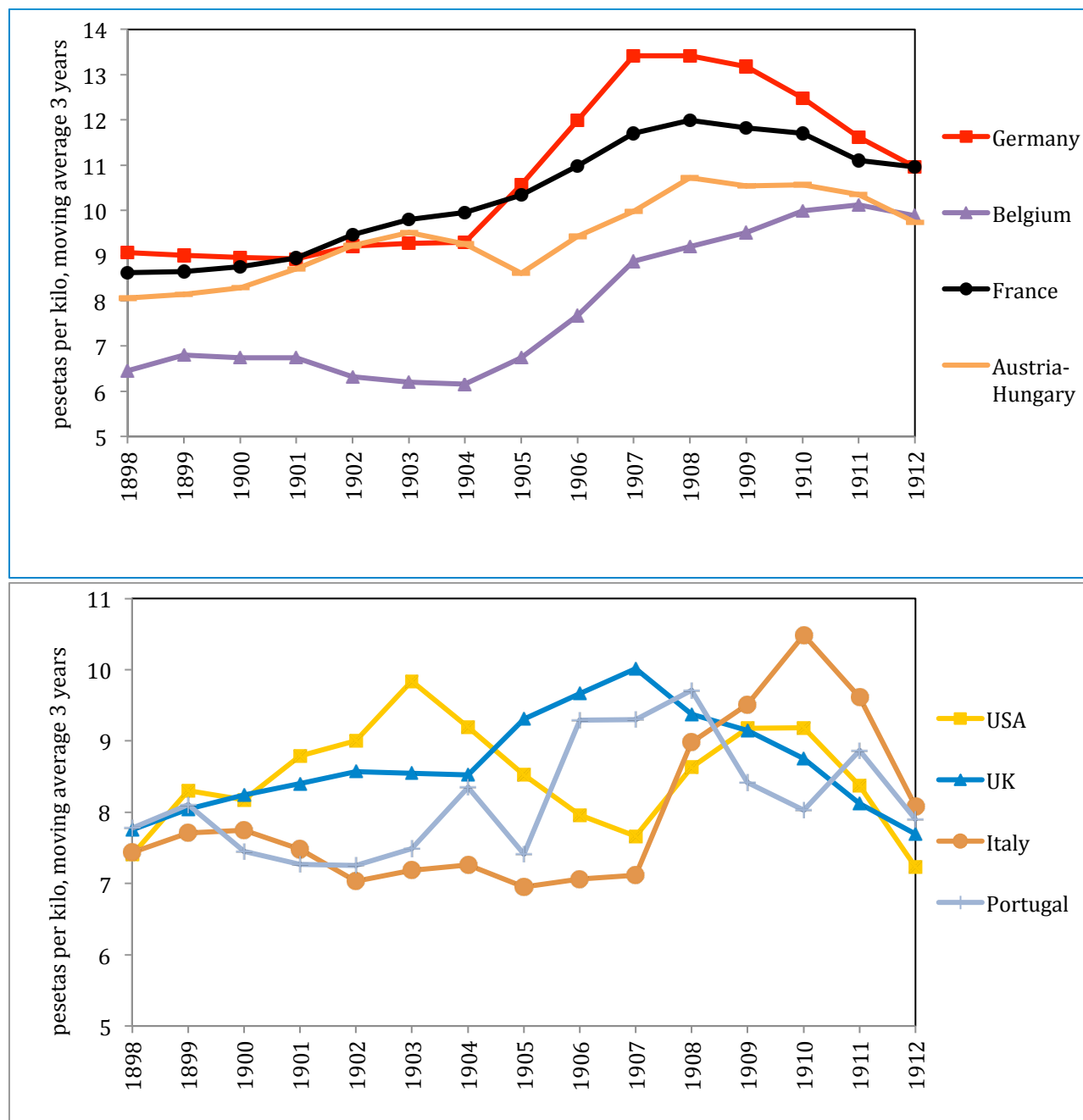


Figure 4. *Unit values by country*

*Notes:* Unit values are export values divided by physical quantities for the 100 items (see appendix for full list). Annual average unit values by country are prices weighted by the export share of each item per year.

*Source:* *Estadísticas de Comercio Exterior de España*

Table 1. *The global cotton-textile industry, ca. 1913*

	1	2	3	4	5	6	7	8	9	10	11	12	13
	<i>% of world GDP 1913</i>	<i>Textile labour force (thousands)</i>	<i>Spindles 1908</i>	<i>Mules % 1908</i>	<i>Looms 1913</i>	<i>Spindles % of world</i>	<i>Looms % of world</i>	<i>Weekly wage rate 1910 (\$US)</i>	<i>Machines per worker 1910</i>	<i>Export % of piece goods production 1929 (volume)</i>	<i>Exports to Europe as % of exports 1913</i>	<i>Share of European exports 1913</i>	<i>% Spanish imports 1913</i>
UK	0.08	1359	52818	83.6	805452	43.64	28.69	5	1.00	70.8	40	28	26.0
US	0.19	898	23200	17.7	696387	19.17	24.82	7.1	1.45	6.7	16		0.4
Germany	0.09	1200	9192	55.5	230200	7.59	8.21	3.8	0.63	8.2	73	16	33.9
Russia	0.09		7562	50.2	213179	6.25	7.59	2.4	0.77	4.1			1.5
France	0.05	913	6609	60.0	108000	5.46	3.85	3.7	0.81	31.8	77	21	17.8
India	0.08		5280	28.0	94136	4.36	3.35	0.7	0.33	10.5			
Austria	0.01		3584	61.0	170000	2.96	6.06	2.8	0.65	26.3	89	5	
Italy	0.04	455	2868	26.6	140000	2.37	4.36	2.4	0.76	40.4	70	7	5.7
<b>Spain</b>	<b>0.02</b>	<b>120</b>	<b>1850</b>	<b>40.0</b>	<b>55000</b>	1.53	<b>1.96</b>	<b>2.7</b>	<b>0.73</b>	<b>6.1</b>	<b>42</b>	<b>4</b>	
Japan	0.03		1540	3.3	20634	1.27	0.73	0.8	0.52	49.8			
SWI	0.01	177	1485		21500	1.23	0.77	3.7	0.70	20.3	71	5	5.1
Belgium	0.01	263	1200	51.5	24000	0.99	1.78			45.6	93	13	8.4
Brazil	0.01		1000	3.0	50000	0.83	1.78						0.2
Canada	0.01	20	894	46.0	30674	0.74	1.09	8.8	1.41	0.3			
China	0.09		756		5852	0.62	0.22	0.5	0.34				
Mexico	0.01		733	4.0	27019	0.61	0.96	2.6	0.77				0.2
NLD	0.01	60	465		39800	0.38	1.42			44.4	67	2	0.2

Sources: Column 1: Maddison, *Historical statistics*; columns 2, 5, 10: ILO, *World textile*, except Spain (*Censo 1910*); columns 3 and 4: Saxonhouse and Wright, 'National leadership'; columns 6 and 7: authors' calculations; columns 8 and 9: Clark, 'Why isn't the world developed'; columns 10-13: Kertesz, *Die Textilindustrie*.

Table 2. *Cotton textile exports to Spain by country, 1897-1913*

Country	1898	1900	1902	1904	1906	1908	1910	1912
UK	100	123.99	123.48	121.85	129.60	105.38	96.60	94.26
France	24.39	33.45	32.47	41.21	54.98	55.42	53.74	60.98
Germany	14.79	24.91	30.02	35.16	67.70	101.47	110.13	103.73
Switzerland	14.34	20.15	16.44	17.34	29.36	52.84	56.59	55.61
Austria-Hungary	1.53	1.74	0.96	0.80	1.11	3.21	3.61	3.60
Belgium	0.46	0.65	0.55	0.39	0.50	1.01	1.06	1.24
Italy	0.33	0.47	0.43	0.33	0.34	0.27	0.22	0.15
US	0.13	0.12	0.11	0.05	0.07	0.27	0.59	0.35
Portugal	0.06	0.05	0.06	0.05	0.07	0.19	0.28	0.42
Netherlands	0.01	0.02	0.10	0.07	0.15	0.36	0.40	0.87
Total exports	100	131.38	131.12	139.19	181.61	204.74	206.52	205.28

*Note:* For all rows except for total exports, three-year moving average centered on U.K. average, 1897-1899 = 100.

*Source:* *Estadísticas de Comercio Exterior de España, 1898-1913.*



Table 3. *Number of products by country*

<b>Country</b>	<i>1897</i>	<i>1898</i>	<i>1899</i>	<i>1900</i>	<i>1901</i>	<i>1902</i>	<i>1903</i>	<i>1904</i>	<i>1905</i>	<i>1906</i>	<i>1907</i>	<i>1908</i>	<i>1909</i>	<i>1910</i>	<i>1911</i>	<i>1912</i>	<i>1913</i>
All	51	49	53	53	55	53	55	49	48	65	57	55	50	48	38	40	39
1 Algeria	3	4	7	4	3	4	6	3	3	4	4	4	5	5	8	4	5
2 Andorra	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
3 Arabia	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4 Argentina	7	5	5	3	5	2	4	4	6	6	7	8	4	12	11	12	10
5 Austria-Hungary	16	10	10	15	12	11	17	14	12	13	13	16	14	15	14	15	15
6 Belgium	13	15	13	11	12	12	13	13	7	14	13	18	14	18	14	16	19
7 Bolivia	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8 Brazil	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0
9 Bulgaria	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
10 Chile	4	0	0	1	2	0	1	3	0	1	1	2	3	4	4	5	2
11 China	2	1	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0
12 Colombia	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 Cuba	8	1	2	6	7	4	5	4	7	9	4	4	4	5	5	6	5
14 Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Egypt	0	0	1	0	3	0	0	0	0	0	0	0	0	0	1	0	0
16 Eq. Guinea	0	1	0	1	1	0	0	0	5	4	3	2	5	2	1	0	1
18 Finland	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 France	49	46	52	51	52	52	51	47	47	64	53	47	46	46	34	37	36
20 Germany	36	34	41	45	47	46	46	37	36	51	46	40	42	37	31	35	33
21 Guatemala	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
22 Italy	14	11	13	10	12	11	13	12	13	13	14	8	6	6	5	6	6
23 Japan	2	0	5	2	4	3	2	1	0	1	2	3	4	2	2	2	1
24 Mexico	0	0	0	1	0	3	1	5	5	3	2	1	0	7	2	2	0
25 Morocco	2	1	3	0	2	1	2	0	1	2	3	1	1	1	7	4	6

26	Netherlands	1	1	3	1	4	2	7	1	2	5	6	9	3	6	7	8	6
27	Norway	0	0	0	0	0	0	0	0	0	0	3	1	0	1	1	1	0
28	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
29	Paraguay	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
30	Peru	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
17	Philippines	3	4	4	2	0	1	1	0	1	3	2	0	0	0	1	0	0
31	Portugal	13	14	11	10	15	10	13	9	11	13	15	11	12	11	8	5	10
32	Puerto Rico	0	1	3	0	0	6	3	2	1	1	4	0	0	3	4	0	0
33	Russia	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	Sweden	0	1	0	1	0	0	0	0	0	0	0	1	1	1	1	3	1
35	Switzerland	39	28	34	33	34	34	36	27	30	29	24	29	22	26	23	21	25
36	Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
37	Uruguay	3	2	0	0	0	0	1	1	2	0	2	2	2	0	6	1	1
38	UK	34	34	38	35	37	34	38	34	32	38	33	35	34	29	26	30	30
39	US	7	4	3	3	8	6	6	4	7	10	5	5	8	9	12	13	12
40	Venezuela	0	0	0	0	2	0	0	0	0	2	0	0	0	0	2	0	0

*Source: Estadísticas de Comercio Exterior de España, 1898-1913.*

Table 4. *Extensive and intensive margins of imports by country, 1900 and 1910*

	1900			1910		
	<i>Extensive margin</i>	<i>Intensive margin</i>	<i>Overall</i>	<i>Extensive margin</i>	<i>Intensive margin</i>	<i>Overall</i>
<i>Developed countries</i>						
UK	0.9962	0.5981	0.5959	0.9981	0.2996	0.2990
France	0.9999	0.1565	0.1565	0.9999	0.1594	0.1594
Germany	0.9995	0.1263	0.1262	0.9995	0.3574	0.3573
Switzerland	0.9895	0.1049	0.1038	0.9537	0.1741	0.1660
Belgium	0.6380	0.0078	0.0050	0.9401	0.0039	0.0036
US	0.3051	0.0009	0.0003	0.6485	0.0018	0.0012
<i>Average</i>	0.8214	0.1658	0.1646	0.9233	0.1660	0.1644
<i>Developing countries</i>						
Austria-Hungary	0.6662	0.0137	0.0091	0.9328	0.0125	0.0117
Italy	0.4594	0.0046	0.0021	0.5323	0.0011	0.0006
Portugal	0.4706	0.0004	0.0002	0.7296	0.0007	0.0005
Argentina	0.1138	0.00003	0.000003	0.3223	0.0001	0.00004
Cuba	0.1686	0.0001	0.00001	0.2579	0.0002	0.00004
Algeria	0.2245	0.0001	0.00003	0.6476	0.0002	0.0001
<i>Average</i>	0.3505	0.0031	0.0019	0.5704	0.0025	0.0022

*Notes:* Overall is the share of country imports in total Spanish imports. Calculations based on Hummels and Klenow, 'Variety and quality'. For definitions, see text and appendix.

*Source:* *Estadísticas de Comercio Exterior de España, 1898-1913.*

Table 5. *Determinants of total exports, 1885-1913*

Dependent variable	Total exports		
	(1)	(2)	(3)
ln Population	1.574*** (0.381)		
ln GDP per capita		4.288*** (1.030)	
ln Wages			4.991*** (1.227)
ln Distance	-4.801*** (0.798)	-1.644*** (0.343)	-3.200*** (0.505)
ln Tariff	-0.135 (0.401)	-0.452 (0.992)	-0.325 (0.785)
Border	-1.522*** (0.426)	1.157*** (0.438)	0.683 (0.549)
MFN	1.190*** (0.374)	0.957*** (0.356)	1.553*** (0.455)
Gold standard	6.005*** (0.843)	3.452*** (0.835)	6.282*** (1.021)
Diplomatic rep in country	-0.271 (1.457)	1.810*** (0.678)	6.073*** (0.496)
Diplomatic rep in Spain	2.460 (1.622)	1.439*** (0.710)	
Intercept	9.049*** (4.102)	-31.003*** (7.988)	-12.550*** (5.130)
Year dummies	Yes	Yes	Yes
Num. obs.	83	71	55
Pseudo R-squared	0.392	0.328	0.359
Method of estimation	PPML	PPML	PPML

*Notes:* Method of estimation is Poisson PML. Dependent variable is total share of country's trade as defined in Hummels and Klenow, 'Variety and quality'. Countries included are eight European countries (Austria-Hungary, Belgium, France, Germany, Italy, Portugal, Switzerland, and U.K.), and Algeria, Cuba, Argentina, and U.S. Years: 1885, 1889, 1897, 1900, 1905, 1910 and 1913. Distance is the great circle distance between Barcelona and exporter's capital; border dummy is 1 for Portugal and France, and 0 otherwise; tariff is calculated by product as the ad-valorem equivalent; MFN dummy is 1 if exporter had a trade treaty with Spain and 0 otherwise; gold standard dummy is 1 if exporter was on the gold standard; diplomatic representation in country dummy is 1 if Spain had representation in exporting country; diplomatic representation in Spain dummy is 1 if exporter had representation in Spain. Robust standard errors in parentheses. \*\*\* p value <0.01; \*\* p value <0.05 and \*p value<0.1.

*Sources:* Exports and tariff from *Estadísticas de Comercio Exterior de España, 1898-1913*. For other variables, see appendix.

Table 6. *The contribution of trade costs (%)*

<i>% of trade explained by</i>	<i>Total</i>	<i>UK</i>	<i>Italy</i>	<i>Germany</i>
Market size (population)	32.39	37.58	33.46	37.08
Trade costs	67.61	62.42	66.54	62.92
Level of development (GDP per capita)	84.19	88.58	81.42	87.54
Trade costs	15.81	11.42	18.58	12.46
Productivity (wages)	61.40	70.12	55.79	67.81
Trade costs	38.60	29.88	44.21	32.19

*Notes:* Share of trade explained by population, GDP per capita, or wages, and trade costs from Table 5. The contribution of each factor is the coefficient of the variable multiplied by the mean value of variable. The share of trade costs is the sum in absolute values of the contributions of distance, border, MFN, gold, and diplomats.

*Sources:* See table 5 and appendix.

Table 7. *Determinants of intensive and extensive margins, 1885-1913*

Dependent variable	<i>Intensive margin</i>			<i>Extensive margin</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
ln Population	1.551*** (0.387)			0.077*** (0.030)		
ln GDP per capita		4.262*** (0.993)			0.572*** (0.131)	
ln Wages			5.017*** (1.208)			0.331* (0.194)
ln Distance	-4.648*** (0.797)	-1.642*** (0.336)	-3.182*** (0.493)	-0.303*** (0.056)	-0.328*** (0.050)	-0.364*** (0.068)
ln Tariff	-0.131 (0.408)	-0.450 (0.971)	-0.319 (0.779)	-0.167 (0.124)	-0.176* (0.106)	-0.061 (0.130)
Border	-1.468*** (0.436)	1.177** (0.426)	0.735 (0.549)	-0.130* (0.079)	0.080 (0.081)	-0.096 (0.093)
MFN	1.145*** (0.393)	0.952*** (0.356)	1.572*** (0.455)	0.078 (0.072)	-0.0001 (0.057)	-0.033 (0.067)
Gold standard	5.434*** (0.814)	2.987*** (0.802)	5.683*** (1.020)	0.389*** (0.103)	0.155 (0.113)	0.363*** (0.160)
Diplomatic rep in country	-0.484 (1.444)	1.679*** (0.705)	5.578*** (0.513)	0.036 (0.172)	0.087 (0.096)	0.202 (0.236)
Diplomatic rep Spain	2.642* (1.592)	1.468*** (0.682)		0.426* (0.224)	0.0005 (0.107)	
Intercept	8.767** (4.075)	-30.227*** (7.706)	-11.74*** (5.102)	0.992 (0.537)	-2.104*** (0.952)	0.741 (0.811)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Num. Obs.	83	71	55	84	71	55
Pseudo R-squared	0.385	0.327	0.359	0.040	0.031	0.033
Method of estimation	PPML	PPML	PPML	PPML	PPML	PPML

*Notes:* Method of estimation is Poisson PML. Dependent variables are the extensive and intensive margins as defined in Hummels and Klenow, 'Variety and quality'. 'Years: 1885, 1889, 1897, 1900, 1905, 1910, and 1913. Robust standard errors in parentheses. \*\*\* p value <0.01; \*\* p value <0.05 and \*p value <0.1.

*Sources:* Exports and tariff from *Estadísticas de Comercio Exterior de España, 1898-1913*. For other variables, see appendix

Table 8. *Similarity index 100 products*

	<i>Germany</i>	<i>UK</i>	<i>France</i>	<i>Belgium</i>	<i>SWI</i>	<i>US</i>	<i>Italy</i>	<i>Portugal</i>	<i>A-H</i>	<i>Argentina</i>	<i>Cuba</i>	<i>Algeria</i>	<i>Ave</i>
UK	0.48												
France	0.78	0.42											
Belgium	0.51	<b>0.24</b>	0.52										
Switzerland	0.28	0.30	0.36	<b>0.19</b>									
US	<b>0.21</b>	<b>0.14</b>	<b>0.17</b>	<b>0.18</b>	<b>0.10</b>								
Italy	0.37	0.66	<b>0.30</b>	<b>0.17</b>	<b>0.11</b>	<b>0.11</b>							
Portugal	<b>0.17</b>	<b>0.09</b>	<b>0.13</b>	<b>0.18</b>	<b>0.09</b>	0.59	<b>0.05</b>						
A-H	<b>0.42</b>	0.46	0.53	0.63	0.21	0.16	0.42	<b>0.10</b>					
Argentina	<b>0.28</b>	0.39	<b>0.40</b>	0.49	0.25	<b>0.14</b>	0.32	<b>0.06</b>	0.54				
Cuba	<b>0.08</b>	<b>0.09</b>	<b>0.11</b>	0.08	<b>0.04</b>	<b>0.05</b>	<b>0.13</b>	<b>0.03</b>	<b>0.13</b>	<b>0.22</b>			
Algeria	0.31	0.33	0.30	0.25	<b>0.08</b>	<b>0.11</b>	<b>0.26</b>	<b>0.05</b>	0.34	0.33	<b>0.10</b>		<b>0.26</b>
													Total
Dissimilar from 1900	<b>5</b> 11	<b>4</b> 11	<b>5</b> 11	<b>5</b> 11	<b>6</b> 11	<b>9</b> 11	<b>7</b> 11	<b>10</b> 11	<b>3</b> 11	<b>5</b> 11	<b>10</b> 11	<b>5</b> 11	<b>74</b> 132

*Notes:* Similarity between country A (column) and B (row) is calculated as one minus half the sum of the absolute value of differences between the product shares in manufacturing exports of country A and those of country B. It ranges between 0 (perfect dissimilarity) and 1 (perfect similarity). The figures in bold are similarity scores that have declined between 1897 and 1913. See Fontagné, Gaulier, and Zignago, 'North-south'.

*Source:* *Estadísticas de Comercio Exterior de España*

Table 9. *Determinants of Unit Values, 1885-1913*

Dependent variable unit value	(1)	(2)	(3)	(4)
ln GDP per capita	0.444*** (0.062)	0.113 (0.084)		
ln GDP per capita Spain		1.203*** (0.219)		
ln Wages			0.796*** (0.161)	0.286* (0.165)
ln Wages Spain				2.755*** (0.382)
ln Distance	0.134* (0.073)	0.007 (0.076)	0.543 (0.466)	0.402 (0.422)
ln Tariff	-0.137*** (0.037)	-0.043* (0.040)	-0.194*** (0.046)	-0.106*** (0.046)
Border	0.197*** (0.061)	0.0261 (0.066)	0.319 (0.264)	0.220** (0.242)
MFN	-0.069*** (0.024)	-0.040 (0.023)	-0.086*** (0.031)	-0.021 (0.030)
Gold standard	-0.137*** (0.037)	-0.033 (0.038)	-0.223*** (0.073)	-0.008 (0.065)
Diplomatic rep. in country	0.158*** (0.055)	0.074 (0.056)	-0.114 (0.135)	-0.212* (0.137)
Intercept	-2.017*** (0.672)	-8.307*** (1.333)	-1.433 (1.581)	-10.403*** (1.987)
Product dummies	Yes	Yes	Yes	Yes
Num. Obs.	572	572	407	407
Pseudo R-squared	0.259	0.266	0.257	0.269
Method of estimation	PPML	PPML	PPML	PPML

*Notes:* Method of estimation is Poisson PML. Dependent variable is unit export values per country for 14 cotton textile products. t-statistics in parentheses. Countries included are eight European countries (Austria-Hungary, Belgium, France, Germany, Italy, Portugal, Switzerland, and U.K.), and Algeria, Cuba, Argentina, and US. Years: 1885, 1889, 1897, 1900, 1905, 1910 and 1913. The regressions control for K/L, labor and capital costs in cotton textiles for each country in 1910. See Table 5 for definition of variables and appendix. Robust standard errors in parentheses. \*\*\* p value <0.01; \*\* p value <0.05 and \*p value <0.1.

*Sources:* Exports and tariff from *Estadísticas de Comercio Exterior de España, 1898-1913*. For other variables, see appendix.