

The good reputation of late XIX century protectionism: manufacture versus total protection in the European tariff growth debate.

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(This is a very preliminary work please do not quote)

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“Although import substitution policies have gradually lost their shine over the postwar period, their reputation has remained intact for the late nineteenth century” (Irwin, D. (2001) p. 1.

Abstract:

In the tariff growth debate, especially for Europe late XIX century, the important question is: was protection a successful policy to foster industrialization? Total tariff average may not only provide little information for interpreting the tariff mechanism causation to growth but perhaps an erroneous one. This paper try to make more explicit the relation between industrial, agricultural and fiscal tariffs to clear the mechanism of causation between tariffs and growth. The good reputation of late 19th century European protectionism is questioned in this paper. First results show a negative relationship between tariffs and growth in Europe despite is founded a relevant disparities between total and manufacture tariff association with growth in Core and Peripheral European countries. In one side, rich European countries growth is associated with total tariff but not with manufacture tariff increase; and in the other side, poor Europeans countries growth appear negatively associated either with total than with manufacture tariff increase.

Traditionally many authors have supported the idea that protection was instrumental to the development of Continental Europe in the late nineteenth century¹. Bairoch hypothesis that tariffs were positively associated with growth is related mainly with European countries but has been extended also to the rich European Offshoots. The positive correlation founded recently by O'Rourke (2000) strength Bairoch's suggestion, that tariffs may have played a causal role in promoting growth in the years previous to First World War. Such a positive impression has been questioned recently by Irving (2002) arguing that the tariff-growth correlation is specially influenced by the country sample used by O'Rourke. Rapid Growth of high tariffs land abundance countries like , USA, Canada and Argentina and Australia was probably caused more by strong imports of capital than by protection policies². High tariffs in those countries with low land-population ratios was probably explained more by trade tax dependence than for an import

¹ For Europe many authors, like Milward –Saul (1977), Pollard (1982) but notably Bairoch (1976, 1989, 1996) and recently the already mentioned work by O'Rourke (2000) and Clemens Williamson (2001) implicitly sustain this position for the period 1875 -1914. “Although import substitution policies have gradually lost their shine over the postwar period, their reputation has remained intact for the late nineteenth century” (Irwin (2001) p. 1

² O'Rourke (2000). data set cover ten countries, three in the New World (Australia, Canada, and USA) and seven in Europe (Denmark, France, Germany, Italy, Norway, Sweden and UK). Irving (2002) Figure 1 present only an unconditional relation between average tariffs in 1870 and per capita growth rates between 1870-1913, for a similar sample with Canada, Argentina, and USA emerging as clear high growth- high tariffs outliers. Correlation without these countries fall from 0,68 to 0,08.

substitution strategy³. More over, even in Europe, tariffs average measures used for correlation equations (costume revenue divided by imports) may not be a good indicator of a country's trade policy, because revenue-generating tariffs (imposed on a few exotic products) represent a relevant and changing share of total costume revenue in Europe late 19th century. Fiscal tariffs imposed on exotic products have a much smaller impact on welfare and on import substitution than tariffs designed to protect domestic production⁴.

Second criticism came in terms of regional asymmetry in tariff-growth behaviour. Clements & Williamson (2001) support Bairoch suggestion that protection was associated with fast growth before World War II but they think that this association is weak and negative in the poor periphery.⁵

Last but not least criticism came from the USA tariff story. DeLong(1998), and Irwin (2000) suggest that the central question to investigate is on how did the tariff affect the process and direction of capital accumulation? Irwin (2002) suggest that, for late 19th century Europe, the main channel to explain the tariffs growth mechanism is the potential encouraging structural change from agriculture to industry to raise output per worker. Tariffs may accelerate the movement from low-productivity agricultural workers into higher-productivity manufacturing jobs⁶.

This paper discusses the main criticisms that make the use of the average tariff indicator to establish a causal relationship between tariffs and growth in late 19th century Europe especially vulnerable. Total tariff average may not only provide little information for interpreting the tariff mechanism causation to growth but perhaps an erroneous one. Historical events as agricultural protection reaction in the aftermath of the Great grain invasion (O'Rourke (1997), European

³ The main departure assumption is that, for a given government demand revenue, trade taxes generates bigger efficiency distortion than income taxes. So the second is preferable to the first but it is not implemented because there are higher collection cost for income taxes than for trade taxes. Eastery&Rebelo(1993) employ "historical data" for 28 countries from 1870-1988 and recent cross-section data for 100 countries 1970-1988, their main findings are (P.417): there is a strong association between development level and fiscal structure: poor countries rely heavily on international trade taxes and its share is significant influenced by the scale of the economy, measured by its population; even if you control by income and share of trade in GNP. In the same line Irwin (2002) p.168, argues that: "Land-abundant countries tended to impose high tariffs for public finance and for political-economy reasons. In terms of public finance, import taxed made sense for countries with low population densities. Other means of raising revenue (excise taxes, land taxes, income taxed, etc.) were not feasible or as enforceable in countries with a widely dispersed population, particularly in late 19th century."

⁴ Tena (2001, 2005) offers evidence of the strong and changing presence of the so-called fiscal products in total tariff revenues in central and peripheral Europe and its implications for 19th century comparative European trade policy.

⁵ Clements & Williamson (2001)p. 10 "finally, tariffs had a negative impact on growth in the European Periphery (-0,17 before war and -0,52 after)". Tariff growth regional asymmetry behavior has been looked out recently for late 20th century decades in the other way around see Dejonj -Ripoll (2005).

⁶ Assuming that Industrial tariff may exerts two contradictory effects on growth. First, emphasizes by import substitutions views, pulling resources into the manufacturing sector, it enlarge the scope for dynamic scale benefits, thereby increasing growth. Second, emphasizes by free traders views, imposing a static efficiency loss, the cost of which rises over the time as the inefficient manufacturing sector becomes larger.

Offshoots trade tax dependence or the big share of exotic tariff goods in total tariff revenue in rich European countries between 1870 to 1914 (Tena 2001, 2005), suggest the use of alternative indicators to the conventional total tariff average in tariff growth correlation equation or even for unconditional association. If we accept that the relevant question for Europe late nineteenth century, is: was protection a successful policy to foster industrialization? Then we should be more interested in the correlation between industrial tariff average and total factor productivity increase. GDP per person growth has probably a good correlation with total productivity increase in the long run, but perhaps total tariff average is not a good proxy for an industrial protection strategy.

This paper will use two sets of industrial tariffs data: first Bairoch's (1989) and League of Nations(1927) estimations of manufacture tariff levels for 15 European countries in 1875 and 1913 respectively. Second a new data sets on prices and tariffs of 25-34 manufactures products in 13-17 European countries constructed for two benchmarks years 1875 and 1902 complementing British Board of trade work for those years. The paper will present two samples of countries, Core and Periphery, according to income level⁷. First results show a negative relationship between tariffs and growth in Europe, despite is founded a relevant disparities between total and manufacture tariff association with growth in Core and Peripheral European countries. In one side, rich European countries growth is associated with total tariff but not with manufacture tariff increase; and in the other side, poor Europeans countries growth appear negatively associated either with total than with manufacture tariff increase.

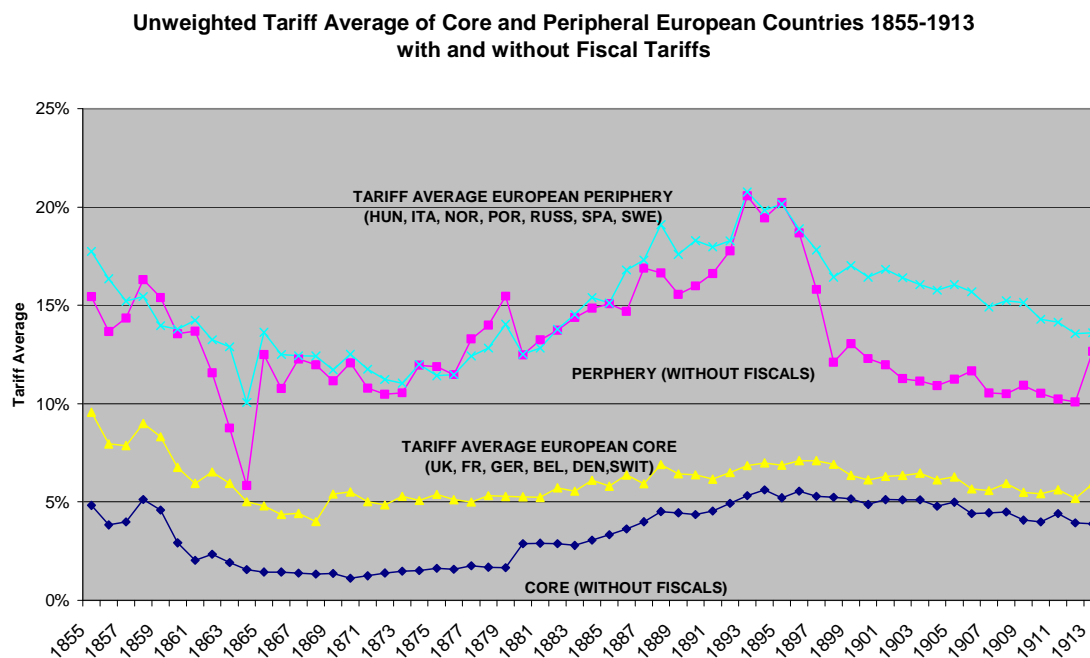
1. European protectionism and the tariff growth debate.

What impact had protection in the late nineteenth century? Is a question with a no easy answer, but the accumulating evidence came mostly from the European trade history. Literature and recent research explain the roots of the international "return to protection" in the European response to the arrival of New World and Russian cheap grain to European markets, from 1870 onwards, because of falling transport cost. The impact of falling agrarian prices in the New World and in Europe has been studied by Harley (1978, 1980) O'Rourke (1997) O'Rourke- Williamson (1999). Notably Barioch (1976, 1989,1996) has extensively studied the European Continent reaction assuming that it was relevant and instrumental for development of Continental Europe, but he put the emphasis more in the Continental reaction against manufacture British competition than in the "agrarian invasion". It is truth that Protection backlash should not be separated from a more general European nationalist reaction to the new globalization period and their influence on

⁷ Core European countries are defined according to Maddison (1995): those that in 1870 had GDP per Capita (international 1990 dollars) equal or superior to France (Core: Austria, Belgium, Denmark, France, Germany, Netherland, Switzerland, UK) that had 56% of the UK level (the next Sweden with the 50%). Peripheral countries the rest (ordered by income): Sweden, Italy, Spain, Norway, Hungary, Portugal, Russia.

new nationalist rethoric had on pressure groups and parliaments alliances or even in long swing political events (Polard (1982). Nevertheless, some authors like Capie thinks that “the extent of protection, however, turns out to have been less than is often suggested, and the impact on economic growth is found to have been trivial” Capie (1994), p.6. Only recently, the European tariff backlash has been contextualized inside the behavior of the world protection tariff reaction. The new measures offered by Clements-Williamson (2001) show a very moderate reaction on average of rich Europe (France, Germany and UK) in contrast with peripheral poor Europe⁸.

Figure 1



Sources: Tena (2005)

Figure 1 confirm and extend the Clements Williamson (2001) evidence supporting European regional asymmetry tariff backlash between Peripheral and Core Countries⁹. Conventional tariff average would show how European return to protection against globalization was more a poor than a rich country experience. European poor countries tariff level double the rich one's in the late sixties and early seventies and late seventies reaction was earlier and stronger than in the rich Europe. Exotic products revenue represented a bigger share in total dutiable

⁸ Clemens Williamson (2001) only include US as a non European country in the 4 members of the industrial core (France, Germany, UK and USA) and 10 European Periphery (Austria-Hungary, Denmark, Greece, Italy, Norway, Portugal, Russia, Serbia, Spain, Sweden).

⁹ Figure 1 tariff average, are estimated as the unweighted average of the countries mentioned. First as the ratio of total tariff revenue between total imports and second excluding of that ratio revenue and imports of the exotic products in every country (sugar, coffee, tobacco and cacao). For Sources and procedure in the individual countries see Appendix 2 Tena (2005).

imports in the European Core than in the Periphery. European Core tariff level *without fiscals* is even lower but *the return to protection* is better defined and adapted to the well known qualitative commercial history, at least for the case of France and Germany. Rich European protection was moderate and because of that very influenced by the exotic product tariffs imposed by fiscal reason. On the contrary much heavy protected Periphery appear more close to an import substitution strategy and probably in these countries protection was more relevant for growth.

Figure 2

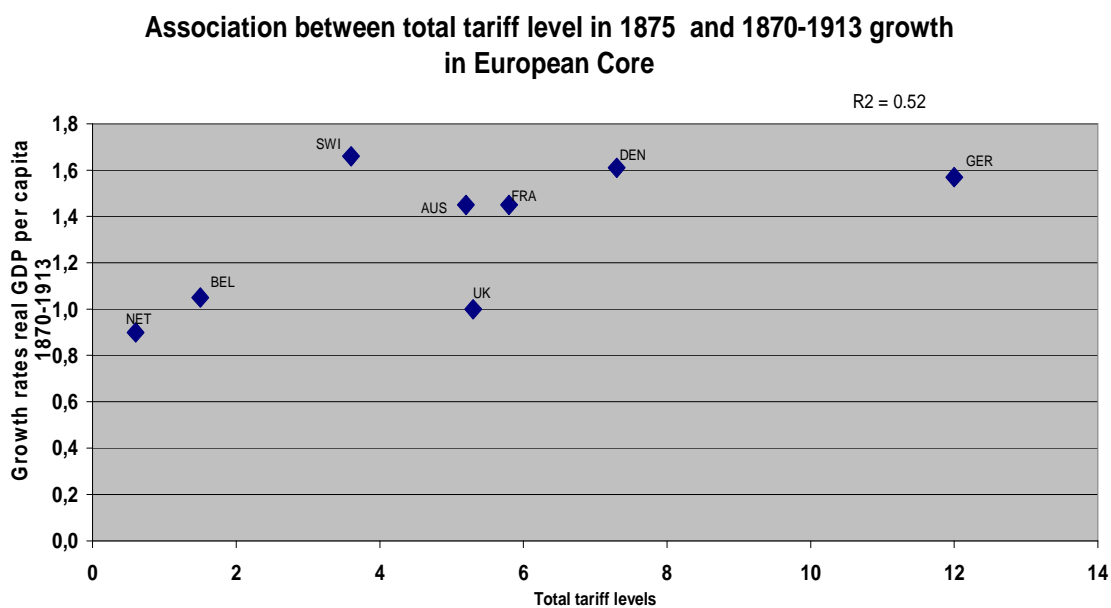
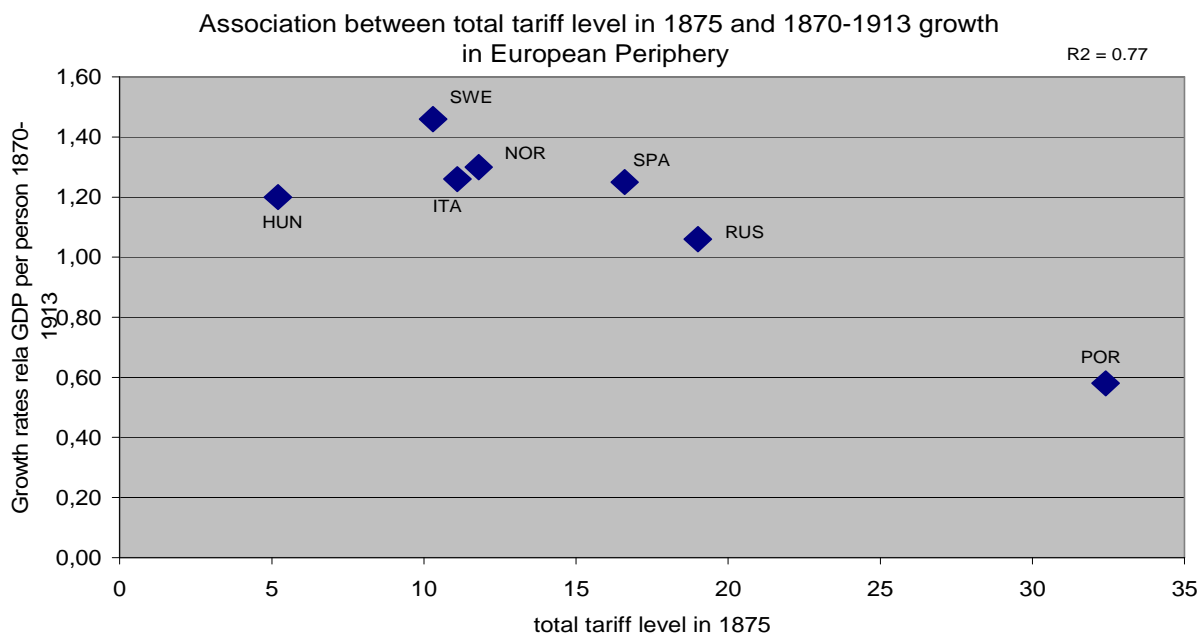
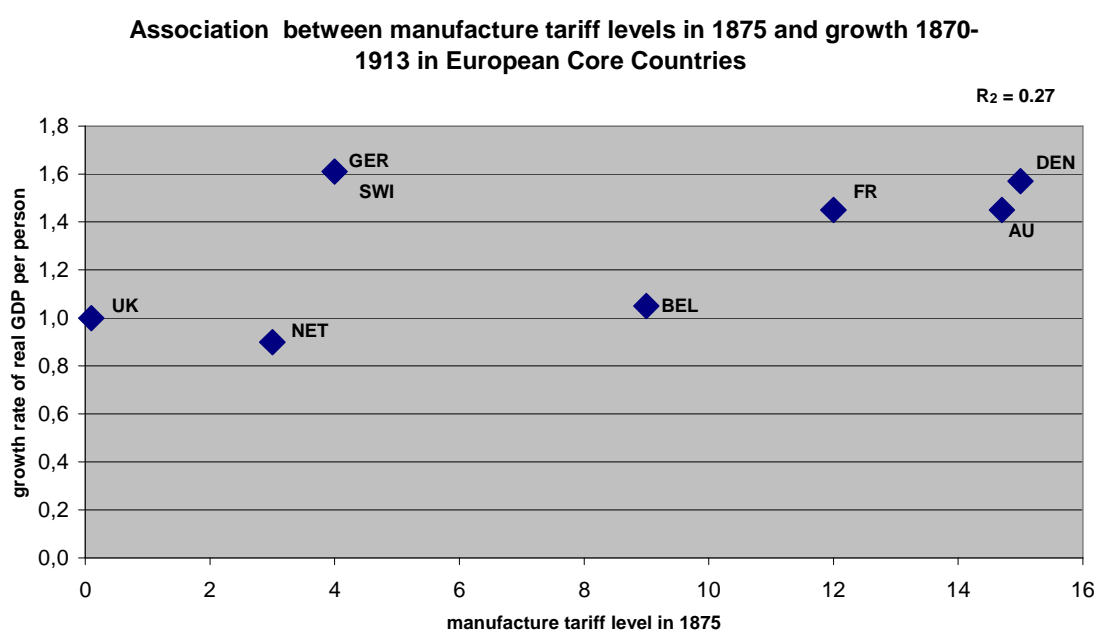


Figure 3



In theory, there is more room for a positive protection impact on growth in countries with a bigger agricultural sector a higher productivity differential from traditional to industrial sector. The positive association between total tariff average and growth showed for rich European countries and the negative showed by poor Europe respectively in Figure 2 and 3 are apparently contra intuitive¹⁰. Initial rich European low tariff levels were positive associated with growth ($R^2=0.52$, without UK $R^2=0.65$), and poor European countries with high tariff levels have a clear negative association with growth ($R^2=0.77$, without Hungary $R^2=0.87$). Bairoch's hypothesis on tariffs fostering Continental Europe industrialization at the end of nineteenth century appear not to holds up for peripheral European countries. But we do not know if the positive association is because moderate tariffs were irrelevant or because core European countries protected more the higher productive sectors with bigger impact on growth.

Figure 4



¹⁰ Dejonj –Ripoll (2005) using tariff average –growth equations for the period 1975-2000 (60 countries) find that the marginal impact of tariffs on growth is declining in income. Moreover, evidence of a negative relationship between tariffs and growth is apparent only among the world's rich countries.

Figure 5

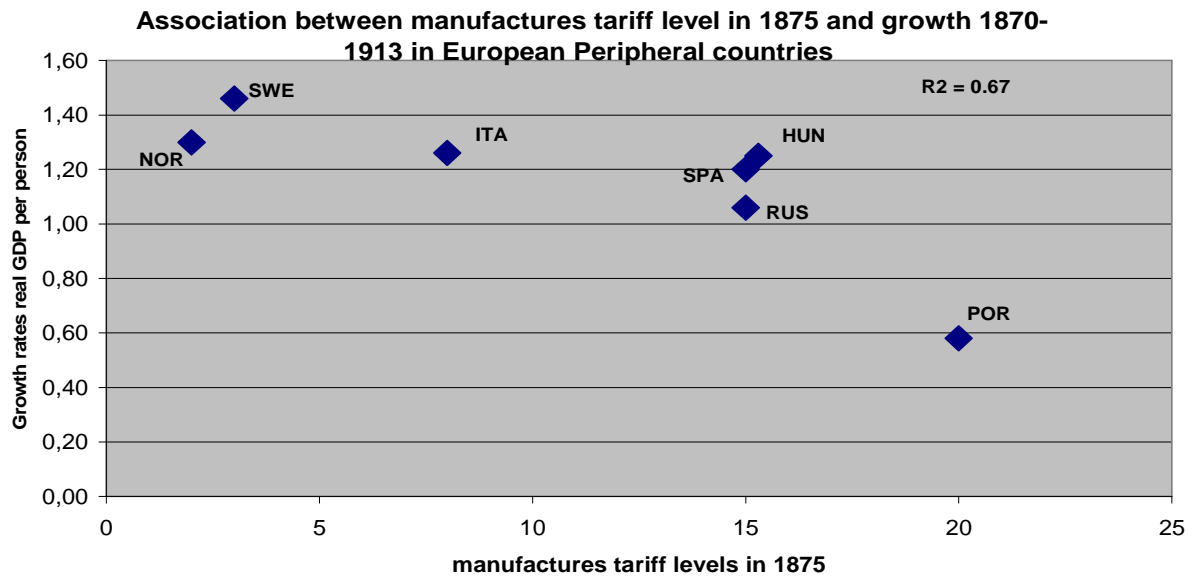


Figure 4 and 5 associate Paul Bairoch estimations of manufacture tariff average in 1875 with tariff growth for the same groups of countries. Rich European countries positive association is lower than for total average very low but still is remained at the same time that the negative strong association between manufacture tariffs and growth is confirmed for the poor European countries. So, In one side, rich European countries growth is associated with total tariff but not with manufacture tariff increase; and in the other side, poor Europeans countries growth appear negatively associated either with total than with manufacture tariff increase. In the next section we will try to introduce new evidence and arguments to clarify this puzzle on the tariff growth mechanism.

2. European industrial tariff policy.

The triumph of protection in Continental Europe was very largely the result of a coalition of interest between farmers, disappointed with lowering grain prices, and industrialist who had never been convinced of the advantage of competing with British manufactures. Industry in Poor Continental Europe during the short period of fifteen years that follow the Cobden –Chevalier free trade period did not enjoyed really from tariff disarmament. It is true that countries political situation in Europe were very different and in consequence liberalism went over at different speeds around Europe. Bairoch (1989) does not pay attention to the industrial tariff levels in relation with economical or Institutional development. This paper has used the only comparative manufacture

tariff level estimation available for 19th century estimated by Bairoch for the year 1875. As Appendix B show Portugal appear as the most manufacture protected country in Europe with a tariff average around 20-25 per cent followed by Austria-Hungary, Denmark, Russia and Spain with levels around 15-20 percent. From Peripheral Europe only Norway and Sweden would appear with low levels around 4 per cent. France with 12-15 per cent level almost three fold Germany and Italian 4-6 per cent levels, the last being presented as one the few big European countries that enjoined a real free trade period. As expected, small rich countries (with the exception of Belgium with a 9-10%) appear with a very low manufacture protection. Manufacture tariff reaction in the 1880's and 1890's was probably very different and disperse all around Europe. We only have a qualitative picture from the literature because there are not accurate estimations comparable along the time before and after the years of return of protection.

Table 1
Manufacture tariff average in Europe 1875-1902

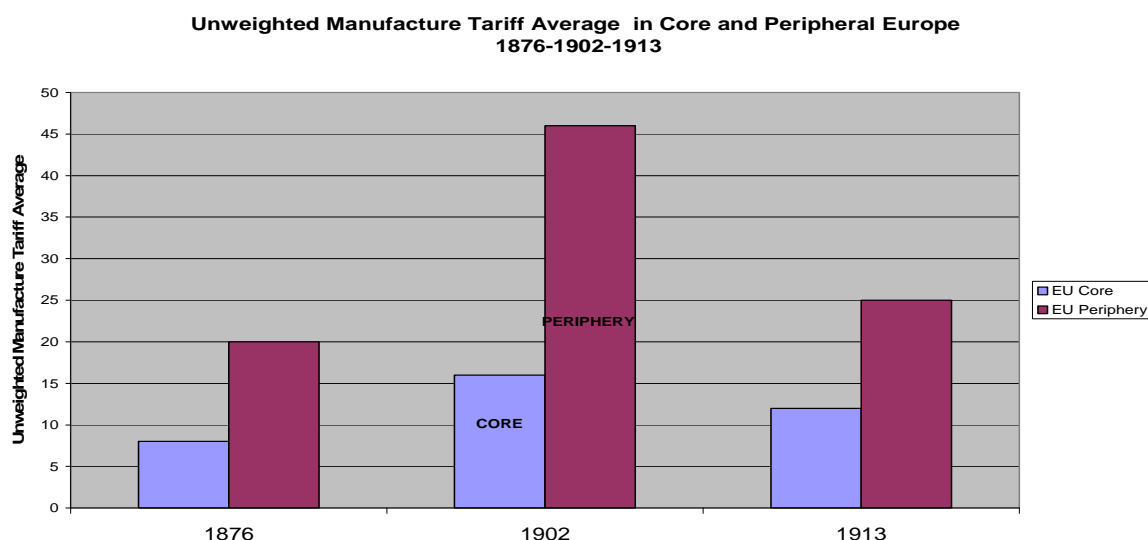
	<u>1875 (a)</u>	<u>1876(b)</u>		<u>1902 (b)</u>		<u>1913 ©</u>
	Manufacture Bairoch	Manufacture Weighted	Unweighted	Manufacture Weighted	Unweighted	Manufact Unweighted
Austria	15-20%	24%	12%	36%	28%	18%
Belgium	9-10%	10%	6%	13%	9%	10%
Denmark	15-20%	16%	10%	20%	16%	14%
France	12-15%	23%	13%	33%	29%	16%
Germany	4-7%	15%	7%	26%	21%	10%
Holland	3-5%	3%	2%	3%	2%	4%
Switzerland				7%	7%	9%
EU Core	11,00%	15%	8%	20%	16%	12%
Hungary	15-20%	24%	12%	36%	28%	18%
Italy	8-10%	17%	10%	27%	24%	15%
Norway	2-4%	13%	6%	14%	11%	
Portugal	20-25%	34%	31%	75%	88%	
Roumania				13%	13%	26%
Rusia	15-20%	69%	38%	144%	118%	
Spain	15-20%	53%	32%	77%	68%	43%
Sweden	3-5%	17%	9%	24%	20%	25%
EU Periphery	13%	33%	20%	51%	46%	25%

Sources: (a): Bairoch (1989) Table 5 p.42. (b): Appendix A. (c): Also export prices from Liepman (1938) Table IV A, p.413, with the exception of Austria, Denmark and Holland that came from League of Nations (1927) B1 p.15 (also export prices).

In previous figures we have used Bairoch's estimation of manufacture tariff levels for 15 European countries in 1875 to construct two samples of countries, Core and Periphery, according

to their income level¹¹. In Table 1 we follow the same classification using the new estimations of manufacture tariff average developed in Appendix A, for 1876 and 1902 and Liepman(1938) and League of Nations (1927) for 1913. Estimation for 1876 and 1902 use export prices weighted or unweighted by british export extending Board of Trade first estimation and comparable with the 1913 estimations, that use too export prices. The use of export fob prices in tariff average has the inconvenient of producing higher higher tariff levels than the conventional tariff average estimated using cif import values. The virtue of this system is that export prices represent better free trade prices than import unit values estimated after tariff distortion on domestic prices. The new estimations of manufacture tariff average levels offered by 1876 are very different from those of Bairoch but offer a quite similar ranking order from more to less protected countries.

Figure 6



Sources: Table 1. Unweighted column .

Figure 6 show how manufacture protection in rich and poor European countries follow a similar trend than it was discussed for total protection in Figure 1. Manufacture protection in the 1870's was much more important in Peripheral than core countries. Most of the poor countries perhaps with the exception or Norway, Italy and Sweden, had not disarmed their manufacture tariff barriers during the short free trade period that followed the Anglo-French treaty. Industrial lobbies coalition with agrarian interest consolidate nationalism and protection all around Europe but especially in poor countries. In the early 1890's most of the countries had approved already complex tariff laws as the epilogue of and extended trade wars and definitive abandonment of the "most favourite country clause". Rich countries point of departure manufacture tariff average was

¹¹ See note 7.

almost one third the level of the peripheral countries but backlash against globalization is recorded by figure 6 as an increment of two fold the 8 per cent tariff average of the 1870's, meanwhile Peripheral countries reacted even stronger, increasing more than two fold their high 20 per cent level of the 1870's. The extended specific tariff method in Continental Europe allowed important reduction in tariff levels from the later 1890's because consistent increase trend in international prices of agrarian and manufacture products from the second half of the 1890's to 1913. Even if parliaments and new tariffs laws were approved during the first years of the 20th century, price increase produced, with the exception of some new sectors developed during the of the second industrial revolution, a generalised reduction in protection especially in Poor European countries.

3. European Manufacture protection and Growth

For late 19th century Europe, a first channel to explain the tariff - growth mechanism is the potential encouraging of structural change from agriculture to industry to raise output per worker. Tariffs may accelerate the movement from agriculture to industry to raise output per worker into higher-productivity manufacturing jobs. A second channel is proposed by Williamson (1974, p. 657), for the case of USA, arguing that industrial tariffs may have had a positive impact on growth because industrial tariffs at the end of 19th century taxed mainly final manufacture goods leaving out the protection of finished capital goods that were rarely traded in this period¹². Nowadays tariffs lower the growth rate, in part by making investment goods such as equipment and machinery relative more expensive: since they are largely traded across international frontiers and in consequence protected. In late 19th century manufacture tariffs lowered the price of construction and investment relative to heavily tariffed manufactured or agriculture products with the results that more resources were devoted to investment. De Long (1998, p. 370) for the case of USA say that "Thus, tariffs on imported capital goods could have proven very harmful to capital accumulation and economic growth"¹³

There are very few reliable comparative studies on relative protection between agricultural and manufactures or total tariff average before 1913¹⁴. So before 1913 we only can make very rude an speculative hypothesis as those derived from Table 1 of the Appendix B.

Table 1 of the Appendix use Bairoch (1989) and Liepman (1938) manufacture tariff average estimations for the respective years of 1875 and 1913 in relation with total average¹⁵. Apparently,

¹² This argument is also cited by O'Rourke (2000). On the contrary De Long (1998) argues that in USA late 19th century capital goods were traded and taxed at roughly the same rate as final manufacture products.

¹³ Collins and Williamson (1999) report regressions that indicate higher tariffs were associated with lower relative prices of capital goods in a panel of countries prior to 1950 (although they report that this finding is not robust to the exclusion of the United States).

¹⁴ This study estimate weighted and unweighted manufacture tariff average using british export prices and results are not comparable with the classical total tariff average estimated as the ratio of tariff revenues between import values. For a comparative study using the same method for years before 1913 see Table 2 of the Appendix for Spain and Italy. For 1913 and the interwar period we have the Liepman (1938) and League of Nations(1927) well known studies.

in the first half of 1870's, before the years of return to protection, rich European countries had a remarkable more protected manufactured sector than the rest of the economy. Amazing, relative manufacture protection in the same years in the European periphery was in the other way around. Even if the data, showed in table 3, have serious comparability problems, it suggest that rich European countries relative manufacture tariffs ratio was reduced from 1870's to First War World. What this crude ratio evolution may show? a) That the stimulus of industrial protection to shift resources out of agriculture and into manufacturing was reduced during the years of return of protection in most rich European countries? b) That the ratio between manufacture tariffs and primary product tariffs worsened because some primary products tariffs used by fiscal reasons increased faster than the rest agricultural and industrial duties. Figure 1 offer some support to the b) hypothesis but data is very weak and provisional to go further on this grounds.

Following the second channel, What may be said on the relative protection levels between investment and consumer manufactures during the period of return to protection?

Table 2
Finished and Investment Manufacture protection in Core and Peripheral European Countries in 1902

European Core 1902	Austria	Belgium	Denmark	France	Germany	Holand	Switzerland
Manufacture Protection Weighted	36%	13%	20%	33%	26%	3%	7%
COTTON MANUFACTURES	55%	25%	33%	46%	44%	5%	10%
IRON AND STEEL MANUFACTURES	43%	5%	10%	32%	18%	0%	5%
MACHINARY HARDWARE &c	15%	3%	6%	9%	8%	0%	5%

European Pheriphery 1902	Italy	Norway	Portugal	Roumania	Russia	Spain	Sweden
MANUFACTURE PROTECTION WEIGHTED	27%	14%	75%	13%	144%	77%	24%
COTTON MANUFACTURES	37%	25%	89%	17%	228%	118%	39%
IRON AND STEEL MANUFACTURES	38%	0%	5%	5%	91%	40%	7%
MACHINARY HARDWARE &c	10%	0%	8%	0%	26%	17%	10%

Sources: Appendix A, Table 5 and 6

For 1876 even if we have some evidence that machinery was internationally traded it is true that the amount of trade in relation with other finished manufacture was very low. So our extended estimation from the British Board of Trade only offer data on steel and chemical products but not on machinary. Other disperse works offer data on comparing

¹⁵ Manufacture tariff average of Bairoch and Liepman are not directly comparable across the time because they use different methodology. Bairoch estimation use a sample of 14 different manufactured products duties in 1875 weighted by import values average of 1869-71(as usual he is not much more explicit about his estimations). Liepman methodology is very well known. He use a simple average of 61 manufactured products in 1913 over export prices in the same year. On the contrary the ratio between Manufacture and total tariff average in each period is perfectly comparable because both follow a similar methodology with some explicit exceptions in 1913.

protection levels in finished and investment manufactures for 1877 for Spain and Italy that corroborate the more protected finished than investment manufacture in protectionist countries like Spain¹⁶. Table 2 shows that for the turn of the century, when increment in protection was around its highest levels, machinery was much less protected than the total or cotton manufacture (still the most important consumer manufacture internationally traded). This happens as much to Periphery than to Core countries, so evidence show a low level of tariffs on machinery manufactures in relation with finished manufactures all around Europe before and after the years of return to protection. So in case that we would find a positive correlation between manufacture tariffs and growth this is a potential channel to explain a positive mechanism connection between tariffs and growth. We have not found a significant difference in the structure of manufacture protection between rich and poor countries and in consequence tariff manufacture structure do not appear as a good explicative variable candidate to explain country growth difference correlations with high tariffs. Evidence show that late 19th century European tariffs protected, as in the case of USA, labour intensive manufactures, such as cotton textiles and leather, rather than capital-intensive manufactures. Such a tariff could have redistributed income from capital to labour and thereby reduced the incentive to accumulate capital but in general terms investment goods protection in Europe have not been proven to be very harmful to capital accumulation and economic growth.

Figures 2 to 5 gives some sense of the unconditional relationship between tariffs and growth. So, In one side, rich European countries growth is associated with total tariff but not with manufacture tariff increase; and in the other side, poor Europeans countries growth appear negatively associated either with total than with manufacture tariff increase. In this section we introduce new evidence and arguments to clarify this puzzle on the tariff growth mechanism.

Table 3 examine this relationship more formally regressing the annual growth in real per capita GDP on the initial level of tariff and GDP per capita. It is used different tariff measures and other control variables (1) initial Total Average Tariff rate for 1870 (nttot70), (2) The estimated Weighted Manufacture Tariff Average for 1876 (ntmanu75); (3) The estimated Unweighted Manufacture Tariff Average for 1876 (untmanu75); (4) The Bairoch Manufacture Tariff Average for 1875 (ntmanu75b); (5) Population in 1870 (pop70) and the estimated Weighted Manufacture Tariff Average (ntmanu75); (6) the Agricultural Share in total GDP in 1870 (agrshare), population (pop70) and Total Average Tariff in 1870 (nttot70). The European sample is about 15 countries but a dummy is used being 0 for Core 1 for Peripheral countries (see note 7).

¹⁶ Spain in 1877 protected consumer manufacture goods around 25% and imported machinery 8,7 per cent. Italy in 1877 had very low tariffs for consumer goods 5,4% and around 8% for machinery (unweighted data).

Table 3
Regressions on Tariffs and Growth

Regression (1)

Dependen Variable: gdpgr70

	without Dummy	Dummy = 0	Dummy = 1
gdp70	-0.0002 (-1.66)	-0.0004 (-3.53)*	0.0004 (1.85)
nttot70	-0.0297 (-2.50)*	0.0215 (1.17)	-0.0210 (-3.07)*
Constant	1.9781 (5.52)**	2.2458 (6.41)**	0.9716 (2.82)*

Observations

15

8

7

R-squared

0.34

0.83

0.87

Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%

Regression (2)

Dependen Variable: gdpgr70

	without Dummy	Dummy = 0	Dummy = 1
gdp70	-0.0001 (-0.66)	-0.0007 (-4.56)**	0.0011 (2.48)
ntmanu75	-0.0064 (-0.97)	-0.0161 (-1.74)	0.0053 (0.95)
Constant	1.6145 (3.52)**	3.2395 (6.89)**	-0.3417 (-0.50)

Observations

15

8

7

R-squared

0.07

0.86

0.65

Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%

Regression (3)

Dependen Variable: gdpgr70

	without Dummy	Dummy = 0	Dummy = 1
gdp70	-0.0003 (-1.46)	-0.0007 (-3.84)*	0.0008 (1.65)
untmanu75	-0.0201 (-1.89)	-0.0261 (-1.31)	0.0001 (0.01)
Constant	2.0372 (4.28)**	3.1676 (5.76)**	0.1876 (0.24)

Observations

15

8

7

R-squared

0.23

0.84

0.57

Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%

Regression (4)

Dependen Variable: gdpgr70

	without Dummy	Dummy = 0	Dummy = 1
gdp70	-0.0001 (-0.54)	-0.0005 (3.53)*	0.0003 (0.47)
ntmanu75b	-0.0129 (-0.78)	-0.0038 (-0.28)	-0.0201 (-0.73)
Constant	1.4969 (3.73)**	2.5292 (5.85)**	0.9791 (0.85)

Observations

14

7

7

R-squared

0.05

0.85

0.62

Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%

Regression (5)

Dependen Variable: gdpgr70

	without Dummy	Dummy = 0	Dummy = 1
gdp70	-0.0002 (-0.80)	-0.0008 (-4.19)*	0.0010 (2.09)
pop70	0.0000 (0.53)	0.0000 (0.41)	0.0000 (0.32)
ntmanu75	-0.0094 (-1.07)	-0.0168 (-1.63)	0.0034 (0.38)
Constant	1.7074 (3.39)**	3.2414 (6.29)**	-0.2753 (-0.34)

Observations

15

8

7

R-squared

0.10

0.87

0.66

Regression (6)

Dependen Variable: gdpgr70

	without Dummy	Dummy = 0	Dummy = 1
gdp70	-0.0006 (-1.43)	-0.0008 (-1.61)	0.0004 (.)
pop70	0.0000 (0.26)	-0.0000 (-0.61)	-0.0000 (.)
agrshare	-0.0046 (-0.28)	-0.0149 (-0.74)	0.0409 (.)
nttot70	-0.0440 (-2.93)*	0.0157 (0.66)	-0.0500 (.)
Constant	2.9793 (1.79)	3.8116 (1.77)	-0.7925 (.)

Observations

13

8

5

R-squared

0.55

0.85

1.00

Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%

Sources and variables. Table 3 Appendix B

Regression (1) finds a low negative (and significant at 5%) relationship between total tariffs and growth in Europe. This negative relationship is higher (and significant at 5%) in the European periphery, as the unconditional association of figure 3 showed. The rich European countries would have a positive but not significant relationship between tariffs and growth, being backwardness (or lower initial levels of per capita GDP) a more significant explicative variable to explain faster rates growth. A similar negative relationship between weighted manufacture tariffs and growth is found in regression (2), but this association is not significant. Further more, backwardness is significant at 1% to explain growth in rich Europe, meanwhile, higher manufacture tariffs have a strong, but not statistically significant, negative association with faster growth. This negative relationship between manufacture tariffs and growth is found very soft in the total sample of European countries and stronger in core European countries in regressions (3), (4) and (5) with R-squared always superior to 0,85 but never statistically significant. In the same regressions manufacture tariffs and growth in peripheral Europe appear with a positive sign with R-squared around 0,60, no statistically significant and very low t statistics values. The only exception to this positive relationship between manufacture tariff and growth in peripheral countries is found in regression (4), that use manufacture weighted tariff average estimated by Bairoch. As figures 4 and 5 showed for the simple association between both variables manufacture show a low but negative association even for peripheral Europe between manufacture tariffs and growth.

Regression (6) introduce two, additional structural variable control the Agricultural GDP share and Population, in relation with regression (1) The statistical significance of the negative relationship between total tariff and growth is confirmed with improved coefficients and the expected negative sign between lower agricultural share and faster growth. Regression (6) also confirm the positive relationship, between total tariffs and growth found for rich European countries in regression 1 (and despite the scarcity of data also the negative for poor Europe):

The whole regression exercise suggest a negative relationship between tariffs and growth in Europe. This negative relationship is stronger in the peripheral Europe but more for total average than for manufacture tariffs. Rich European countries, on the contrary, had a positive relationship between total tariff average and growth but a negative in the case of manufacture tariffs and growth. An argument that would allow explain in part this puzzle came from figure 1, and is related with the bigger share of fiscal tariffs in total tariff average in rich Europe than in poor Europe. Fiscal tariffs influence more rich European

tariff average but are not related with an import substitution policy. That's would explain the negative relationship with growth of manufacture tariffs in rich Europe too.

Conclusions

This paper discusses the main criticisms that make the use of the average tariff indicator to establish a causal relationship between tariffs and growth in late 19th century Europe especially vulnerable. Total tariff average may not only provide little information for interpreting the tariff mechanism causation to growth but perhaps an erroneous one. Historical events as agricultural protection reaction in the aftermath of the Great grain invasion (O'Rourke (1997), European Offshoots trade tax dependence or the big share of exotic tariff goods in total tariff revenue in rich European countries between 1870 to 1914 (Tena 2001, 2005), suggest the use of alternative indicators to the conventional total tariff average in tariff growth correlation equation or even for unconditional association. If we accept that the relevant question for Europe late nineteenth century, is: was protection a successful policy to foster industrialization? Then we should be more interested in the correlation between industrial tariff average and total factor productivity increase. GDP per person growth has probably a good correlation with total productivity increase in the long run, but perhaps total tariff average is not a good proxy for an industrial protection strategy.

First results show a negative relationship between tariffs and growth in Europe, despite is founded a relevant disparities between total and manufacture tariff association with growth in Core and Peripheral European countries. In one side, rich European countries growth is associated with total tariff but not with manufacture tariff increase; and in the other side, poor Europeans countries growth appear negatively associated either with total than with manufacture tariff increase.

Evidence showed in this paper appear quite contrary to Bairoch (1977,1989,1996) traditional hypothesis on the positive role that protection played to foster Continental Europe industrialization before First War World. Nevertheless, the paper suggest additional research to explicit the relation between industrial, agricultural and fiscal tariffs to clear the mechanism of causation between tariffs and growth. As Irwin (2001) mention correlation between tariffs and growth are only suggestive of causality. This regression exercise do not prove any causal relationship between tariffs and slow growth but put in question the good reputation of 19th century protectionism to foster European Industrialization.

Bibliography

- Bairoch, Paul (1989). "European Trade Policy, 1815-1914," in Peter Mathias and Sidney Pollard (eds.), *Cambridge Economic History of Europe*, Vol. III. Cambridge: Cambridge University Press, 1989.
- Bairoch, Paul (1993). *Economics and World History: Myths and Paradoxes*. Chicago: University of Chicago Press, 1993.
- Collins, William J., and Jeffrey G. Williamson (1999). "Capital Goods Prices, Global Capital Markets, and Accumulation, 1870-1950," NBER Working Paper No. 7145, May 1999.
- David, Paul (1972a) "Learning by Doing and Tariff Protection: A Reconsideration of the Case of the Ante-Bellum United States Cotton Textile Industry," in Paul David, *Technical Choice, Innovation, and Economic Growth* (New York: Cambridge University Press, 1972)
- David, Paul (1972b), *Technical Choice, Innovation, and Economic Growth* (New York: Cambridge University Press, 1972);
- Dejong-Ripoll, M. (2005) *Tariffs and Growth: An empirical Exploration of Contingent Relationships*. University Pittsburgh, manuscript, april 2005. www.pitt.edu/~dejong/restatfi.pdf
- FEDERICO, G.- TENA, A.(1998) "Was Italy a protectionist country?" *European Review of Economic History*, Vol. 2, n.1, 73-97.
- FEDERICO, G. -TENA, A.(1999) "Did trade policy foster Italian industrialization. Evidences from the effective protection rates 1870-1930". *Research in Economic History*, Volume 19, 111-138.
- Irwin, Douglas A (2001a): "Tariffs and Growth in Late Nineteenth Century America" *The World Economy*, January 2001, 24, pp. 15-30.
- Irwin, Douglas A (2002) "Did Import substitution promote growth in late Nineteenth Century" *NBER working papers W.8751*, January.
- Irwin, Douglas A (2002). Interpreting the Tariff-Growth Correlation in the Late Nineteenth Century. *American Economic Review (Papers & Proceedings)* 92 (May 2002), pp.165-169.
- LEAGUE OF NATIONS (1927). *Tariff Levels Indices*. Geneva: League of Nations.
- LIEPMAN, H. (1938). *Tariff levels and the Economic Unity of Europe*, London: Allen and UNwin
- Tena, Antonio (2001,2005). .Measuring Protection over Time: Revenue and Protective Products in 19th Century Commercial Policy History.. Department de Historia Economica e Instituciones, Universidad Carlos III de Madrid, October 2001.
- TENA, A. (1999): "Un nuevo perfil del proteccionismo español durante la Restauración 1875-1930" *Revista de Historia Económica*, Año XVII, nº 3, 579-621.
- Williamson, Jeffrey (1972) , "Embodiment, Disembodiment, Learning-by-Doing, and Returns to Scale in Nineteenth-Century Cotton Textiles," *Journal of Economic History* (1972).
- Williamson, Jeffrey G. "Watersheds and Turning Points: Conjectures on the Long-Term Impact of Civil War Financing." *Journal of Economic History* 34 (September 1974): 636-661.

APPENDIX A

ESTIMATION OF THE MANUFACTURE EUROPEAN TARIFF LEVEL AVERAGE IN 1876 and 1902.

There are some well known contemporaneous estimation of comparative manufactures tariffs average by country before First World War. League of Nations (1927) and Liepmann (1938) offer Comparative index numbers for more than a dozen of countries in 1913. Another important work, less commonly used by economic historians, is that of the Board of Trade (1903) that offers an estimation for 20 countries of 32 manufacture articles tariff average. This work uses British export prices and weight manufacture and semimanufacture tariff average by country according to British world export industrial structure. For previous years, with the exception of Bairoch (1989), there are no comparative studies by countries of industrial tariff levels. Bairoch (1989) offers a table of comparative industrial tariff average in 1875 for 14 countries ("Author's computation based on tariff duties and prices for 14 different manufactures products" p.42). This work does not offer information on the manufacture items included and the method used (tariffs, prices and weight). But the year selected, the number of countries and products are coincident with the Board of Trade (1877) study signed by Robert Giffen that is also the source of the present estimation.

This Estimation departs from the information offered by the original Board of Trade (1877) data on prices and tariffs for 14 countries and 15 manufacture articles. This work has been complemented with own estimations on prices and duties for other 9 manufacture articles obtained from the Annual Statement of Trade (1876) and Board of Trade (1870) study on British export prices and duties levied by the same 14 European Countries. Second, original Board of Trade (1903) work that offers, from British export prices sources, data for 30 different manufacture products, and duties for 25 countries national sources for the respective products.

The estimations that follow below measure the incidence of import tariffs on the principal manufactures exported from United Kingdom. Both estimations offer some technical vices and virtues. On the vicious side, this estimation uses British f.o.b. export prices instead of national c.i.f import prices in the denominator for the estimation of tariff average (this would imply an over bias but in the case of manufacture articles with low freight factors practical implementation of fob instead of cif prices makes little difference in the final results)¹⁷. On the virtues side, one should take account that many peripheral countries declared British export values are closer to real market price in frontier than the low accurate official import unit values estimations¹⁸. Second, in this estimation advalorem tariffs are weighted by the structure of British manufacture export to the world, and not by the particular country manufacture import demand. This seems inappropriate but has the virtue of overcome the well known "index number problem" of the conventional tariff average weighted by import values.¹⁹

This method (which is that adopted below) has the advantage of applying a uniform standard to all countries, both as regards the list of articles on which the duties are calculated, and the relative "weight" attached to each article. This implies, on one side, a no rigorous decision, because you apply an artificial standard import demand structure to every country. On the other side, this method assumes a free trade manufacture import demand do not affected by tariffs. It offers an uniform and explicit tariff average by country that is complemented by an additional unweighted average.²⁰

¹⁷ League of Nations (1927) used cif import and fob export prices and conclude. " *the results obtained under the two systems are in fair accordance, but those from method B (fob export prices) tend to be slightly higher (on the average circa 8 per cent)* ". p.6.

¹⁸ See Federico- Tena (1991); Tena (1992)

¹⁹ "The objection to employing import values ratios rest on the fact that those ratios are themselves directly influenced by the duties imposed. If a duty on any article proved to be prohibitive, there would be no imports and no weight could be given to it". League of Nations (1927), p.7.

²⁰ For this work we assume that British manufacture export structure, at least for 1876, was closer to world demand structure than in 1913 so weighted and unweighted average are used. The unweighted average was recommended by Loveday in his work on "tariff levels" League of Nations (1927) and was supported also by Liepman (1938). League of Nations (1927) estimated a tariff manufacture unweighted average using 110 manufacture articles (leaving out semimanufactures). Liepman (1938) used unweighted average of fob export prices for 144 products of which used a separate index for semimanufacture (44 articles) and manufactures (62 manufacture articles). This can be considered a better approximation to the 1913 and 1926 free trade world export demand.

The technique consists first to make a list of the principal classes of goods and to “weight” each group roughly, according to its comparative importance in British exports. Out of each group a few leading articles or classes of articles are then chosen as representative of the whole group, and the average tariff rates of duty on these leading articles for each country are taken as fairly representative of the tariff treatment of the whole group. Those tariffs should be uniformed to monetary, capacity, mass or weight to British unit values measurement of the corresponding articles (for especial calculations see sources below point (a), (b), (c)).

Sources:

Prices and manufacture export values 1876 :

from: Import Duties on British Goods (Foreign Countries) Return of the Estimated Average *ad valorem* Rate of Import Duty Levied in The Principal European Countries and in the United States, on certain Articles of British Produce or Manufacture. British Parliamentary Papers vol LXXVI.181. Session 1877.

Except for Cotton Manufactures and Woollen and Worsted Manufactures, that have been estimated, for the year 1877, from the Annual Statement of Trade: Return of the Values of the Exports of British and Irish Produce 1854-1880. British Parliamentary Papers vol LXVI; Session 1882.

Prices and manufacture export values 1902 : **“The comparative incidence of foreign and colonial Import tariffs on the principal Classes of Manufactures Exported from the United Kingdom. British Parliamentary Papers vol. XXXIV, 1905; pp.285-315.**

Advalorem rates & Import Duties 1876:

From: Import Duties on British Goods (Foreign Countries) Return of the Estimated Average *ad valorem* Rate of Import Duty Levied in The Principal European Countries and in the United States, on certain Articles of British Produce or Manufacture. Parliamentary Papers vol LXXVI.181. Session 1877.

Except for Cotton Manufactures and Woollen and Worsted Manufactures, custom tariffs for the 14 countries came from: "Return of Rates of Import Duty levied by Tariffs of European Countries and United States on Principal Articles of Merchandise, 1860, 1870, Parliamentary Papers Vol. LXI.337; Session 1870.

Advalorem rates & Import Duties 1902: **“The comparative incidence of foreign and colonial Import tariffs on the principal Classes of Manufactures Exported from the United Kingdom. British Parliamentary Papers vol. XXXIV, 1905; pp.285-315.**

Technical specification for some articles used for 1876 and 1902

- (a) In the same way than in cotton piece goods cotton yarns 40yards to lb has been assumed see British Parliamentary Papers (1905).p.291.
- (b) Cotton piece goods are entered in UK Trade Accounts by the yard whereas most duties are imposed by weight, or graduated according to the weight per square metre of the tissues. After inquiry, an "average account" of 5 yards to lb has been assumed. See British Parliamentary Papers (1905), p.291.
- (c) In the case of Woollen and Worsted Piece Goods average weights have been estimated varying from 18ozs to the yard for heavy broad woollen piece goods and worsted coatings to 5ozs to the yard for Mixed Worsted Stuffs. See British Parliamentary Papers (1905) p.291.
- (d) Equivalence for measurement of Mass or Weight: - 112Lb = 0,4535Kg; 100yard = 20Lb; 1CWT = 112,02 Lb; 1onz = 1/16 Lb.
- (e) Standard equivalence for monetary units: 1 Pound = 240d; 1shilling = 20d.

Table 1

Groups, articles and prices taken as representatives of British manufacture exports 1876

Group	Representative Articles	British Exports 1876 Wheight attached to each group forming the average (%)	Value of British Exports of these groups of manufactures in 1876 (Thousand Pounds)	Average export values of these Articles 1876
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Cotton yarns (a)	cotton single unbleached cotton single undyed cotton double undyed	10,1%	12782	9d/Lb 20d/Lb 23d/Lb
Cotton Manufactures(b)	Cotton piece bleached Cotton piece printed	24,7% 14,5%	31454 18494	1988,08 d/Cwt (d) 2661,93 d/Cwt (d)
Wollen & Worsted Yarn	Wollen and worsted yarn undyed	3,5%	4417	60d/Lb
Wollen & Worsted Manufact©	Woolen stuffs all wool	14,6%	18603	4594,35d/Cw (d)
Linen Yarn (Lbs)	Linen yarns unbleached linen yarns single linen yarns double	1,1%	1450	20d/Lb 26d/Lb 46d/Lb
Silk (Throws)	Silk Thrown	0,9%	1081	800d/Lb
Jute Manufactures	Jute Canvas and Sacking	1,0%	1212	4d/Lb
Iron and Steel Manufactures	Pig Iron Bars & Angle Rails including steel rails	2,2% 13,7% 8,0%	2842 17382 10225	1200d/Ton 1680d/Ton 1680d/Ton
Copper Manufactures	Copper lingots, Cakes, Slabs	0,8%	983	19200d/Ton
Leather and Manufactures thereof	Ox & Cow Hides Calf Skins	2,3%	2945	26d/lb 46d/lb
Alkaly Chemichals products	Bicarbodate Soda Soda caustic Crystals of Soda	1,7%	2223	228d/Cwt 280d/Cwt 82d/Cwt
Paper Manufactures	Paper for writing Paper for printing	0,8%	1020	6d/Lb 4d/Lb
<i>Total of Above Groups (Sample)</i>		Σ 100% 71%	127115	
<i>Total British Manufact & partially Manufact Exports</i>		100%	179540	

Table2
Manufacture Weighted and Unweighted Tariff Average Estimated for European Core Countries in 1876

European Core 1876	Austria advalorem	Belgium advalorem	Denmark advalorem	France advalorem	Germany advalorem	Holland advalorem
Articles	duty	duty	duty	duty	duty	duty
1876	%	%	%	%	%	%
Cotton Manufactures						
Cotton piece bleached	24%	12%	14%	12%	22%	5%
Cotton piece printed	45%	18%	56%	55%	45%	5%
Cooton yarns undyed	9%	10%	7%	10%	7%	0%
cotton single unbleached	10%	13%	9%	13%	7%	0%
cotton single undyed	9%	10%	6%	10%	8%	0%
cotton double undyed	8%	8%	5%	8%	7%	0%
Linen Yarn (Lbs)	3%	0%	4%		3%	0%
Linen yarns unbleached	2%	0%	6%		2%	0%
linen yarns single	4%	0%	4%		4%	0%
linen yarns double	2%	0%	3%		2%	0%
Silk throwns	0%	3%	4%	0%	0%	0%
Woolen stuffs all wool	2%	3%	3%		1%	0%
JuteCanvas and Sacking	4%	10%	26%	19%	5%	5%
Iron and Manufacture	29%	6%	6%	35%	0%	0%
Pig Iron (l/Lbs)	17%	7%	0%	27%	0%	0%
Bars &Angle(l/Tons)	35%	5%	9%	35%	0%	0%
Rails including stel	35%	5%	9%	43%	0%	0%
Copper lingots, Cakes, Slabs	0%	0%	0%	0%	0%	0%
Wollen&Worsted Manufact	12%	10%	9%	10%	10%	5%
Wollen&Worsted manufc. All wool	12%	10%	9%	10%	10%	5%
Leather and Manufactures	4%	4%	10%	2%	4%	0%
Ox & Cow Hides	4%	4%	11%	3%	4%	0%
Calf Skins	3%	3%	9%	2%	3%	0%
Alkaly Chemichals products	25%	0%	0%	17%	16%	0%
Bicarbobate Soda	26%	0%	0%	15%	7%	0%
Soda caustic	29%	0%	0%	19%	22%	0%
Crystals of Soda	19%	0%	0%	18%	18%	0%
Paper Manufactures	6%	4%	14%	9%	5%	5%
paper for writing	5%	3%	11%	7%	5%	5%
paper for printing	7%	5%	16%	10%	5%	5%
Manufacture protection unweighted	12,4%	5,8%	10,0%	13,4%	7,0%	1,5%
Manufacture protection weighted	23,9%	9,8%	16,3%	23,0%	14,7%	2,8%

Table 3

Manufacture Weighted and Unweighted Tariff Average Estimated for European Peripheral Countries in 1876

European Peryphery 1876	1876						
	Hungary advalorem	Italy Advalorem	Norway advalorem	Portugal advalorem	Russia advalorem	Spain advalorem	Sweden advalorem
Articles	duty	Duty	duty	duty	duty	duty	duty
1876	%	%	%	%	%	%	%
Cotton Manufactures							
Cotton piece bleached	24%	12%	15%	15%	72%	70%	25%
Cotton piece printed	45%	23%	46%	122%	217%	84%	51%
Cooton yarns undyed	9%	9%	5%	40%	30%	56%	10%
cotton single unbleached	10%	10%	3%	38%	38%	61%	13%
cotton single undyed	9%	9%	3%	45%	29%	55%	10%
cotton double undyed	8%	7%	4%	37%	23%	51%	8%
Linen Yarn (Lbs)	3%	4%	2%	27%	24%	13%	10%
Linen yarns unbleached	2%	4%	3%	31%	35%	10%	12%
linen yarns single	4%	5%	2%	32%	23%	19%	11%
linen yarns double	2%	3%	2%	19%	14%	11%	8%
Silk throwns	0%	0%	1%	5%	1%	4%	
Woolen stuffs all wool	2%	6%	2%	47%	13%	31%	4%
JuteCanvas and Sacking	4%	13%	15%	44%	10%		0%
Iron and Manufacture	29%	20%	0%	5%	32%	49%	0%
Pig Iron (l/Lbs)	17%	0%	0	5%	17%	34%	0%
Bars &Angle(l/Tons)	35%	52%	0%	5%	50%	68%	0%
Rails including stel	35%	7%	0%	5%	28%	46%	0%
Copper lingots, Cakes, Slabs	0%	2%	0%	1%	7%	11%	0%
Wollen&Worsted Manufact	12%	11%	11%	22%	34%	16%	11%
Wollen&Worsted manufc. All wool	12%	11%	11%	22%	34%	16%	11%
Leather and Manufactures	4%	4%	4%	6%	31%	27%	7%
Ox & Cow Hides	4%	4%	5%	6%	26%	30%	5%
Calf Skins	3%	3%	3%	5%	35%	23%	8%
Alkaly Chemichals products	25%	7%	0%	88%	20%	20%	0%
Bicarbodate Soda	26%	2%	0%	26%	17%	13%	0%
Soda caustic	29%	16%	0%	168%	21%	11%	0%
Crystals of Soda	19%	2%	0%	71%	23%	37%	0%
Paper Manufactures	6%	9%	7%	26%	53%	15%	13%
paper for writing	5%	7%	14%	42%	53%	18%	19%
paper for printing	7%	11%	0%	9%	53%	11%	7%
Total protection unweighted	12,4%	9,5%	6,3%	30,9%	38,4%	32,2%	9,2%
Total protection weighted	23,9%	17,2%	12,9%	34,2%	69,1%	53,4%	16,8%

Table 4
Groups, articles and prices taken as representatives of British manufacture exports 1902

Group	Representative Articles	British Exports 1902 Wheight attached To each group forming the average (%)	Value of British Exports of these groups of manufactures in 1902 (Thousand Pounds)	Average export values of these Articles 1902 <u>export prices</u>
Cotton Manufactures		<u>%</u> 39%	<u>Mill Pounds</u> 65,00	
	Cotton piece unbleached(d/yards)			2,01d per yards
	Cotton piece bleached(d/yard)			2,46 d per yard
	Cotton piece printed(d/yard)			2,68d per yard
	Cotton piece dyed(d/yard)			3,46 d per yard
Cotton Yarns		4%	7,40	
	Cotton thread for sewing(d/yard)			26,89 d per pound
	Cotton yarn Grey(d/lb)			10,49 d per pound
	Cotton yarn bleached or dyed(d/lb)			11,23d per pound
Wollen worsted manufactures		9%	15,30	
	Woollen pice heavy all wool(d/yard)			52,57d per yard
	Woollen piece heavy mixed(d/yard)			22,65 d per yard
	Wollen pice light all wool(d/yard)			36,22d per yard
	Woolem pice light mixed			15,23 d per yard
	Worsted coating all wool(d/yard)			47,27d per yard
	Worsted coating mixed(d/yard)			27,5 d per yard
	Worsted stuffs all wool(d/yard)			11,57d per yard
	Worsted stuffs mixed(d/yard)			9,72d per yard
Wollen worsted yarns		3%	5,00	
	Worsted yarn(d/lb)			16,07 d per pound
Linen manufactures		3%	5,40	
	Linen pice goods(d/yard)			5,7 d per yard
Machinery hardware &c		12%	21,00	
	Textil Machinery(l/Ton)			49 l per ton
	Locomotive Machinery(l/Ton)			45 l per ton
	Sewing Machinery(l/Ton)			135 l per ton
Iron and Steel manufactures		16%	29,20	
	Pig iron(s/Ton)			64,75s per ton
	Rails(l/Ton)			5,44l per ton
	Galvanised corrugated sheets(l/Ton)			12,48l per ton
	Tinplates(l/Ton)			13,89 l per ton
	Steel bars, angles,shapes(l/Ton)			11,57l per ton
Ships		3%	5,90	
	Ships(l/Ton)			12 l per ton gros
Apparel		4%	6,30	
	Wollen clothing(s/lb)			6,67 s per lb
Leather and Manufactures therof		2%	4,40	
	Boots and shoes of leather(s/doz)			48,09s per doz pairs
Chemicals		5%	9,60	
	Sulphate of copper(s/cwt)			19,3 s per cw
	Caustic soda(s/cwt)			9,7 s per cw
	Bleaching powder(s/cwt)			6,14 s per cw
		$\Sigma 100\%$		
Groups above		77%	174,50	
Total manufacture				
British exports		100%	227,50	

Table 5

Manufacture Weighted and Unweighted Tariff Average for European Core Countries in 1902

European Core 1902	Austria	Belgium	Denmark	France	Germany	Holand	Switzerland
Manufacture	Advalorem	Advalorem	Advalorem	Advalorem	Advalorem	Advalorem	Advalorem
Articles	Duty	duty	duty	Duty	duty	duty	duty
	%	%	%	%	%	%	%
COTTON MANUFACTURES	55%	25%	33%	46%	44%	5%	10%
Cotton piece unbleached(d/yards)	54%	28%	15%	49%	43%	5%	4%
Cotton piece bleached(d/yard)	53%	25%	24%	48%	44%	5%	14%
Cotton piece printed(d/yard)	65%	27%	60%	51%	49%	5%	13%
Cotton piece dyed(d/yard)	47%	22%	32%	36%	38%	5%	10%
COTTON YARNS	15%	7%	9%	77%	13%	0%	4%
Cotton thread for sewing(d/yard)	14%	8%	3%	197%	14%	0%	6%
Cotton yarn Grey(d/lb)	14%	6%	7%	14%	9%	0%	3%
Cotton yarn bleached or dyed(d/lb)	17%	7%	18%	20%	15%	0%	5%
WOLLEN WORSTED MANUFACTURES	27%	11%	26%	17%	28%	5%	9%
Woollen pice heavy all wool(d/yard)	19%	10%	17%	17%	16%	5%	5%
Woollen piece heavy mixed(d/yard)	27%	10%	40%	16%	37%	5%	12%
Wollen pice light all wool(d/yard)	15%	10%	14%	11%	13%	5%	6%
Woolem pice light mixed	36%	10%	33%	20%	30%	5%	14%
Worsted coating all wool(d/yard)	21%	10%	19%	19%	17%	5%	6%
Worsted coating mixed(d/yard)	22%	10%	33%	13%	30%	5%	10%
Worsted stuffs all wool(d/yard)	39%	15%	26%	20%	39%	5%	11%
Worsted stuffs mixed(d/yard)	38%	15%	26%	21%	39%	5%	11%
WOLLEN AND WORSTED YARNS	7%	5%	9%	18%	3%	0%	2%
Worsted yarn(d/lb)	7%	5%	9%	18%	3%	0%	2%
LINEN MANUFACTURES	25%	10%	14%	53%	17%	5%	9%
Linen pice goods(d/yard)	25%	10%	14%	53%	17%	5%	9%
MACHINERY HARDWARE &c	15%	3%	6%	9%	8%	0%	5%
Textil Machinery(l/Ton)	8%	3%	10%	4%	5%	0%	3%
Locomotive Machinery(l/Ton)	19%	4%	2%	14%	9%	0%	9%
Sewing Machinery(l/Ton)	19%	1%	5%	11%	9%	0%	1%
IRON AND STEEL MANUFACTURES	43%	5%	10%	32%	18%	0%	5%
Pig iron(s/Ton)	20%	3%	0%	19%	16%	0%	1%
Rails(l/Ton)	47%	8%	10%	45%	23%	0%	4%
Galvanised corrugated sheets(l/Ton)	65%	10%	18%	39%	20%	0%	10%
Tinplates(l/Ton)	59%	0%	17%	35%	18%	0%	9%
Steel bars, angles,shapes(l/Ton)	22%	4%	5%	21%	11%	0%	2%
SHIPS	4%	0%	3%	1%	0%	1%	7%
Ships(l/Ton)	4%	0%	3%	1%	0%	1%	7%
APPAREL	15%	10%	11%	12%	20%	5%	6%
Wollen clothing(s/lb)	15%	10%	11%	12%	20%	5%	6%
LEATHER AND MANUFACTURES THEROF	11%	1%	25%	22%	11%	5%	5%
Boots and shoes of leather(s/doz)	11%	1%	25%	22%	11%	5%	5%
CHEMICALS	17%	0%	0%	19%	15%	0%	1%
Sulphate of copper(s/cwt)	8%	0%	0%	6%	0%	0%	1%
Caustic soda(s/cwt)	31%	0%	0%	27%	21%	0%	1%
Bleaching powder(s/cwt)	12%	0%	0%	23%	25%	0%	2%
Manufacture Protection Weighted	36%	13%	20%	33%	26%	3%	7%
Manufacture Protection Unweighted	28%	9%	16%	29%	21%	2%	7%

Table 6

Manufacture Weighted and Unweighted Tariff Average Estimated for European Peripheral Countries in 1902

European Pheriphery 1902 Manufacture	1902							
	Hungary Advalorem	Italy Advalorem	Norway Advalorem	Portugal Advalorem	Roumania Advalorem	Russia Advalorem	Spain Advalorem	Sweden Advalorem
Articles	duty %	duty %	duty %	duty %	duty %	duty %	duty %	duty %
COTTON MANUFACTURES	55%	37%	25%	89%	17%	228%	118%	39%
Cotton piece unbleached(d/yards)	54%	34%	12%	49%	21%	207%	145%	30%
Cotton piece bleached(d/yard)	53%	33%	20%	47%	16%	268%	119%	44%
Cotton piece printed(d/yard)	65%	52%	50%	146%	19%	246%	124%	50%
Cotton piece dyed(d/yard)	47%	29%	18%	113%	13%	191%	84%	32%
COTTON YARNS	15%	17%	7%	52%	7%	62%	53%	10%
Cotton thread for sewing(d/yard)	14%	18%	5%	68%	6%	39%	40%	9%
Cotton yarn Grey(d/lb)	14%	14%	6%	39%	5%	70%	62%	9%
Cotton yarn bleached or dyed(d/lb)	17%	19%	10%	49%	10%	76%	58%	12%
WOLLEN WORSTED MANUFACTURES	27%	29%	20%	178%	19%	143%	102%	34%
Woollen pice heavy all wool(d/yard)	19%	15%	13%	115%	13%	95%	99%	21%
Woollen piece heavy mixed(d/yard)	27%	35%	30%	268%	29%	220%	139%	49%
Wollen pice light all wool(d/yard)	15%	14%	10%	97%	10%	76%	80%	18%
Woolem pice light mixed	36%	33%	25%	230%	24%	182%	115%	43%
Worsted coating all wool(d/yard)	21%	23%	14%	128%	14%	105%	110%	25%
Worsted coating mixed(d/yard)	22%	39%	25%	220%	24%	181%	115%	43%
Worsted stuffs all wool(d/yard)	39%	35%	20%	183%	19%	143%	84%	34%
Worsted stuffs mixed(d/yard)	38%	35%	19%	181%	19%	142%	69%	34%
WOLLEN AND WORSTED YARNS	7%	22%	8%	118%	22%	60%	99%	10%
Worsted yarn(d/lb)	7%	22%	8%	118%	22%	60%	99%	10%
LINEN MANUFACTURES	25%	21%	18%	98%	23%	310%	79%	29%
Linen pice goods(d/yard)	25%	21%	18%	98%	23%	310%	79%	29%
MACHINARY HARDWARE &c	15%	10%	0%	8%	0%	26%	17%	10%
Textil Machinery(l/Ton)	8%	7%	0%	9%	0%	28%	15%	10%
Locomotive Machinery(l/Ton)	19%	13%	0%	13%	0%	39%	14%	10%
Sewing Machinery(l/Ton)	19%	9%	0%	2%	0%	10%	21%	10%
IRON AND STEEL MANUFACTURES	43%	38%	0%	5%	5%	91%	40%	7%
Pig iron(s/Ton)	20%	13%	0%	4%	0%	91%	25%	0%
Rails(l/Ton)	47%	45%	0%	8%	0%	90%	33%	0%
Galvanised corrugated sheets(l/Ton)	65%	65%	0%	6%	13%	122%	52%	27%
Tinplates(l/Ton)	59%	47%	0%	5%	12%	110%	58%	0%
Steel bars, angles,shapes(l/Ton)	22%	21%	0%	4%	0%	42%	33%	10%
SHIPS	4%	0%	0%	0%	0%	0%	8%	0%
Ships(l/Ton)	4%	0%	0%	0%	0%	0%	8%	0%
APPAREL	15%	16%	15%	202%	22%	82%	62%	20%
Wollen clothing(s/lb)	15%	16%	15%	202%	22%	82%	62%	20%
LEATHER AND MANUFACTURES								
THEROF	11%	14%	33%	281%	54%	171%	119%	38%
Boots and shoes of leather(s/doz)	11%	14%	33%	281%	54%	171%	119%	38%
CHEMICALS	17%	4%	0%	11%	0%	88%	11%	3%
Sulphate of copper(s/cwt)	8%	4%	0%	6%	0%	41%	2%	10%
Caustic soda(s/cwt)	31%	8%	0%	24%	0%	101%	16%	0%
Bleaching powder(s/cwt)	12%	0%	0%	4%	0%	123%	16%	0%
Manufacture Protection Weighted	36%	27%	14%	75%	13%	144%	77%	24%
Manufacture Protection Unweighted	28%	24%	11%	88%	13%	118%	68%	20%

APPENDIX B

Table 2

Manufacture and Total Tariff Ratio between 1870 and 1913 in Europe

	Bairoch Tariff Average1875	Tariff Average1870	Ratio		Tariff Average 1913	Tariff Average 1913	Ratio
1870`s	Manufact. (1)	Total (2)	(3) = (1) / (2)	1913	Manufact.(4)	Total (5)	(6) = (4) / (5)
Austria	15	5.2	2.83	Austria	14.6	22.8	0.64
Belgium	9	1.5	6	Belgium	8.7	14.2	0.61
Denmark	15	12	1.25	Denmark*	14	9	1.55
France	12	5.8	2.07	France	12.9	23.6	0.55
Germany	4	7.3	0.55	Germany	8.5	16.7	0.51
Netherlands	3	0.6	5	Netherland s*		3	
Switzerland	4	3.6	1.11	Switzerland	7.6	10.5	0.72
UK	0.1	5.3	0.019	UK*	0.1*	4.2 (2)	0.02
EU(Core)				EU (Core)			
Hungary	15	5.2	2.83	Hungary	14.6	2.,8	0.64
Italy	8	11.1	0.72	Italy	12.6	24.8	0.51
Norway	2	11.8	0,17	Norway*		11.4	
Portugal	20	32.4	0.62	Portugal(2)		24.7	
Russia	15	19	0,79	Russia	79	7.5	1.09
Spain	15.3	16.6	0.92	Spain	35.7	37	0,96
Sweden	3	10.3	0,29	Sweden	22,5	27.6	0.82
EU(Periphery)				Serbia	15	22.2	0.68
				Rumania	22.5	30.3	0.74
				Bulgaria	18.7	22.8	0.82
				Finland	36.4	35	1.04

Sources : (1) Bairoch (1989), Table 5 p.42; (2) Mitchell (1981) Custom revenue & Import value; (4) Liepman (1938) Table IV A p.413 Industrial Manufactured goods potential tariff levels; (5) Liepman (1938) Table IV B p.415 General potential levels with fiscal goods included. * League of Nations(1927) arithmetic averages sample.

Table 2
Wheighted (NT) and unweighted (UNT) Industrial and Total tariff average for Spain and Italy
1870-1930

		NT	NT	UNT	UNT
		Spain	Italy	Spain	Italy
1877	Total	12.7	7.3	17.7	6,8
	Industry	17.6	6.5	22.4	5.4
1889	Total	11.0	17.6	16.7	16,9
	Industry	13,8	16.9	17.6	15.6
1897	Total	14.6	18.5	26.3	16.1
	Industry	18.4	13.2	32.4	15.2
1913	Total	14.9	9.6	25.2	12.7
	Industry	15.5	9.3	23.6	11.9
1926	Total	15.5	11.9	26.6	13.7
	Industry	26.0	15.0	35.9	15.7

Sources: Spain: Tena (1999); Italy: Federico-Tena (1998)

Table 3
Regresión data on tariff and growth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
	GDPGR70	GDP70	NTTOT70	NTMANU75	UNTMANU75	NTMAN75B	POP70	AGRSHARE	DUMY
AU	1,5	1.863	5,2	24	12	14,7	4520	65	0
BEL	1,1	2.692	1,5	10	6	9	5096	43	0
FRA	1,5	1.876	5,8	23	13	12	38440	49	0
GER	1,6	1.839	7,3	15	7	4	39231	50	0
SWI	1,7	2.102	3,6	4	4		2655	50	0
NET	0,9	2.757	0,6	3	2	3	3610	37	0
UK	1,0	3.190	5,3	0	0	0,1	31400	23	0
DEN	1,6	2.003	12	16	10	15	1888	52	0
HUN	1,20	1.092	5,2	24	12	15	10155		1
ITA	1,26	1.499	11,1	17	10	8	27888	62	1
NOR	1,30	1.432	11,8	13	26	2	1735	53	1
PORT	0,58	975	32,4	34	31	20	4327	66	1
RUS	1,06	943	19	69	38	15	88672		1
SPA	1,25	1.207	16,6	53	32	15,3	16201	66	1
SWE	1,46	1.662	10,3	17	9	3	4169	54	1

Sources: (1) GDP per capita Growth; (2) GDP per capita 1870 both from Maddison (2003). (3) from Mitchell (1983); (4) Weighted manufactured tariff average, (5) Unweighted Manufacture Tariff average Both from Appendix A: Tables 2 and 3. (6) Bairoch Manufacture Tariff Average, (7) Population in 1870 from Maddison(2003); (8) Agricultural Share on PIB from Maddison (1991).

$$(1) \text{GDPGR70} = A_0 + B_1 \text{GDP70} + B_2 \text{NTTOT70} + e_i$$

(a) Sin DUMY y con (b)DUMY 0 y (c) 1 respectivamente

$$(2) \text{GDPGR70} = A_0 + B_1 \text{GDP70} + B_2 \text{NTMANU75} + e_i$$

(a) Sin DUMY y con (b)DUMY 0 y (c) 1 respectivamente

$$(3) \text{GDPGR70} = A_0 + B_1 \text{GDP70} + B_2 \text{UNTMANU75} + e_i$$

(a) Sin DUMY y con (b)DUMY 0 y (c) 1 respectivamente

$$(4) \text{GDPGR70} = A_0 + B_1 \text{GDP70} + B_2 \text{NTMANU75B} + e_i$$

(a) Sin DUMY y con (b)DUMY 0 y (c) 1 respectivamente

$$(5) \text{GDPGR70} = A_0 + B_1 \text{GDP70} + B_2 \text{POP70} + B_3 \text{NTMANU75} + e_i$$

(a) Sin DUMY y con (b)DUMY 0 y (c) 1 respectivamente

$$(6) \text{GDPGR70} = A_0 + B_1 \text{GDP70} + B_2 \text{POP70} + B_3 \text{AGRSARE} + B_4 \text{NTTOT70} + e_i$$

(a) Sin DUMY y con (b)DUMY 0 y (c) 1 respectivamente