# TERMS OF TRADE AND BACKWARDNESS: TESTING THE PREBISCH DOCTRINE FOR SPAIN AND BRITAIN DURING THE INDUSTRIALIZATION

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Abstract_____

A historical test of Prebisch-Singer thesis of a long-run deterioration of primary producers' terms of trade vis-a-vis industrial nations is performed in this paper as part of an inquiry on the consequences of economic relations between DCs and LDCs on the latter's welfare. The setting is Europe in the age of the Industrial Revolution and Spain and Britain are the countries chosen. The results strongly reject Prebisch-Singer doctrine as the welfare of Spain's productive factors embodied in exportables improved in absolute and relative terms, supporting the view that 19th Century Spain's relative decline cannot be blamed on specialization along lines of comparative advantage.

Key words:
Terms of Trade; Relative Backwardness, International economic relations.

HISTORIOGRAPHY

The terms of trade between industrialised nations and primary
producers has been the subject of considerable debate since Torrens first
dealt with the problem in 1821.[1] For more than a century, British economists
from J.S. Mill to Marshall and Keynes interpreted secular trends in the
terms of trade, moving against industrialising countries, as a reflection
of the law of diminishing returns in agriculture and extractive industries,
in contrast to constant or increasing returns in manufacturing industries.[2]

After World War II, long-term trends in the terms of trade became a
major concern of development economists because of their relevance to the
economic growth of Third World countries.

Quantitative studies, carried out by the Statistical Department of the
League of Nations under the supervision of Folke Hilgerdt, and Raúl Prebisch
at the Economic Commission for Latin America at the United Nations in the
late 1940's, suggested that between 1870 and 1938 there was a deterioration
in the net barter terms of trade of primary producers with industrialised
countries.[3] This gave rise to the widely accepted Prebisch-Singer
interpretation which suggests that, in the long run, the terms of trade
between countries specialised in the production of raw materials and
foodstuffs and the industrial nations tend to deteriorate to the

1. R. Torrens, An Essay on the Production of Wealth, (London, 1821).

2. A detailed discussion of the Classical thesis can be found in W.W. Rostow,
'The Terms of Trade in Theory and Practice', Economic History Review,
iii, 1 (1950), 1-20. B. Sodersten, International Economics (London,
1970) Ch.12, follows Rostow's argument and discusses the Classical
interpretation within the framework of the Neoclassical theory of
international trade.

3. F. Hilgerdt, Industrialization and Foreign Trade (Geneva, 1945).
R. Prebisch, Relative Prices of Exports and Imports of Underdeveloped
Countries (New York, 1949).

disadvantage of the former.[1]

This controversy among development economists about the secular trends in the terms of trade of primary products percolated through to economic history.[2] Studies by Sideri for Portugal, and Glazier and Bandera for Italy, attempted to test the Prebisch-Singer thesis for primary producers and industrialising countries in nineteenth century Europe.[3] Nadal Farreras hypothesised that the terms of trade between Spain and Britain should be estimated as a measure of Spanish dependency.[4] Berend and Ranki, after noticing an improvement in Scandinavia's and Hungary's net barter terms of trade throughout the nineteenth century, suggested, however, that 'the situation was quite different in the case of the countries of the Iberian Peninsula'.[5] Fernández de Pineda guessed that unfavourable terms of trade existed in eighteenth century Spain, which made it unprofitable to export wool in exchange for wheat.[6] For the second half of the

1. R. Prebisch, The Economic Development of Latin America and its Principal Problems (New York, 1950); 'Commercial Policy in Underdeveloped Countries' American Economic Review (Papers and Proceedings) xlix (1959), 251-73; Towards a Dynamic Development Policy in Latin America (New York, 1963). A discussion of Prebisch's work can be found in Sodersten, International Economics, Ch.12, and in J. June Flanders, 'Prebisch on Protectionism: An Evaluation', Economic Journal lxxiv (1964) 305-26. H.W. Singer, 'The distribution of Gains Between Investing and Borrowing Countries', American Economic Review (Papers and Proceedings) xl (1950), 473-85, and 'The Distribution of Gains from Trade and Investment Revisited', Journal of Development Studies xi (1974-75), 376-82.

2. For a survey of the controversy see J. Spraos, Inequalising Trade? (Oxford 1983), Chs. 2 & 3, and in addition to those works already cited, see W.A. Lewis, 'World Production, Prices and Trade, 1870-1960', Manchester School of Economic and Social Studies, xxi (1952); C.P. Kindleberger, 'The Terms of Trade and Economic Development', Review of Economics and Statistics xl (supplement) 1, pt.2 (1958), 72-90; G.M. Meier, International Economics (New York, 1963); C.M. Peláez, 'The Theory and Reality of Imperialism in the Coffee Economy of Nineteenth Century Brazil' Economic History Review, xxix (1976) 276-90; R.E. Lipsey, Price and Quantity Trends in the Foreign Trade of the United States (Princeton, 1963) P. Bairoch, The Economic Development of the Third World (London, 1975); B.M. Bhatia, 'Terms of Trade and Economic Development: A Case Study of India, 1861-1939', Indian Economic Journal, xvl, 4-5 (1969), 414-33; P.T. Ellsworth, 'The Terms of Trade between Primary Producing and Industrial Countries', Inter-American Economic Affairs x (1956), 47-65.

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3.  S. Sideri, Trade and Power, <u>Informal Colonialism in Anglo-Portuguese</u>
    <u>Relations</u> (Rotterdam, 1970), Ch.ix;  I.A. Glazier and V.N. Bandera,
    'Terms of Trade between South Italy and the United Kingdom 1817-1869',
    <u>Journal of European Economic History</u> i, 1 (1972), 7-36; I.A. Glazier,
    V.N. Bandera & R.B. Brener, 'Terms of Trade between Italy and the
    United Kingdom 1815-1913', <u>Journal of European Economic History</u> iv,
    1 (1975), 5-48.

4.  J. Nadal Farreras, <u>Comercio exterior y subdesarrollo.  España y Gran</u>
    <u>Bretaña de 1772 a 1914: política económica y relaciones comerciales</u>
    (Madrid, 1978), p.177.

5.  I.T. Berend and G. Ranki, 'Foreign Trade and the Industrialization of
    the European Periphery in the XIXth century', <u>Journal of European</u>
    <u>Economic History</u> ix, 3 (1980), 539-84, quotation on p.550.  See also,
    by the same authors, European Periphery, Chs. 5 & 6.

6.  E. Fernández de Pinedo, 'Coyuntura y política económicas', in M. Tuñon
    de Lara, ed., <u>Historia de España</u>, vii, 9-173, page 43.

nineteenth century Sánchez-Albornoz has written that 'if the terms of trade circumstantically evolved in favour of Spain, the historical trend shows that they did not last very long'.[1]

Finally, Nadal suggests that Spain's net barter terms of trade deteriorated in the last quarter of the nineteenth century.[2]

My reconstruction of the terms of trade between Spain and Britain for the period 1714-1913 was designed to confront a widely accepted view that the purchasing power per unit of Spanish exports deteriorated over the long run, and that this was part of a wider problem of the economic relations between 'peripheral' and 'core' countries before, during, and after the Industrial Revolution in Europe. Different types of indices have been estimated in this chapter to analyse the long swings in the net barter terms of trade (NBTT) between Spain and Britain. If a change in the NBTT were endogenous, it has no clear welfare significance. It may be the outcome of increases in productivity, or, if there is unemployment, of an increase in job opportunities. Trends in the purchasing power per unit of production factors embodied in exported goods, as measured by the single factorial terms of trade (SFTT) are also examined. Both NBTT and SFTT measure absolute inequality in traditional patterns of trade and specialisation.

However, the relative differences in per capita incomes amongst West European countries have been stressed as much as absolute growth in per capita income. It has been argued that traditional patterns of trade between Core and Periphery, that is, less developed countries' primary goods in exchange for manufactured goods from developed countries, have tended to increase inequality. Double factorial terms of trade (DFTT) are designed to account for those movements and are estimated in the last section of this chapter.

1. N. Sánchez-Albornoz, _España hace un siglo_, p.145.
2. J. Nadal, _El fracaso_, p.53.

<u>THE NET BARTER TERMS OF TRADE</u>

## 1. THE METHODS

The net barter or commodity terms of trade can be represented thus:

$$N = Px : Pm$$

where <u>Px</u> and <u>Pm</u> are index numbers of export and import prices, respectively. An increase in <u>N</u> means, on the basis of the price relationship alone, that a greater volume of imports can be obtained with a given volume of exports. In principle, an increase of <u>N</u> implies that the real income of a country grows faster than its output due to the growth of purchasing power per unit of its exports. There are, however, some important qualifications to be made before a deterioration in the terms of trade can be accepted as a reduction in a country's real income. Only under Classical assumptions of constant supply of resources, no technological change, full employment and free competition do changes in the net barter terms of trade imply changes in real income.[1]

Nevertheless, movements in the terms of trade are interesting for historians to analyse.[2] For instance, Why do the terms of trade change? Have foreign or domestic supply curves shifted? Were changes in the terms of trade accompanied by changes in the export volume? Are changes in the net barter terms of trade related to changes in the productivity of export industries?

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1. See R.E. Baldwin, 'Secular Movements in the Terms of Trade', <u>American Economic Review</u>, xlv (1955), 259-69, page 263.

2. See W.W. Rostow, 'The Historical Analysis of the Terms of Trade', <u>Economic History Review</u>, iv (1950), 53-76. See also G. Haberler, 'Terms of Trade and Economic Development' in H.S. Ellis and H.C. Wallich, eds., <u>Economic Development in Latin America</u> (New York, 1961), pp.257-97.

I constructed index numbers for both import and export prices (see Appendix). These index numbers do not reflect quality changes in the commodities traded and over the long run they become less reliable. Even if base years are changed to cover segments of the time series, splicing becomes necessary to make comments about long-term changes. Biases in the links will be amplified when separate runs are chained, and the index numbers can only provide rough orders of magnitude for changes over long periods. Amid the different types of indices available, the Laspeyres index, in which the prices of each commodity are weighted with their base period quantities, has the advantage of reflecting only price variations. The Paasche index, weighted annually with the quantities traded, has the advantages of taking into consideration annual changes in the composition of trade, although it does not only reflect price changes over time. The Fisher index, the geometric mean of Laspeyres and Paasche indices, is a compromise.[1] All three indices are used here.

If $P$ and $Q$ represent price and quantity indices for each commodity exported $x$ and imported $m$, and the subindices $i = 1,2,3$ ... and $o$ indicate current year and base year respectively, the net barter or commodity terms of trade can be defined thus:

$$N_{\text{Laspeyres}} = \frac{P_{xi}Q_{xo}}{P_{xo}Q_{xo}} : \frac{P_{mi}Q_{mo}}{P_{mo}Q_{mo}}$$

$$N_{\text{Paasche}} = \frac{P_{xi}Q_{xi}}{P_{xo}Q_{xi}} : \frac{P_{mi}Q_{mi}}{P_{mo}Q_{mi}}$$

$$N_{\text{Fisher}} = \sqrt{N_{\text{Laspeyres}} \cdot N_{\text{Paasche}}}$$

1. See R.G.D. Allen, Index Numbers in Theory and Practice (London, 1975) and C.P. Kindleberger, The Terms of Trade. A European Case Study (New York, 1956), pp.318-21. For a discussion of the economy theory surrounding the bias in export and import indices, and its consequences for the terms of trade, see B. Hansen, 'On the Biases in Foreign Trade Indices', Review of Income and Wealth, xxiii (1977), 397-404.

An important distinction which needs to be made is that, whereas prices for exports (1714-1869) and for imports (1714-1812) are price quotations for specific commodities, prices for exports (1870-1913) and for imports (1814-1913) are unit values.[1] Unit values not only reflect changes in price quotations for specific kinds of goods, but also changes in the composition of commodity groups, including changes in type and quality.[2] I have used f.o.b. prices for Spanish domestic exports, and f.o.b. and c.i.f. prices for imports of British goods in order to show how transport costs affected prices paid in Spain for imports.

To make some allowance for changes in the structure of relative prices over time, each index has been constructed in nine distinct subperiods, using the end year as the base year. These nine subperiods have been chosen because there were no significant changes in the commodity composition of trade during each time span. These intervals have been linked at the overlapping years to obtain indices covering the whole period, and 1854 has been adopted as the final base year.

The commodities involved in my construction of export and import price indices are shown in Tables 5A1 and 5A2. The chosen periods, link years and base years for building the indices, together with the coverage of goods included in the price indices over total trade in the base years, are shown in Table 1.

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1. For the sources used to construct the price series for exports and imports see Appendix . For a discussion of unit values, see Kindleberger, The Terms of Trade, pp.317-8, and R.G.D. Allen, 'Index Numbers of Volume and Price', in R.G.D. Allen and J.E. Ely, eds., International Trade Statistics (London, 1953), pp.186-211.

2. For each commodity, unit values are Paasche indices. This fact does not affect, however, the general price index.

## TABLE 1
## CONSTRUCTION OF EXPORT AND IMPORT PRICE INDICES

| Periods | Link year | Base year | Coverage in the base year (%) | |
|---|---|---|---|---|
| | | | Exports | Imports |
| 1714-1750 | | 1750 | 88.5 | 90.3 |
| | 1750 | | | |
| 1750-1778 | | 1778 | 89.0 | 94.7 |
| | 1778 | | | |
| 1778-1796 | | 1796 | 85.0 | 77.5 |
| | 1796 | | | |
| 1796-1814 | | 1814 | 88.7 | 68.6 |
| | 1814 | | | |
| 1814-1827[a] | | 1827[a] | 86.6 | 88.9[b] |
| | 1827[a] | | | |
| 1827-1854[c] | | 1854 | 72.6 | 78.7 |
| | 1854 | | | |
| 1854-1873 | | 1873 | 72.4 | 69.8 |
| | 1873 | | | |
| 1873-1896 | | 1896 | 87.9 | 50.1 |
| | 1896 | | | |
| 1896-1913 | | 1913 | 89.8 | 60.6 |

Sources: Tables A1 and A2    See also text.

a) For imports, the period covers 1814-1832, with 1832 as the base year. Link year with next period, 1832-1854, is also 1832.

b) Percentage for 1832.

c) For imports, the period covers 1832-1854.

The extent of the coverage would appear to be acceptable, given that a figure of 75 per cent of the coverage of the total trade value is normally considered satisfactory.[1] The lack of quantitative data for some commodities, and the fact that the value of other products make up a negligible percentage of total trade makes 75 per cent coverage acceptable. The lower coverage for imported commodities during the second half of the nineteenth century stems from the fact that for a high percentage information is only available for the value. The accepted convention of assuming that changes in the prices of commodities not included in the price indices will be of a similar amplitude, and move in the same direction as those that make up the indice, has been adopted.[2]

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1. Allen, 'Index Numbers of Volume and Price', p.199.

2. Ibid., pp.199-202.

## 2. TRENDS IN THE NET BARTER TERMS OF TRADE

Long swings in the net barter terms of trade can now be distinguished. The period to 1780 shows no clear trend, but two phases can be differentiated: a fall during the first half of the century in which the terms of trade as measured by the Laspeyres indices of export and import prices declined at a slower pace than that of the Paasche terms of trade (Table 2). No significant trends are observed during the years between 1750 and 1780, although the Laspeyres terms of trade show a slightly positive trend, whereas the Paasche terms of trade show a negative one. On balance, import capacity per unit of output exported remained unchanged throughout the years 1714-1778.

The second long swing covers the years between 1784 and 1879, and represents a period of growing import capacity per unit of exports, with a faster rate of growth for the Laspeyres than for the Paasche indices. Four phases can be differentiated. In the prewar phase, 1784-1807, a decline of small proportions in the relative price of exports in terms of imports up to 1801 was followed by a strong recovery until the French invasion of the Peninsula in 1808. The war years show a remarkable rise in the terms of trade, with a peak in 1809. A second phase covers the years from the end of the Napoleonic Wars up to the beginning of the Carlist War (1833), and the import capacity per unit of Spanish exports rose at the fastest pace in the two centuries involved in this study. Again, Laspeyres terms of trade improved at a higher pace than the Paasche ones.

After this period of steady growth, a third phase of unstable expansion took place up to the late 1850's, during which growth rates slowed down. The years of the Carlist War show declining terms of trade followed by a recovery in the 1840's which gave way to another adverse movement in the import capacity per unit of exports and, finally, a remarkable rise up to 1857. As ever, estimates for the Laspeyres index improved more than the Paasche index.

GRAPH 1. Net Barter Terms of Trade between Spain and Britain (1714-1913)
(1854 = 100)
(Laspeyres FOB Export and CIF Import Prices)
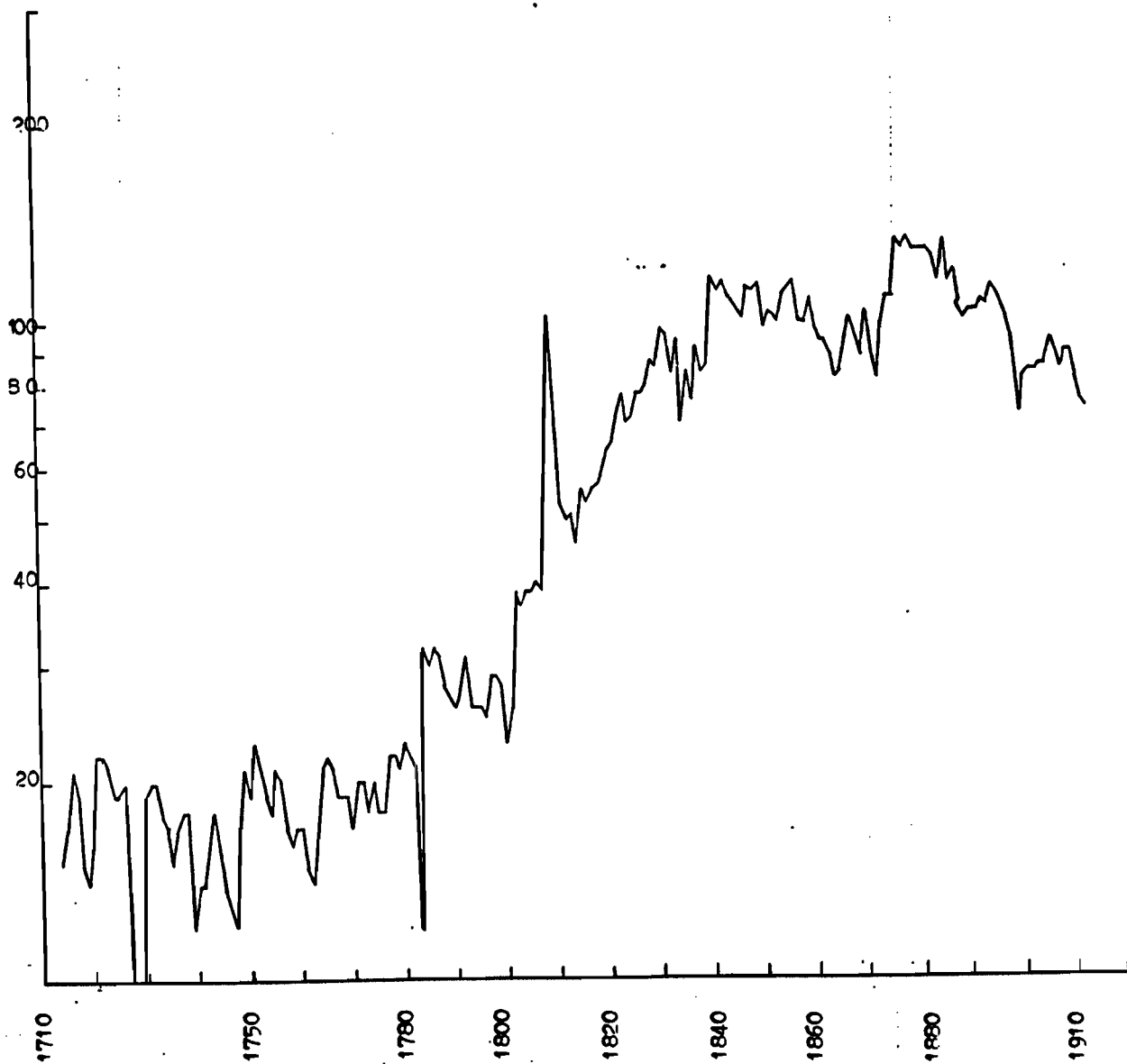
GRAPH 2. Net Barter Terms of Trade between Spain and Britain (1714-1913)
(1854 = 100)
(Paasche FOB Export and CIF Import Prices)

TABLE 2                                                13
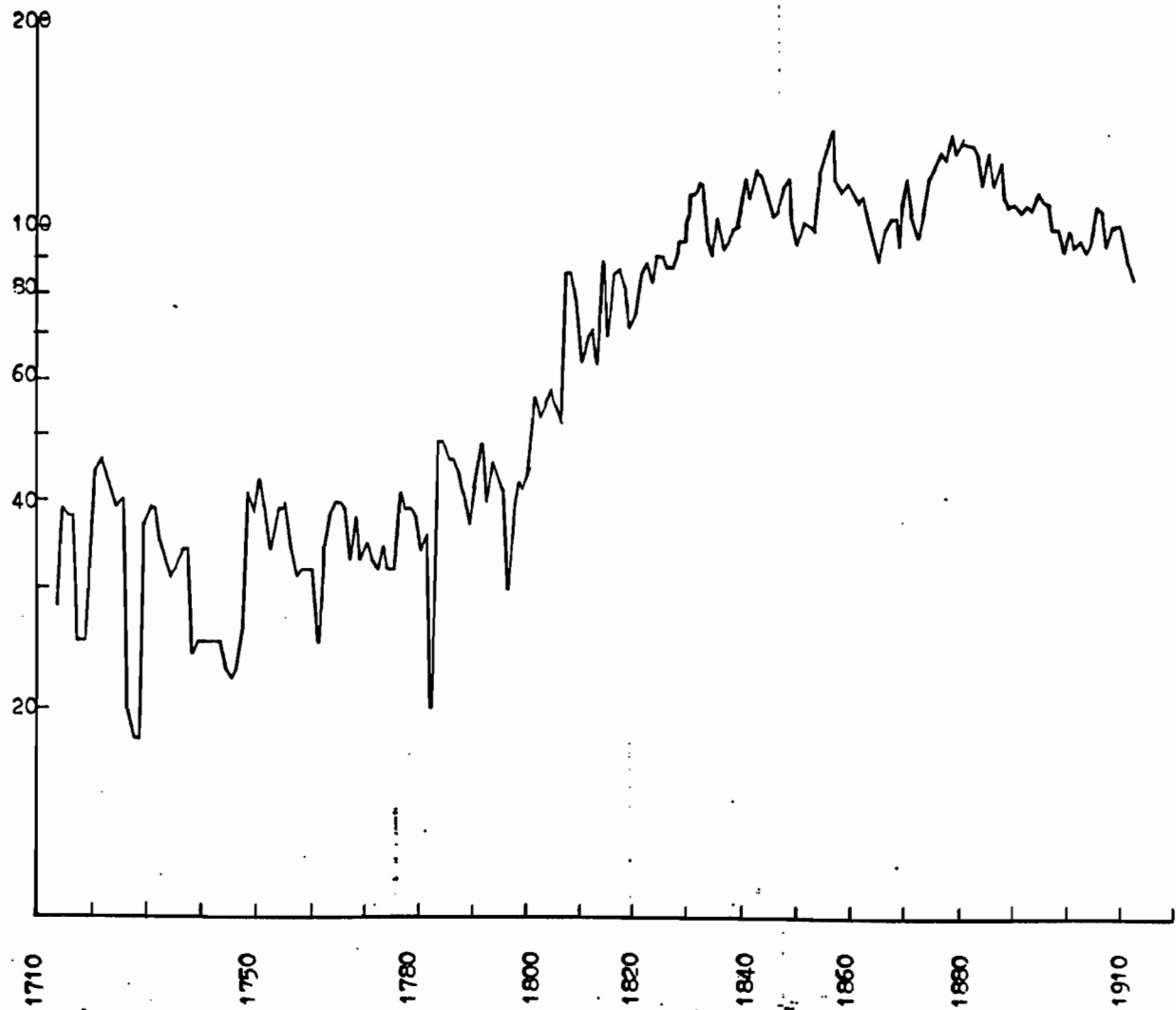
## TRENDS IN THE NET BARTER TERMS OF TRADE BETWEEN SPAIN AND BRITAIN, 1714-1913

(annual growth rates - exponential fitting)

|           | Laspeyres Index |           | Paasche Index |
|-----------|-----------------|-----------|---------------|
| 1714-1778 | 0.32            |           | 0.20          |
| 1784-1857 | 2.29            |           | 1.64          |
| 1784-1879 | 1.63            |           | 1.19          |
| 1879-1913 | -1.61           |           | -1.12         |
|           |                 |           |               |
| 1714-1748 | -0.39           |           | -1.14         |
| 1749-1778 | 0.06            |           | -0.26         |
| 1784-1807 | 1.34            |           | 0.90          |
| 1814-1831 | 3.69            | 1814-1833 | 2.06          |
| 1831-1857 | 1.10            | 1833-1857 | 0.65          |
| 1857-1879 | 0.89            |           | 0.28          |

Sources: Table A4.

The year between 1857 and 1879 produced a sharp discontinuity in the trend shown by the net barter terms of trade from 1784 up to 1857. A significant decline took place between 1857 and 1866, followed by a recovery up to 1871, only to be interrupted during the years of the Third Carlist War (1872-74). In the second half of the 1870's, the terms of trade improved in a remarkable fashion, reaching higher levels than in the late 1850's.

The last long swing covers the years 1879-1913, and shows a deterioration of Spain's net barter terms of trade with Britain. The annual rate of decline in these years was similar to the growth rate shown by the terms of trade in the years 1784-1879. By 1913, the import capacity per unit of output exported had fallen to the level of the 1820's; however, the increased purchasing power per unit of exports achieved during these crucial years of the beginning of the English Industrial Revolution was preserved.

On the basis of price effects alone, import capacity per unit of output exported multiplied by 3 according to the Paasche index, and by 4 according

to the Laspeyres index, between 1784 and 1879, and then fell by one-third between 1879 and 1913.

On balance, the import capacity of a given volume of exports by 1913 was 2 to 2.5 times greater than in 1784 (Paasche and Laspeyres indices respectively). Finally, the favourable long run trend of Spain's terms of trade with Britain made it possible for the quantity of British goods which could be obtained in return for £1 of Spanish goods in 1714, to fall to only £0.2-£0.4 units by 1913 (Paasche and Laspeyres estimates respectively).

After 1880, productivity gains in shipping were reflected in falling freight rates.[1] Because of the low percentage of transport costs in c.i.f. import values, since British manufactures had a very high value to bulk ratio, differences between f.o.b. and c.i.f. import prices are negligible for most of the two hundred years considered. However, after 1880, coal imports from Britain became steadily more important for Spain.[2] Thus, falling freight rates became more influential in the general import price index. Since most trade was carried in British ships, from Spain's point of view c.i.f. prices are relevant for computing shifts in the net barter terms of trade. The decline in freight rates partially offset the rise in prices for British commodities imported into Spain. The gains from falling freight rates transferred to Spanish consumers can be observed by comparing shifts in the net barter terms of trade estimated first with f.o.b. and then with

1. For the evolution of shipping costs, see D.C. North, 'The role of Transportation in the Economic Development of North America' in J. Heers, ed., Les grandes voies maritimes dans le monde xv-xix siècles (Paris, 1965), pp.209-246. See also A.K. Cairncross, Home and Foreign Investment, 1870-1913. Studies in Capital Accumulation (Cambridge, 1953), p.176.

2. See L. Prados de la Escosura, 'El comercio hispano-británico en los siglo XVIII y XIX. Tendencias y estructura', Revista de Historia Económica (forthcoming).

c.i.f. price indices for Spanish imports, that is the same as to measure shifts in the terms of trade with freight rates constant and with actual rates falling. Ratios of the net barter terms of trade estimated both ways are shown in Table 3, and they represent the percentages by which Spanish import capacity per unit of output exported grew because of improvements in the productivity of British shipping: between 5 and 7 per cent between 1880 and 1913.

<div align="center">TABLE 3</div>

<div align="center">GAINS IN SPANISH IMPORT CAPACITY FROM INCREASES IN BRITISH SHIPPING PRODUCTIVITY, 1855-1913 (Five years average) (1855-64 = 100)</div>

|  | Laspeyres Indices | Paasche Indices |
|---|---|---|
| 1855-1864 | 100 | 100 |
| 1865-1874 | 101 | 103 |
| 1875-1884 | 99 | 103 |
| 1885-1894 | 104 | 105 |
| 1895-1904 | 106 | 107 |
| 1905-1913 | 106 | 108 |

Source: Tables A3 and A4.

Note: The formula is $(Px_{fob}/Pm_{cif}) : (Px_{fob}/Pm_{fob}) = Pm_{fob} : Pm_{cif}$

A series representing the terms of trade is a moving ratio between price indices which can only pose questions. These indices reflect the forces operating on the economy of a certain country in the framework of the world trading area.[1] The aim of the following two sections is to find out whether the trends in the terms of trade shown before are due to movements in export or import prices, and to consider their long-term determinants.

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1. See Rostow, 'The Historical Analysis of the Terms of Trade', pp.55-63.

## 3. TRENDS IN EXPORT AND IMPORT PRICES

Price indices for both exports and imports moved in a similar way, according to the general trends in the international economy.[1] Only marginal deviations from the trend in international prices may be explained by British and Spanish offer curves. Several long swings in export and import prices which coincide can be discerned. First, a long swing from 1714 until the late 1740's for export prices, and up to the middle 1750's for import prices. Prices fell throughout these years for both imports and exports, although the rate of fall, adjusted by exponential fitting, was more rapid for export than import prices. A second long swing, which started around 1750, reached its peak in the first decade of the nineteenth century. In this period Spanish export prices increased at double the rate for import prices. Two other features can also be observed in the behaviour of export and import prices. Export prices fluctuated more widely than import prices during the eighteenth century, suggesting higher price instability. This suggests lower short run supply elasticities for exports than for imports, which is consistent with the different composition of exports 'primary products) and imports (manufactures). The second feature is that export prices fell faster during the first half of the century, and rose faster during the second half of the eighteenth century.

Three long swings can be differentiated over the nineteenth century. First, a remarkable decline in both export and import prices from 1814 to 1830, during which the decline in import prices was almost double that for export prices.

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1. For a discussion of the explanations of trends in international prices, see M.D. Bordo and A.J. Schwartz, 'Money and Prices in the 19th Century: Was Thomas Tooke Right?', Explorations in Economic History xviii (1981), 97-127.

GRAPH 3. Spanish FOB Export and CIF Import Price Indices (1714-1913)

(1854 = 100)     (Iaspeyres Indices)
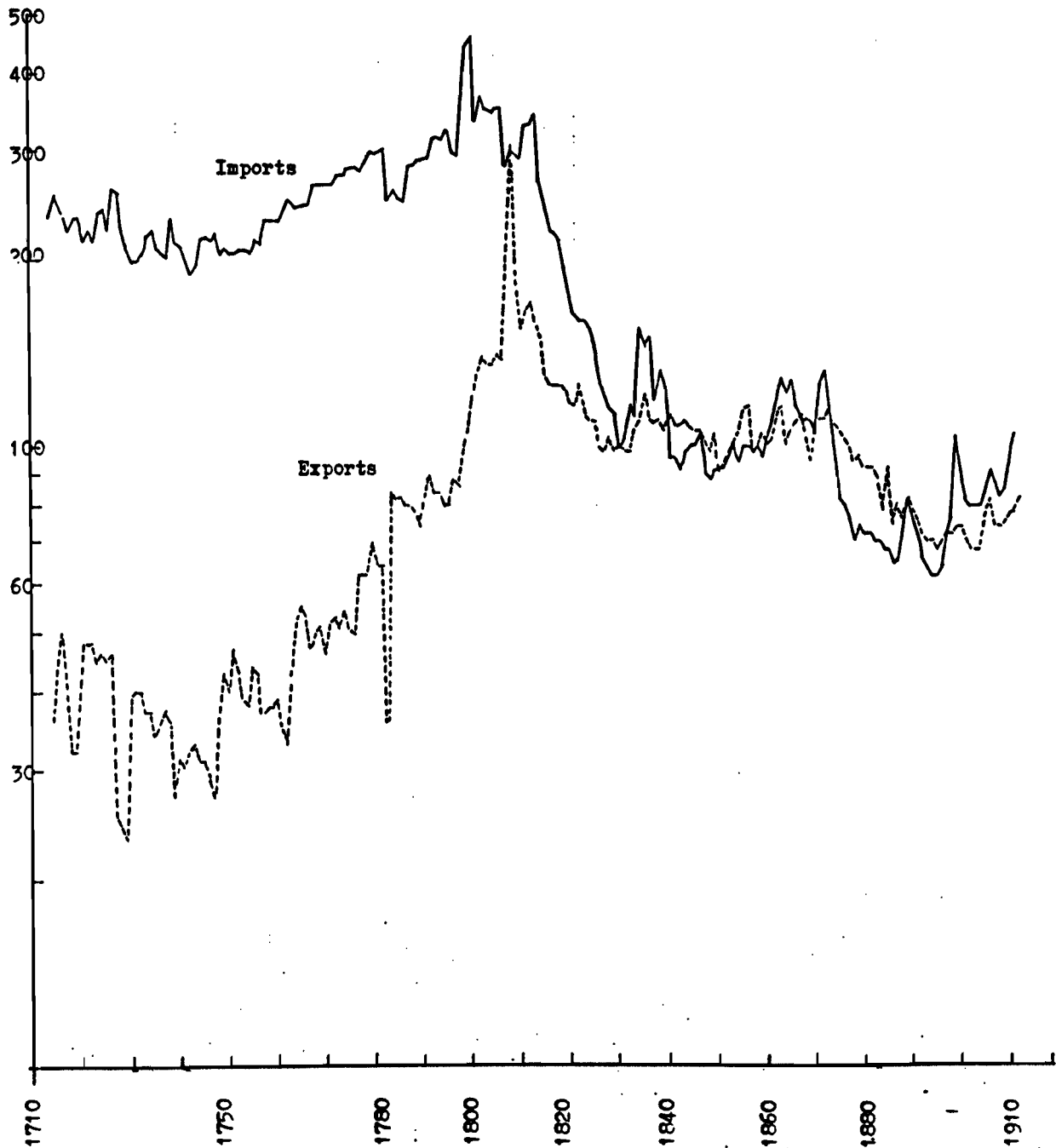
GRAPH  4. Spanish FOB Export and CIF Import Price Indices (1714-1913)

(1854 = 100)     (Paasche Indices)
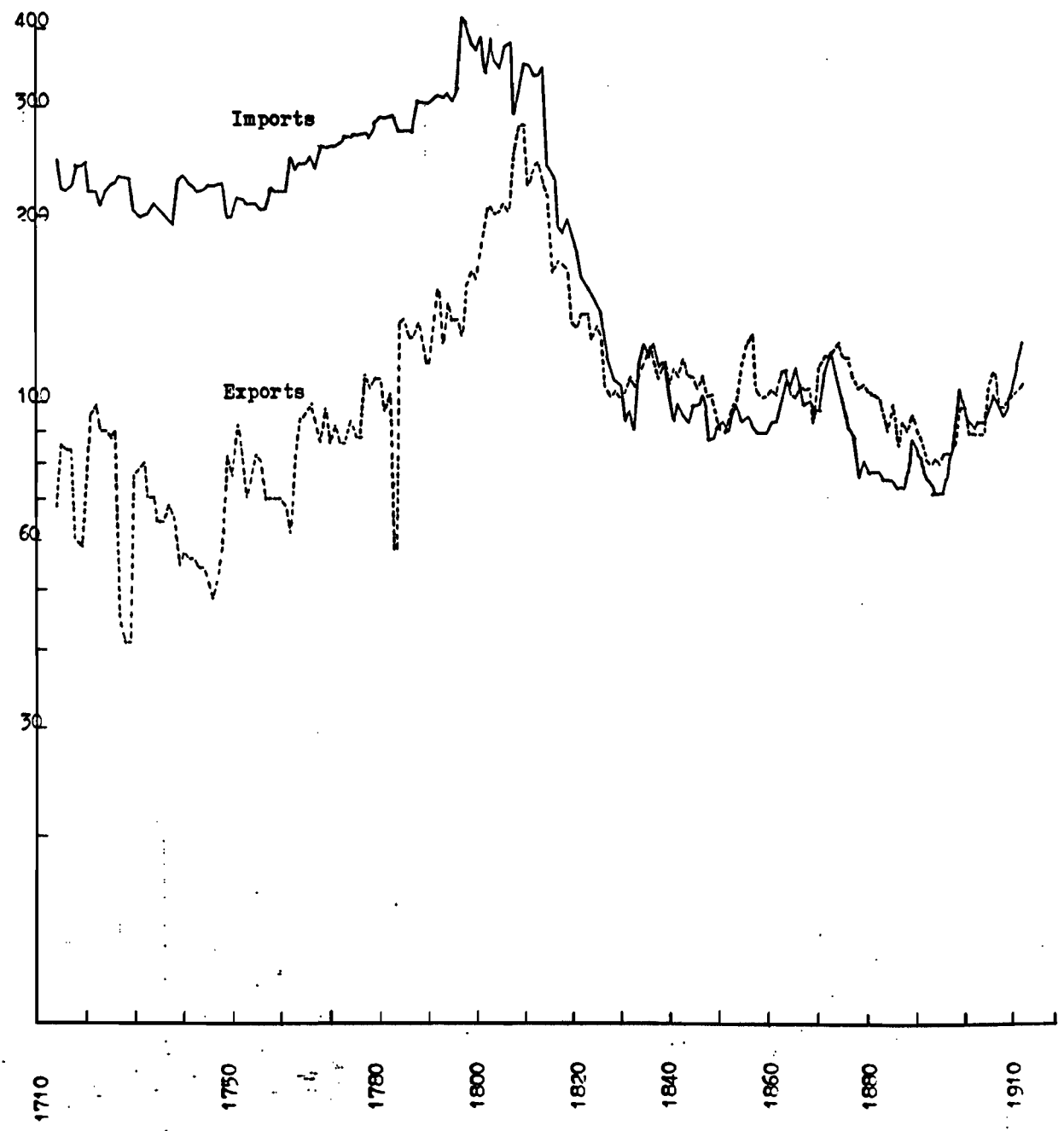
Secondly, a subperiod of relatively stable prices between 1830 and the early 1870's in which three phases can be distinguished: after an upswing in the early 1830's, in which prices for imports rose faster than those for exports, prices fell until 1850 with imports having a greater rate of decline than exports. Finally, a recovery took place from 1850 until the early 1870's, with import prices growing faster than export prices. The third long swing covers the years between the mid-1870's and 1813. Import prices fell sharply during the second half of the 1870's to stabilize during the 1880's and, after a short recovery around 1890, they fell again until 1896. The second part of this long swing consisted of a steady rise in import prices between 1896 and 1913. In turn, export prices declined more steadily and at a higher rate than import prices during the years 1875 and 1896. The recovery which took place after 1896, and lasted until 1913, shows a slower pace of growth for export than for import prices.

## TABLE 4

### TRENDS IN EXPORT AND IMPORT PRICES, 1714-1913 (annual growth rates – exponential fitting)

| | Export Price Indices | | | Import Price Indices | |
|---|---|---|---|---|---|
| | Laspeyres | Paasche | | Laspeyres | Paasche |
| 1714-1748 | -1.07 | -1.31 | 1714-1755 | -0.40 | -0.21a |
| 1749-1807 | 2.24 | 1.79 | 1755-1807 | 0.93 | 1.15b |
| 1814-1830 | -2.56 | -4.51 | 1814-1831 | -6.16 | -6.06 |
| 1830-1874 | 0.06 | 0.03c | 1831-1873 | -0.02 | -0.06 |
| 1874-1896 | -2.20 | -2.00d | 1873-1896 | -1.92 | -1.54 |
| 1896-1913 | 0.78 | 1.57 | 1896-1913 | 2.09 | 2.26 |
| 1749-1778 | 1.33 | 0.96 | 1755-1778 | 1.29 | 1.26e |
| 1784-1807 | 2.80 | 2.39 | 1784-1807 | 1.60 | 1.60 |
| 1830-1836 | 3.38 | 2.81 | 1831-1835 | 0.46 | 7.82 |
| 1836-1851 | -1.13 | -1.39 | 1835-1849 | -3.82 | -2.32 |
| 1851-1874 | 0.49 | 0.54f | 1849-1873 | 1.36 | 0.86 |

Source:   Table A4.

Notes:   a)   1714-1757     b)   1757-1807     c)   1830-1875
         d)   1875-1896     e)   1757-1778     f)   1851-1875

## 4. LONG RUN DETERMINANTS OF THE NET BARTER TERMS OF TRADE

### a)   1784-1879

Rising British demand for primary products, for which supply was relatively inelastic, and increasing efficiency in the production of British goods passed on as lower prices, explain the higher growth rates for export rather than import prices in the late eighteenth century and the slower pace of decline for export prices, as compared with those for imports, from the end of the Napoleonic Wars up to the middle of the nineteenth century. This resulted in an increase in the purchasing power per unit of Spanish output exported throughout the period 1780-1860. It may be suggested, therefore, that shifts in the British offer curve mainly accounted for the improvements in Spain's net barter terms of trade with Britain during the

years of English industrialisation. The growth of the British population, industrial production and per capita incomes, together with rising total factor productivity in English export industries between 1780 and 1860, provide empirical support for this interpretation.[1]

The decline in the purchasing power per unit of exports in the 1860's and the early 1870's comes, to a great extent, from the rise in import prices. Increased international demand for British goods, together with rising prices for raw cotton during the American Civil War (reflected in the prices of cotton manufactures) account for this fact. A remarkable increase in Spanish imports of British goods took place in the late 1850's and early 1860's when railway construction started in Spain and required considerable quantities of technical equipment and fuel, leading to the single period of persistent trade deficit with Britain between the end of the Napoleonic Wars and the First World War.[2] This situation was common to other areas of the world during this period, and helps to explain the rise in the prices for British manufacturers. Besides, coal shortages also

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1. In Britain, increases in total factor productivity compare very favourable with the decline in export prices between 1780 and 1860: 1.6 per cent average annual growth for total factor productivity in the production of exports against -1.3 per cent annual decline in export prices. For productivity estimates in new industries see D.N. McCloskey, 'The Industrial Revolution, 1780-1860: A Survey', in Floud & McCloskey, The Economic History of Britain since 1700, 2 vols. (Cambridge, 1981); and N.F.R. Crafts, British Economic Growth, pp. 83-86 and 148-9. For export prices, A.H. Imlah, Economic Elements in the Pax Britannica, Studies in British Foreign Trade in the Nineteenth Century (Cambridge, Mass., 1958), pp.94-98.

2. For the trade balance between Spain and Britain see Appendix B. For the derived demand for equipment and fuel from railway construction, see A. Gómez Mendoza, Ferrocarriles y cambio económico en España 1855-1913 (Madrid, 1982), Chs. 4 and 5.

occurred in these years and it affected not only the price of British coal (in great demand because of the spread of the railway and modern industry in Western Europe and other parts of the world), but also the prices of steel and engineering goods for which foreign demand was also rising very fast.[1] The recovery of Spain's NBTT in the late 1870's is connected again with import prices. Coal shortages were eventually solved and prices for British coal and those manufactures which used it as an input in their production fell sharply.[2]

b) 1879-1913

The deterioration of the Spanish terms of trade with Britain in the years 1879-1913 derives from the fact that export prices declined faster than import prices up to 1896, and grew at a slower pace from 1896 to 1913. Movements in import prices account for a certain proportion of the adverse shift in the terms of trade. The slackening of productivity growth in British industry, coupled with strong demand for British manufactures from areas of recent settlement, in which considerable British investment took place, is behind the rise in import prices.[3] A shortage of coal at the end of the 1890's and early 1900's is also responsible for the rise in prices for coal and steel and engineering manufactures.[4]

1. W.W. Rostow, The World Economy: History and Prospects (London, 1978) p.93.

2. Rostow, World Economy, p.93.

3. Total factor productivity growth slowed down in nineteenth century Britain: falling from 1.5 per cent annual growth during the years 1856-1873 to 0.6 per cent during 1873-1913 according to Matthews et al., and from 1.2 per cent to 0.4 per cent according to Floud, (R. Floud, 'Britain, 1860-1914: A Survey', in Floud & McCloskey, eds., Economic History of Britain, ii, 1-26); R.C.O. Matthews, C.H. Feinstein and J.C. Odling-Smee, British Economic Growth, 1856-1973 (Oxford, 1982), p.210. For the patterns and pace of British overseas investment, M. Edelstein, Overseas British Investment in the Age of High Imperialism, 1850-1914 (London, 1983).

4. Rostow, World Economy, p.94. Productivity in coal mining was declining in Britain in the years 1890-1913. See Lewis, Growth and Fluctuations, pp.95 and 132.

A possible explanation for the unfavourable trend in the NBTT from the mid-1890's up until 1913 focuses on the devaluation of the currency after Spain abandoned convertibility into gold in 1883. The purchasing power of the peseta, however, did not deteriorate noticeably until the early 1890's. Table 5 compares actual and counterfactual (in the absence of devaluation) trends in the NBTT from the late 1880's until 1913. Two different periods can be observed; one, up to 1898, shows the declining purchasing power of the Spanish currency in which the devaluation explains the deterioration. In the hypothetical absence of depreciation of Spanish currency, a reverse tendency would have taken place.

The second period shows the opposite phenomenon; appreciation of the peseta avoided a sharper decline in the import capacity per unit of Spanish exports between 1898 and 1913. A comparison in levels would show, nevertheless, that hypothetical relative prices for exports performed better than actual ones during the period 1888-1905. Finally, when trends for both actual and counterfactual NBTT are compared in the long swing covering 1879-1913, it is possible to assess that the devaluation accounted for 33 to 47 per cent (Laspeyres and Paasche indices respectively) of the decline in import capacity.

## TABLE 5

### TRENDS IN ACTUAL AND COUNTERFACTUAL NBTT, 1888-1913

| | Laspeyres Indices | | Paasche Indices | | Purchasing Power of the Peseta |
|---|---|---|---|---|---|
| | actual | counter-factual | actual | counter-factual | |
| 1888-1898 | -0.31 | 3.00 | -1.01 | 2.31 | -3.32 |
| 1898-1913 | -0.68 | -2.89 | -0.40 | -2.61 | 2.21 |
| 1879-1913 | -1.61 | -1.08 | -1.12 | -0.59 | |

Source: Table A5

Before any conclusions can be drawn from this exercise, it is necessary
to find out the reasons behind the devaluation of Spanish currency,
that is, whether the devaluation was a consequence of a consistent
lack of competitiveness of Spanish exports or a result of governmental
mismanagement.

Spain abandoned the gold convertibility of the peseta when most
advanced economies, which were also Spain's main trading partners, were
adopting it, and this implied Spain's isolation from the international
economy for more than two decades.[1] From 1883 onwards, Spain's currency
was fiduciary. The quantity of paper money issued depended on the
Government's budget difficulties. The chronic government deficit, the
origin of which lay in the inflexible and regressive fiscal system, led
to permanent issues of public debt (including External Debt), and its
service represented more than a fourth of cumulated Government expenditure
over the period 1850-1890.[2] Public debt was systematically discounted
by the Bank of Spain with contingent effects on the money supply.
In addition, servicing the national debt resulted in a permanent strain
on the balance of payments.

In 1881-82, Camacho, the finance minister, introduced the conversion
of the Public Debt, a major feature of which was that foreign bond-holders
would get their interest payments in gold. The result would have been an

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1. For a survey of monetary and fiscal issues in the late nineteenth
   century Spain, see G. Tortella, 'La economía española', pp.124-29,
   131-48 and 157-60. A more recent and detailed account is provided
   by P. Martín Aceña, 'Deficit público y política monetaria en la
   Restauración, 1874-1923; in Martín Aceña & Prados de la Escosure, eds.,
   Nueva Historia Económica, pp.262-284; see also G. Tortella,
   'Las magnitudes monetarias y sus determinantes', in Tortella & Schwartz,
   eds., La Banca española en la Restauración, 2 vols. (Madrid, 1974) i,
   457-521.

2. Tortella, 'Economía española', p.140.

addition to the exportation of gold already taking place to settle the
apparent balance of payments deficit on income account, in the absence
of capital imports, which had collapsed in the 1880's.[1] From 1890 onwards,
servicing the Debt was extremely difficult given that neither gold
nor foreign investments were as abundant as in previous decades. In
this context, the peseta fell.

In 1895, Cuba's War of Independence started, and this led to further
increases in Public Debt. To service the External Debt it was necessary
to buy foreign exchange, and this forced the peseta down even further.
Domestic inflation, emanating from increases in the money supply through
issues of Public Debt discounted by the Bank of Spain reduced competitiveness
of Spanish exports.

Finally, given the importance of interest payments on the External
Debt, the devaluation increased the burden on the balance of payments
on current account.

There are contradictory views concerning Spain and the gold standard
in the historiography. For many years, the commonly accepted interpretation
has been that of Sardá, who argued that    abandoning the convertibility
and increasing the money supply through fiduciary circulation (plus the
introduction of protectionism) maintained domestic investment and the level
of employment and Spain's economy kept growing during the 1880's and 1890's.[2]
In fact, for Sardá, Spain's isolation from the international economy helped
the economy to avoid the cyclical crises of the 1890's. Sardá also believed

1. No estimate is available for the balance of payments on current
   account. Recent trade reconstruction shows   a surplus in the commodity
   trade balance but nothing is known on the other components of the balance
   of payments. Some contemporary estimates for 1901, 1904 and 1911
   collected by S. Chamorro, 'Bosquejo histórico de la Balanza de Pagos de
   España', Información Comercial Española, clxvii (1976), 151-59, suggest
   against the main historiographical stream a surplus. New research would
   be required to provide a solid answer to this historical question.

2. Sardá's, Política monetaria, pp.195-227, 258-69, 289-97 and 313-15.

that the main cause for the devaluation of Spanish currency in the years 1890-1905 has to be found in the structural problems of the balance of payments rather than in the Government's chronic budgetary deficit.

Tortella and Martín Aceña have reinterpreted the evidence and added new information to the debate. From their work, it is possible to reverse Sardá's views of the cause of devaluation, stressing instead the role played by the Government's financial difficulties and its harmful consequences on the competitive position of Spain in the international market.[1] Nevertheless, Tortella shares Sardá's opinion about abandoning the convertibility into gold. He suggests that if Spain had stayed on gold that would have provoked a deep economic depression. For Tortella, the gold standard was not an efficient way to run monetary policy for a poor and uncompetitive economy like Spain.[2]

A revisionist interpretation has been put forward by Martín Aceña. In his view, Tortella's view assumes that outside the international monetary system Spain's economy became less poor and uncompetitive.[3] And he argued that by staying off gold Spain missed a unique opportunity to share in the benefits of the expansion in world trade an investment that took place in the three decades prior to the First World War. According to Martín Aceña, the policy discouraged foreign investors because they distrusted flexible exchange rates in the nineteenth century. Thus the suspension of external convertibility of the peseta damaged the mechanism of external adjustment to balance of payments disequilibria through long-term capital inflows.

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1. Tortella, 'Economía española', pp.131-48, and Martín Aceña, 'Deficit público', pp.280-82.
2. Tortella, ibid., p.160; Tortella, 'Las magnitudes monetarias', pp.480-1.
3. P. Martín Aceña, 'España y el patrón-oro, 1880-1913', Hacienda Pública Española, lxix (1981), 267-90, and 'Deficit Público', p.281.

Anyway it now seems that the deterioration in the purchasing power of Spanish currency in the international market cannot be imputed exclusively to the lack of competitiveness of Spanish exports. On the contrary, it seems that it was the financial difficulties of the government, provoked by an ossified tax system, which led to balance of payments problems and, eventually, to the devaluation of the peseta and the deterioration of the NBTT in the years 1890-1905. The foreign trade sector to some extent paid the cost of governmental mismanagement.

## THE FACTORIAL TERMS OF TRADE

Exogenous changes in the NBTT imply a gain or a loss of welfare, but the significance in terms of welfare is ambiguous when the changes are endogenous. NBTT may deteriorate as a result of increases in productivity or in job opportunities in a situation of unemployment. There are grounds for believing this happened in the Spanish case. Agriculture and mining provided most of Spain's exports to Britain. Evidence from mining and agricultural surveys suggest increases in partial productivity. Thus, the exploitation of mineral resources with modern techniques by foreign investors might have increased production and the gains could have been transferred in the form of lower export prices. My estimates of output per worker for the production of the major ores and metals exported show clear improvements between 1880 and 1900 with an increase in weighted labour productivity of 61 per cent.[1] My evidence for the agricultural

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1. Estimated metric tons of minerals and metals per man over 18 years old, from iron ore, lead, quicksilver, copper metal, Estadística Minera; for copper ore and pyrites, Ch. E. Harvey, The Rio Tinto Company. An Economic History of a Leading International Mining Concern 1873-1954 (Penzance, 1981), pp.128 and 332. I am indebted to José Ramón Castillo, who supplied the Estadística Minera data to me. On this basis, I constructed a Laspeyres-type index of output per male worker in two segments using 1896 and 1913 as base years, and 1895-99 as the link years. The weights used are the shares of each mineral in the total value of mineral exports (see Prados de la Escosura, 'Comercio hispano-britanico').

sector also shows a sharp increase in the labour productivity from 1890 to 1910[1]

Jobs seem to have been provided by the export sector. In nineteenth century Spain, as in other Mediterranean economies, unemployment and underemployment have been stressed as the defining features of the labour markets.[2] High percentages of the labour force were still employed in primary production, and its marginal productivity was undoubtedly low. Emigration and increases in output tend to support this contention, as well as direct evidence on unemployment provided by economists and historians.

Vandellós, in his estimate of national income for 1913, calculated that the average number of days worked per year in agriculture was 250.[3] Jornaleros, or day labourers, according to García Sanz, were out of work one-fourth of the year in the 1850's. Gómez Mendoza has emphasised seasonal employment for the late nineteenth century: 210 days for the average *bracero* or farm labourer, out of a possible 300 days a year working (275 days as a lower bound).[4] Full employment occurred only during the summer months and peasants were idle for three or four months every year. The opportunity cost of allocating agricultural labour to alternative occupations during the dead season was minimal.

The exploitation of minerals to cater to foreign demand provided more

1. G. Toniolo, 'Railways and Economic Growth in Mediterranean Countries: Some Methodological Remarks', in P. O'Brien, ed., Railways and Economic Development of Western Europe 1830-1914 (London, 1983), pp.227-36.

2. Vandellós, 'Richesse', p.119.

3. A. García Sanz, 'Jornales agrícolas y presupuesto familiar campesino en España a mediados del siglo XIX', Anales del CUNEF (1979/80), 51-71.

4. A. Gómez Mendoza, Ferrocarriles y cambio económico, pp.99-104.

employment, although the numbers involved were small.[1] Internal migration and shifts within occupations from subsistence to commercial agriculture were also stimulated by the growth of exports.

SINGLE FACTORIAL TERMS OF TRADE

To take changes in productivity into account, economists measure the single factorial terms of trade (SFTT). This index is a measure of a country's absolute welfare in relation to international trade and specialisation. SFTT weights a productivity index of the factors used in the production of exportables with NBTT already weighted by the share of imports in home consumption. Labour productivity has been suggested as the relevant productivity in estimates of single factorial terms of trade, since it is an indicator of changes in welfare, that is, changes in real incomes per head, abstracting from distribution.[2]

$$SFTT = WSFTT = P^W O/L \qquad (1)$$

where $\underline{P}$ stands for the NBTT, $\underline{w}$ is the share of imports in home consumption and O/L stands for labour productivity in the home country's exportables.

If there is chronic unemployment, as in the case of nineteenth century Spain, an increase in employment derived from export expansion would have the same effect on absolute real income as an increase in labour productivity. For this case, an 'employment-corrected' index is appropriate.

$$ECWSFTT = P^W O/L N \qquad (2)$$

where $\underline{N}$ stands for an index of the labour volume used in the exportable production.

1. In 1900 and 1910, labour employed in extractive industries were 76,200 and 90,800 workers respectively out of total active population of 7.6 million. Estadísticas básicas de España, 1900-1970, p.369.
2. cf. J. Spraos, Inequalising Trade?, pp.70-80. Crafts, British Economic Growth, pp.147-48.

Since proxies for labour productivity in LDCs export sectors are difficult to obtain, and given that $P = Px/Pm$ and $P \, O/L \, N = V$, where $\underline{V}$ stands for the value of exportable output, ECWSFTT can be written as follows:

$$ECWSFTT = \left(Px^{W-1} \; V\right)\Big/P_m^W \qquad (3)$$

In the case of Spanish-British trade, the value of output of exportables (V) may be proxied by the value of exports. Minerals accounted for half the value of exports from the late 1870's to 1913, and most of its output was exported. A significant part of the production of commercial agriculture along the Mediterranean coast (almonds, oranges, raisins, as well as cork and Sherry wine), found its way to Britain.[1]

The share of imports in home consumption for the period prior to 1814 is largely a 'guess-estimate' of 5.7 per cent          . The estimate for 1830, 2.9 per cent, was extended to the years 1814-1853, while the share for 1860, 6.8 per cent, was assumed to be appropriate for the period 1854-1873. Shares of imports in domestic consumption for the rest of the period up to 1913 are available, being around 11 per cent for 1880-1900, and 9.3 per cent for 1910.

Table 6 presents the estimates for weighted single factorial terms of trade (employment corrected) (ECWSFTT) over the period 1784-1913 by decennial average. A mild improvement in the early nineteenth century (1.3 per cent annually) opens the way to a fast increase in the purchasing power of exports in the late nineteenth century (3.0 per cent per year). The annual increase of 2.6 per cent in the ECWSFTT over the entire period shows that a deterioration of the NBTT between 1879 and 1913 was more than offset by improvements in employment opportunities and, on a smaller scale, by productivity. It is also worth mentioning that, since half Spain's late

1. Prados de la Escosura, 'Comercio hispano-británico'.

nineteenth century exports were exhaustible resources (minerals and metals), welfare neutrality requires a long-term improvement in the terms of trade, which is what actually occurred.[1]

We may conclude that 'immiserizing growth' certainly did not occur in the economic relations between Spain, a primary producer, and the first industrial nation, Britain.

## TABLE .6

### EMPLOYMENT CORRECTED WEIGHTED SINGLE FACTORIAL TERMS OF TRADE (ECWSFTT) 1784-1913 (Decennial averages)

| | | | |
|---|---|---|---|
| 1784-1793 | 100.0 | 1854-1863 | 374.1 |
| 1794-1803 | 124.0 | 1864-1873 | 667.8 |
| 1804-1813 | 146.3 | 1874-1883 | 996.6 |
| 1814-1823 | 140.1 | 1884-1893 | 1070.4 |
| 1824-1833 | 191.5 | 1894-1903 | 1726.1 |
| 1834-1843 | 191.5 | 1904-1913 | 1650.3 |
| 1844-1853 | 229.7 | | |

Sources: Shares of imports in home consumption,
Export and Import Prices, Fisher indices from Table .A4:
Export values at current prices, table .A1.

It is now widely know the apparent paradox for Spain of increasing its income per head and simultaneously worsening its position vis-à-vis the Core countries of north-west Europe. But only changes in absolute welfare stemming from international trade and specialisation have been considered so far. Since the aim of this research is to find out the causes of Spanish backwardness relative to other nations, a comparison of the experience of Spain and Britain is of interest. It is possible for patterns of trade and specialisation to increase absolute welfare as measured by the ECWSFTT and, at the same time, decreasing relative incomes across countries.

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1. Spraos, Inequalising Trade?, pp.78-79.

Double factorial terms of trade are designed to test how patterns of trade effect relative welfare. When weighted for the import share in consumption of each country involved, DFTT can be written:

$$WDFTT = (P^{W+W^*}O/L) : (O^*/L^*) \qquad (4)$$

where $*$ stands for the foreign country, in this case, Britain.

Double factorial terms of trade represent, according to Spraos,

> 'the rate at which one home man-hour exchanges for foreign man-hours via the intermediation of trade, but with due regard for the importance of the traded goods in the respective consumption basket.'[1]

DFTT, therefore, is an exchange ratio of real income between the home country and the foreign country.

Employment correction appears necessary in the case of Spain, where unemployment is the rule, whereas it was not for Britain.[2] An appropriate index is available, where relative welfare is accounted for with allowances for changes in employment where necessary,

$$ECWDFTT = (P^{W+W^*}O/L \ N) : (O^*/L^*) \qquad (5)$$

and, as in (3), may be transformed into

$$ECWDFTT = (P^{W+W^*-1}V) : (P^{W+W^*}O^*/L^*) \qquad (6)$$

Table 7 presents the findings for relative welfare stemming from Ricardian patterns of trade and specialisation which reveal a modest annual improvement of 0.6 per cent for (weighted employment corrected) double factorial terms of trade in the early nineteenth century, accelerating in the nineteenth century to 3.0 per cent, implying an annual growth rate (exponentially fitted) of 1.7 per cent for the entire period.

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1. Spraos, <u>Inequalising Trade?</u> p.76.

2. Matthews, Feinstein & Odling-Smee, <u>op.cit.</u>, pp.81-95; J.G. Williamson, <u>Did British Capitalism Breed Inequality?</u> (London, 1985), pp.20-22.

TABLE -7

EMPLOYMENT CORRECTED WEIGHTED DOUBLE FACTORIAL TERMS OF TRADE, 1784-1913
(decade average)

| | |
|---|---|
| 1784-1793 | 100.0 |
| 1794-1803 | - |
| 1804-1813 | 100.9 |
| 1814-1823 | 109.4 |
| 1824-1833 | 139.6 |
| 1834-1843 | 116.3 |
| 1844-1853 | 128.8 |
| 1854-1863 | 193.7 |
| 1864-1873 | 282.3 |
| 1874-1883 | 424.6 |
| 1884-1893 | 504.7 |
| 1894-1903 | 594.7 |
| 1904-1913 | 509.4 |

Sources:

For Britain: $w^*$ share of imports in home consumption, 1780, Crafts, British Economic Growth, p.131; R. Davis, British Overseas Trade during the Industrial Growth (Leicester, 1979), p.86; 1800-1850, Deane & Cole, British Economic Growth, pp.166 and 330; Imlah, Economic Elements, pp.94-98. 1850-1910, C.H. Feinstein, National Income, Expenditure and Output of the United Kingdom, 1855-1965 (Cambridge, 1972), T4 and T5; Imlah, Economic Elements, pp.94-98.

$(O^*/L^*)$ Industrial Labour Productivity: Crafts, 'Economic Growth', p.61 for 1835-44 to 1905-13.

For the earlier period, calculated from backward extrapolation from Crafts, British Economic Growth, p.26; for the Divisia index for industrial products; O'Brien & Keyder, Economic Growth, p.94, for industrial labour force.

For Spain: $w$, . ; export and import prices, Table A4; Fisher indices; export values at current prices, Table A1,

My quantitative exercises imply that the larger rise in British labour productivity relative to that of Spain's was matched by the increase in employment apparently provided by trade specialisation, in addition to the favourable export prices relative to imports for Spain. It may be said,

GRAPH 5. Trends in the Net Barter, Single Factorial and Double Factorial Terms of Trade (1784-1913).
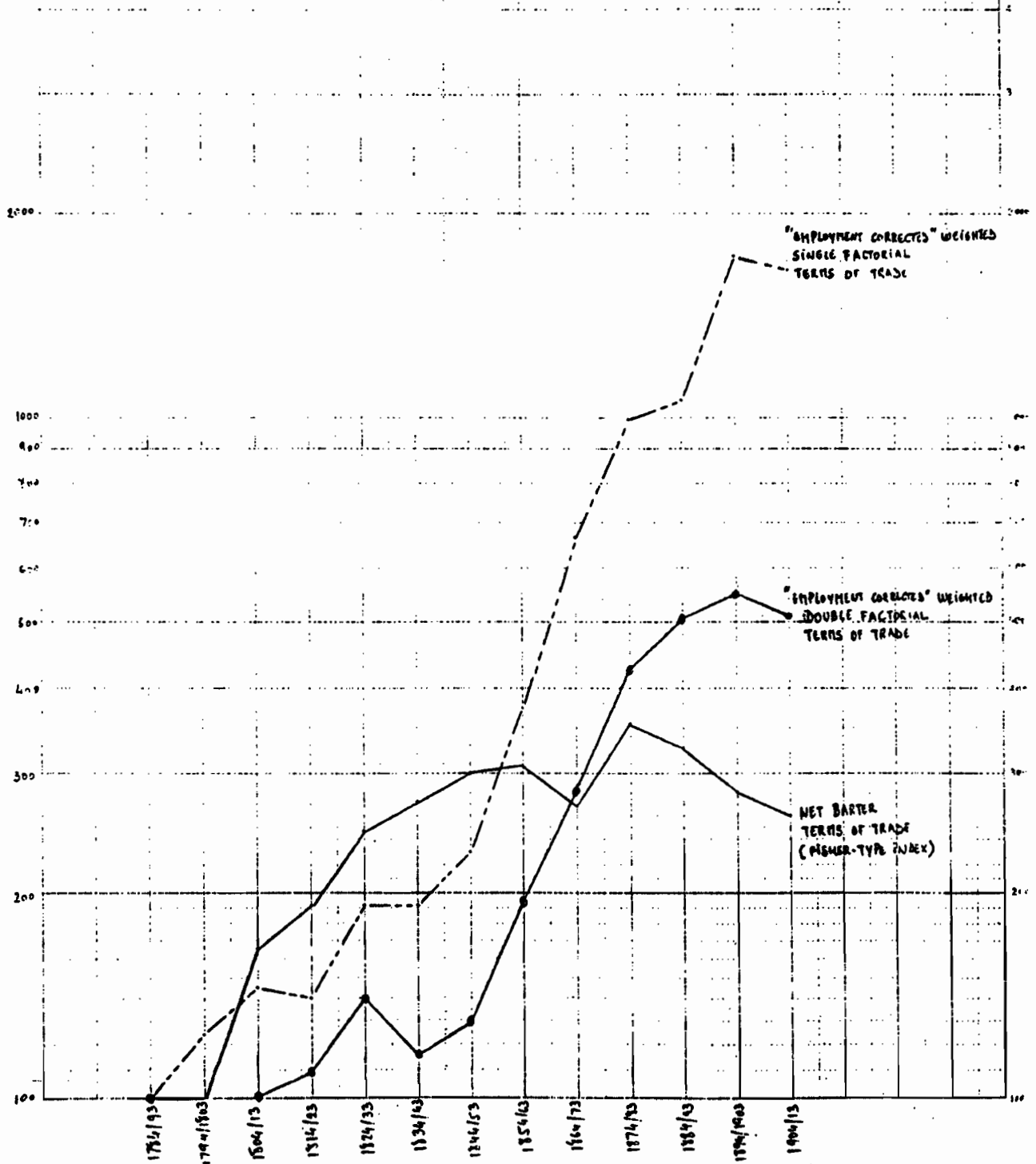
therefore, that the sectors most closely associated with traditional patterns of specialisation did not share the inequalising experience of the Spanish economy as a whole, suffered over the century .

The explanation for the growing gap in living standards between Spain and the Core countries of Western Europe must be explored outside the export sector.

## CONCLUSION

The Prebisch-Singer thesis (which posits a long run decline in prices for primary producers relative to prices for industrial producers) has been widely accepted in Spanish historiography. The quantitative evidence assembled and analysed suggests that, for most of the two hundred years covered here the Prebisch-Singer interpretation does not apply to the economic relations between Spain and Britain. Following a period with no clear trends from 1714 to 1778, relative prices of exports in terms of imports improved remarkably from 1784 to 1879. Finally, a phase of unfavourable net barter terms of trade took place between 1879 and 1913.

Suggestions of unfavourable NBTT in the eighteenth century can be plainly dismissed as can Berend and Ranki's argument of a secular deterioration of the terms of trade during the nineteenth century. Sánchez-Albornoz's pessimistic view of the NBTT can only be applied to the last thirty years of the period under study.

Changes in the NBTT, however, have different implications for a country's welfare depending on whether they derive from endogenous or exogenous sources. Explorations into the deteriorating NBTT from 1879 to 1913 suggest complex causes that require more sophisticated indices, such as the use of the single factorial terms of trade, which weight changes in the NBTT with those taking place in productivity.

In countries where unemployment is endemic increases in job
opportunities should also be taken into account, since SFTT are a measure
of absolute welfare stemming from patterns of trade and specialisation
and are connected to real income per worker. An improvement in SFTT
means that a larger amount of foreign goods can be purchased per unit
of labour embodied in exporting goods. Estimates for 'employment corrected'
weighted single factorial terms of trade (ECWSFTT) show a long-term
improvement throughout the nineteenth century, most of it due to
employment opportunities opened by the expanding foreign trade sector.

Absolute welfare for factors of production employed in sectors linked
to patterns of trade and specialisation improved over the nineteenth
century. However, increasing absolute levels of welfare may also coincide
with declining welfare relative to that of major trading partners.
In order to measure the latter, double factorial terms of trade, adjusted
for unemployment, have been estimated, showing a clear increase throughout
the nineteenth century. Rising employment in the exportable sector and,
on a milder scale, improvements in labour productivity, more than offset
greater productivity obtained by the British economy. The consequence
was that relative incomes between Spain and Britain evolved favourably for
Spain. The growth in real incomes in Spain, while at the same time
falling further behind the levels of Western Europe, cannot therefore be
blamed on economic specialisation along lines of comparative advantage.
On the contrary, for the 'long nineteenth century' the Spanish economy was
taking full advantage of British industrialisation. If, as it has often
been argued, the empirical evidence collected and analysed in this essay
tends to reject any suggestion that Spain became a more dependent economy
before 1914.

APPENDIX

## Reconstruction of Annual Series for Export and Import
## Price Indices and the Net Barter Terms of Trade

### TABLE A1
### COMMODITIES INCLUDED IN THE EXPORT PRICE INDICES

1714-1750 Almonds, Barilla, Iron bars, Olive oil, Raisins, Salt, Silk, Sherry and Wool

1750-1778 Almonds, Barilla, Iron bars, Olive oil, Raisins, Salt, Silk, Sherry and Wool

1778-1796 Almonds, Barilla, Olive oil, Raisins, Sherry and Wool

1796-1814 Almonds, Barilla, Olive oil, Quicksilver, Raisins, Sherry and Wool

1814-1827 Almonds, Barilla, Brandy, Olive oil, Quicksilver, Raisins, Sherry and Wool

1827-1854 Barilla, Lead bars, Olive oil, Quicksilver, Raisins, Sherry and Wool

1854-1873 Almonds, Copper(metal), Copper(ore), Cork, Corks, Lead bars, Oranges, Olive oil, Oxen, Quicksilver, Raisins, Common wine, Sherry and Wool

1873-1896 Almonds, Copper(ore), Copper(regulus), Pyrites, Cork, Corks, Iron ore, Lead bars, Oranges, Olive oil, Quicksilver, Raisins, Common wine, Sherry and Wool

1896-1913 Almonds, Copper(ore), Copper(regulus), Pyrites, Cork, Corks, Esparto grass, Grapes, Iron ore, Lead bars, Oranges, Olive oil, Onions, Quicksilver, Raisins, Common wine, Sherry and Wool

TABLE A2

COMMODITIES INCLUDED IN THE IMPORT PRICE INDICES

1714-1750 Brass & Copper manufactures, Coal, Fish, Flour, Hats,
Iron & Steel manufactures, Lead, Leather manufactures,
Linen manufactures, Tin, Wheat, Woollen manufactures

1750-1778 Brass & Copper manufactures, Coal, Fish, Flour, Hats, Iron &
Steel manufactures, Lead, Leather manufactures, Linen
manufactures, Tin, Wheat, Woollen manufactures

1778-1796 Brass & Copper manufactures, Coal, Fish, Hats, Iron & Steel
manufactures, Lead, Leather manufactures, Linen manufactures,
Tin, Woollen manufactures

1796-1814 Brass & Copper manufactures, Coal, Fish, Hats, Iron & Steel
manufactures, Lead, Leather manufactures, Tin, Woollen
manufactures

1814-1827 Brass & Copper manufactures, Coal, Cotton manufactures,
Cotton yarn, Hats, Hardware and Cutlery, Iron & Steel
manufactures, Lead, Linen manufactures, Tin, Woollen manufactures

1827-1854 Brass & Copper manufactures, Coal, Cotton manufactures,
Cotton yarn, Hardware & Cutlery, Iron & Steel manufactures,
Linen manufactures, Linen yarn, Tin, Woollen manufactures,
Woollen yarn

1854-1873 Brass & Copper manufactures, Alkali, Coal, Cotton manufactures,
Cotton yarn, Iron & Steel manufactures, Linen manufactures,
Linen yarn, Linseed oil, Tin, Woollen manufactures

1873-1896 Brass & Copper manufactures, Alkali, Coal, Cotton manufactures,
Cotton yarn, Iron & Steel manufactures, Jute yarn, Linen
manufactures, Linen yarn, Linseed oil, Tin, Woollen manufactures

1896-1913 Brass & Copper manufactures, Alkali, Coal, Cotton manufactures,
Cotton yarn, Iron & Steel manufactures, Jute yarn, Linen
manufactures, Linen yarn, Linseed oil, Manure, Tin, Wool,
Woollen manufactures

## Table A3

NET BARTER TERMS OF TRADE BETWEEN SPAIN AND BRITAIN, 1714-1913

(1854 = 100)   (FOB Export and Import Prices)

| | FOB Export Price Indices | | | FOB Import Price Indices | | | Net Barter Terms of Trade | | |
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
|------|---------|---------|--------|-----------|---------|---------|-----------|---------|--------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1714 | 35.99 | 68.51 | 49.66 | 233.30 | 232.36 | 232.83 | 15.43 | 29.48 | 21.33 |
| 1715 | 44.19 | 86.75 | 61.92 | 260.05 | 227.53 | 243.25 | 16.99 | 38.13 | 25.46 |
| 1716 | 50.14 | 84.54 | 65.11 | 247.36 | 225.72 | 236.29 | 20.27 | 37.45 | 27.56 |
| 1717 | 43.68 | 83.65 | 60.45 | 239.28 | 226.21 | 232.65 | 18.25 | 36.98 | 25.98 |
| 1718 | 32.30 | 59.54 | 43.85 | 218.11 | 224.43 | 221.25 | 14.81 | 26.53 | 19.82 |
| 1719 | 32.36 | 59.20 | 43.77 | 233.40 | 225.52 | 229.43 | 13.86 | 26.25 | 19.08 |
| 1720 | 38.89 | 71.94 | 52.89 | 234.14 | 229.03 | 231.57 | 16.61 | 31.41 | 22.84 |
| 1721 | 47.89 | 96.72 | 67.92 | 219.90 | 224.96 | 222.42 | 21.69 | 42.99 | 30.54 |
| 1722 | 48.39 | 100.97 | 69.90 | 228.57 | 231.28 | 229.92 | 21.17 | 43.66 | 30.40 |
| 1723 | 45.18 | 89.11 | 63.45 | 222.19 | 212.88 | 217.49 | 20.33 | 41.86 | 29.17 |
| 1724 | 46.14 | 89.67 | 64.32 | 243.06 | 226.40 | 234.58 | 18.98 | 39.61 | 27.42 |
| 1725 | 45.22 | 87.42 | 62.87 | 248.28 | 230.92 | 239.44 | 18.21 | 37.86 | 26.26 |
| 1726 | 45.52 | 89.81 | 63.94 | 228.26 | 228.59 | 228.42 | 19.94 | 39.29 | 27.99 |
| 1727 | 25.20 | 45.43 | 33.84 | 258.97 | 214.46 | 235.67 | 9.73 | 21.18 | 14.36 |
| 1728 | 23.50 | 40.87 | 30.99 | 255.54 | 211.76 | 232.62 | 9.20 | 19.30 | 13.32 |
| 1729 | 23.31 | 40.84 | 30.85 | 221.82 | 212.24 | 216.98 | 10.51 | 19.24 | 14.22 |
| 1730 | 39.16 | 75.84 | 54.50 | 213.77 | 208.83 | 211.29 | 18.32 | 36.32 | 25.79 |
| 1731 | 39.88 | 78.68 | 56.02 | 203.34 | 205.32 | 204.33 | 19.61 | 38.32 | 27.42 |
| 1732 | 40.47 | 79.05 | 56.56 | 204.04 | 206.35 | 205.19 | 19.83 | 38.31 | 27.56 |
| 1733 | 36.55 | 70.15 | 50.64 | 209.49 | 207.83 | 208.66 | 17.45 | 33.75 | 24.27 |
| 1734 | 37.04 | 69.31 | 50.67 | 223.93 | 215.80 | 219.83 | 16.54 | 32.12 | 23.05 |
| 1735 | 34.48 | 64.13 | 47.02 | 228.24 | 210.70 | 219.29 | 15.11 | 30.44 | 21.44 |
| 1736 | 34.95 | 64.98 | 47.66 | 213.20 | 206.78 | 209.97 | 16.39 | 31.42 | 22.70 |
| 1737 | 36.58 | 67.74 | 49.78 | 211.19 | 203.39 | 207.25 | 17.32 | 33.31 | 24.02 |
| 1738 | 35.85 | 66.87 | 48.96 | 207.22 | 199.76 | 203.46 | 17.30 | 33.48 | 24.06 |
| 1739 | 26.73 | 53.83 | 37.93 | 230.29 | 208.06 | 218.89 | 11.61 | 25.87 | 17.33 |
| 1740 | 30.68 | 57.28 | 41.92 | 209.92 | 213.84 | 211.87 | 14.62 | 26.79 | 19.79 |
| 1741 | 29.85 | 55.92 | 40.67 | 206.82 | 207.95 | 207.38 | 14.30 | 26.89 | 19.61 |
| 1742 | 31.57 | 56.13 | 42.10 | 193.50 | 204.58 | 198.96 | 16.32 | 27.44 | 21.16 |
| 1743 | 33.24 | 53.88 | 42.32 | 184.61 | 197.12 | 190.76 | 18.01 | 27.33 | 22.18 |
| 1744 | 31.27 | 54.43 | 41.29 | 191.27 | 198.42 | 194.81 | 16.35 | 27.43 | 21.20 |
| 1745 | 31.30 | 52.22 | 40.43 | 213.02 | 203.99 | 208.46 | 14.69 | 25.60 | 19.39 |
| 1746 | 28.70 | 48.44 | 37.29 | 214.13 | 203.47 | 208.73 | 13.40 | 23.81 | 17.87 |
| 1747 | 26.67 | 51.57 | 37.09 | 213.31 | 204.03 | 208.62 | 12.50 | 25.28 | 17.78 |
| 1748 | 34.53 | 58.51 | 44.95 | 215.93 | 205.45 | 210.62 | 15.99 | 28.48 | 21.34 |
| 1749 | 42.82 | 81.88 | 59.21 | 211.73 | 204.24 | 207.95 | 20.22 | 40.09 | 28.47 |
| 1750 | 40.07 | 75.35 | 54.95 | 213.82 | 204.69 | 209.21 | 18.74 | 36.81 | 26.27 |
| 1751 | 47.09 | 91.16 | 65.52 | 214.22 | 219.56 | 216.87 | 21.98 | 41.52 | 30.21 |
| 1752 | 43.44 | 82.52 | 59.87 | 214.33 | 219.01 | 216.66 | 20.27 | 37.68 | 27.63 |
| 1753 | 38.89 | 70.65 | 52.42 | 216.33 | 216.23 | 216.28 | 17.98 | 32.67 | 24.24 |
| 1754 | 38.14 | 76.91 | 54.16 | 215.73 | 215.02 | 215.37 | 17.68 | 35.77 | 25.15 |
| 1755 | 43.74 | 82.44 | 60.05 | 215.60 | 215.31 | 215.45 | 20.29 | 38.29 | 27.87 |
| 1756 | 42.71 | 80.03 | 58.46 | 217.98 | 211.85 | 214.89 | 19.59 | 37.78 | 27.20 |
| 1757 | 36.95 | 69.97 | 50.85 | 215.63 | 212.05 | 213.83 | 17.14 | 33.00 | 23.78 |

Table A3 (cont'd)

| | FOB Export Price Indices | | | FOB Import Price Indices | | | Net Barter Terms of Trade | | |
|---|---|---|---|---|---|---|---|---|---|
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1758 | 37.52 | 69.63 | 51.11 | 235.42 | 233.17 | 234.29 | 15.94 | 29.86 | 21.81 |
| 1759 | 38.21 | 69.60 | 51.57 | 235.46 | 229.16 | 232.29 | 16.23 | 30.37 | 22.20 |
| 1760 | 38.61 | 70.96 | 52.34 | 235.21 | 228.50 | 231.83 | 16.42 | 31.05 | 22.58 |
| 1761 | 34.82 | 68.94 | 48.99 | 235.16 | 227.51 | 231.30 | 14.81 | 30.30 | 21.18 |
| 1762 | 33.41 | 62.01 | 45.52 | 235.17 | 236.58 | 235.87 | 14.21 | 26.21 | 19.30 |
| 1763 | 41.74 | 81.11 | 58.19 | 254.87 | 252.61 | 253.74 | 16.38 | 32.11 | 22.93 |
| 1764 | 52.08 | 93.50 | 69.78 | 255.10 | 250.35 | 252.71 | 20.42 | 37.35 | 27.61 |
| 1765 | 54.71 | 96.79 | 72.77 | 254.96 | 249.35 | 252.14 | 21.46 | 38.82 | 28.86 |
| 1766 | 52.67 | 100.42 | 72.73 | 257.13 | 257.91 | 257.52 | 20.48 | 38.94 | 28.24 |
| 1767 | 47.03 | 94.52 | 66.67 | 257.07 | 246.26 | 251.61 | 18.29 | 38.38 | 26.50 |
| 1768 | 49.51 | 87.21 | 65.71 | 277.43 | 269.85 | 273.61 | 17.85 | 32.32 | 24.01 |
| 1769 | 51.15 | 98.99 | 71.16 | 277.12 | 268.12 | 272.58 | 18.46 | 36.92 | 26.11 |
| 1770 | 45.69 | 85.74 | 62.59 | 277.07 | 267.73 | 272.36 | 16.49 | 32.02 | 22.98 |
| 1771 | 52.18 | 91.23 | 69.00 | 277.06 | 269.04 | 273.02 | 18.83 | 33.91 | 25.27 |
| 1772 | 52.55 | 86.06 | 67.25 | 277.19 | 269.90 | 273.52 | 18.96 | 31.89 | 24.59 |
| 1773 | 50.92 | 85.79 | 66.09 | 288.32 | 279.92 | 284.09 | 17.66 | 30.65 | 23.26 |
| 1774 | 53.87 | 94.02 | 71.17 | 288.06 | 278.65 | 283.32 | 18.70 | 33.74 | 25.12 |
| 1775 | 51.06 | 87.27 | 66.75 | 288.75 | 280.36 | 284.52 | 17.68 | 31.13 | 23.46 |
| 1776 | 50.32 | 88.46 | 66.72 | 288.85 | 280.36 | 284.57 | 17.42 | 31.55 | 23.45 |
| 1777 | 61.69 | 112.15 | 83.18 | 289.97 | 281.62 | 285.76 | 21.27 | 39.82 | 29.11 |
| 1778 | 62.23 | 104.89 | 80.79 | 286.77 | 279.05 | 282.88 | 21.70 | 37.59 | 28.56 |
| 1779 | 61.66 | 109.52 | 82.18 | 287.87 | 278.95 | 283.37 | 21.42 | 39.26 | 29.00 |
| 1780 | 70.32 | 110.78 | 88.26 | (299.16) | (289.89) | (294.49) | (23.50) | (38.21) | (29.97) |
| 1781 | 64.32 | 98.17 | 79.46 | (296.34) | (287.15) | (291.71) | (21.70) | (34.19) | (27.24) |
| 1782 | 63.75 | 104.56 | 81.64 | (299.16) | (289.89) | (294.49) | (21.31) | (36.07) | (27.72) |
| 1783 | 36.73 | 58.31 | 46.28 | 300.20 | 290.29 | (295.20) | 12.24 | 20.09 | 15.68 |
| 1784 | 84.66 | 134.88 | 106.86 | 290.83 | 284.32 | 287.56 | 29.11 | 47.44 | 37.16 |
| 1785 | 81.62 | 136.98 | 105.74 | 299.44 | 285.40 | 292.34 | 27.26 | 48.00 | 36.17 |
| 1786 | 82.57 | 126.63 | 102.25 | 290.41 | 284.35 | 287.36 | 28.43 | 44.53 | 35.58 |
| 1787 | 80.40 | 128.46 | 101.63 | 289.01 | 285.16 | 287.08 | 27.82 | 45.05 | 35.40 |
| 1788 | 80.15 | 136.21 | 104.48 | 319.90 | 319.82 | 319.86 | 25.05 | 42.59 | 32.67 |
| 1789 | 77.32 | 126.04 | 98.72 | 320.33 | 317.97 | 319.15 | 24.14 | 39.64 | 30.93 |
| 1790 | 74.36 | 115.83 | 92.81 | 324.50 | 317.75 | 321.11 | 22.92 | 36.45 | 28.90 |
| 1791 | 82.37 | 130.11 | 103.52 | 326.40 | 321.90 | 324.14 | 25.24 | 40.42 | 31.94 |
| 1792 | 90.68 | 154.30 | 118.29 | 327.55 | 323.53 | 325.53 | 27.68 | 47.69 | 36.34 |
| 1793 | 83.21 | 125.18 | 102.06 | 335.71 | 332.33 | 334.02 | 24.79 | 37.67 | 30.56 |
| 1794 | 84.11 | 146.03 | 110.83 | 336.77 | 333.65 | 335.21 | 24.98 | 43.77 | 33.06 |
| 1795 | 80.75 | 135.79 | 104.71 | 335.16 | 328.80 | 331.96 | 24.09 | 41.30 | 31.54 |
| 1796 | 80.95 | 137.11 | 105.35 | 342.35 | 338.68 | 340.51 | 23.65 | 40.48 | 30.94 |
| 1797 | 87.07 | 128.83 | 106.15 | (298.00) | (456.13) | (368.68) | (29.35) | (28.24) | (28.79) |
| 1798 | 85.64 | 154.19 | 114.91 | (296.23) | (439.94) | (361.00) | (28.91) | (35.05) | (31.83) |
| 1799 | 98.19 | 163.59 | 126.74 | (354.47) | (400.85) | (376.95) | (27.70) | (40.81) | (33.62) |
| 1800 | 102.50 | 158.51 | 127.46 | (462.97) | (391.43) | (425.70) | (22.14) | (40.50) | (29.94) |
| 1801 | 120.74 | 177.10 | 146.23 | 485.92 | 417.51 | 450.42 | 24.85 | 42.42 | 32.47 |
| 1802 | 132.46 | 195.24 | 160.82 | 355.88 | 371.90 | 363.80 | 37.22 | 52.50 | 44.21 |
| 1803 | 138.22 | 208.19 | 169.63 | 391.26 | 430.41 | 410.37 | 35.33 | 48.37 | 41.34 |
| 1804 | 136.45 | 202.05 | 166.04 | 356.72 | 371.59 | 364.08 | 38.25 | 54.37 | 45.61 |
| 1805 | 136.37 | 205.88 | 167.56 | 354.98 | 360.89 | 357.92 | 38.42 | 57.05 | 46.81 |
| 1806 | 140.33 | 209.74 | 171.56 | 359.58 | 401.77 | 380.09 | 39.03 | 52.20 | 45.14 |
| 1807 | 137.92 | 203.78 | 167.65 | 358.78 | 410.70 | 383.86 | 38.44 | 49.62 | 43.67 |
| 1808 | 166.43 | 258.27 | 207.33 | 281.03 | 296.32 | 288.57 | 59.22 | 87.12 | 71.85 |
| 1809 | 307.76 | 284.36 | 295.83 | (299.35) | 330.13 | (314.36) | (102.81) | 86.14 | (94.11) |
| 1810 | 192.93 | 283.77 | 233.98 | (298.76) | 365.51 | (330.45) | (64.58) | 77.64 | (70.81) |
| 1811 | 153.67 | 225.77 | 186.26 | (290.39) | 364.24 | (325.23) | (52.92) | 61.98 | (57.27) |

## Table A3 (cont'd)

| | FOB Export Price Indices | | | FOB Import Price Indices | | | Net Barter Terms of Trade | | |
|---|---|---|---|---|---|---|---|---|---|
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1812 | 164.93 | 241.44 | 199.56 | 335.16 | 347.60 | 341.37 | 49.22 | 69.44 | 58.46 |
| 1813 | (170.98) | (248.19) | (206.00) | (336.91) | (349.52) | (343.16) | (50.75) | (71.00) | (60.03) |
| 1814 | 157.61 | 228.79 | 189.89 | 354.40 | 363.43 | 358.89 | 44.47 | 62.95 | 52.91 |
| 1815 | 149.50 | 217.07 | 180.14 | 271.45 | 242.98 | 256.82 | 55.07 | 89.34 | 70.19 |
| 1816 | 129.84 | 164.10 | 145.97 | 246.46 | 233.50 | 239.89 | 52.68 | 70.28 | 60.85 |
| 1817 | 125.91 | 171.15 | 146.80 | 224.30 | 196.42 | 209.90 | 56.13 | 87.13 | 69.94 |
| 1818 | 126.33 | 168.83 | 146.04 | 222.17 | 188.39 | 204.58 | 56.86 | 89.62 | 71.39 |
| 1819 | 126.37 | 166.07 | 144.87 | 219.76 | 204.26 | 211.87 | 57.50 | 81.30 | 68.38 |
| 1820 | 124.18 | 137.38 | 130.61 | 200.59 | 193.98 | 197.26 | 61.91 | 70.82 | 66.21 |
| 1821 | 116.83 | 133.06 | 124.68 | 185.09 | 179.19 | 182.12 | 63.12 | 74.26 | 68.46 |
| 1822 | 116.83 | 139.64 | 127.73 | 168.12 | 163.43 | 165.76 | 69.49 | 85.44 | 77.06 |
| 1823 | 126.25 | 140.65 | 133.26 | 163.78 | 159.21 | 161.48 | 77.09 | 88.34 | 82.52 |
| 1824 | 112.83 | 126.70 | 119.56 | 163.07 | 153.37 | 158.12 | 69.21 | 82.61 | 75.61 |
| 1825 | 110.66 | 134.66 | 122.07 | 156.96 | 149.61 | 153.24 | 70.50 | 90.01 | 79.66 |
| 1826 | 110.02 | 128.97 | 119.12 | 147.08 | 141.82 | 144.43 | 74.80 | 90.94 | 82.48 |
| 1827 | 99.15 | 106.67 | 102.84 | 127.35 | 120.91 | 124.09 | 77.86 | 88.22 | 82.88 |
| 1828 | 97.38 | 102.78 | 100.04 | 123.00 | 116.08 | 119.49 | 79.17 | 88.54 | 83.72 |
| 1829 | 102.77 | 105.74 | 104.24 | 115.64 | 108.90 | 112.22 | 88.87 | 97.10 | 92.89 |
| 1830 | 97.49 | 103.23 | 100.32 | 113.52 | 107.65 | 110.55 | 85.88 | 95.89 | 90.75 |
| 1831 | 99.24 | 104.86 | 102.01 | 99.78 | 92.56 | 96.10 | 99.46 | 113.29 | 106.15 |
| 1832 | 98.85 | 109.69 | 104.13 | 102.75 | 96.24 | 99.44 | 96.20 | 113.98 | 104.72 |
| 1833 | 98.88 | 107.30 | 103.00 | 120.78 | 91.68 | 105.23 | 81.87 | 112.35 | 97.88 |
| 1834 | 105.96 | 112.32 | 109.09 | 115.59 | 117.34 | 116.46 | 91.67 | 95.72 | 93.67 |
| 1835 | 109.49 | 116.68 | 110.42 | 163.18 | 129.61 | 145.43 | 67.10 | 90.02 | 75.93 |
| 1836 | 122.34 | 124.02 | 123.18 | 150.27 | 120.07 | 134.32 | 81.41 | 103.29 | 91.71 |
| 1837 | 111.91 | 118.06 | 114.94 | 154.13 | 125.86 | 139.28 | 72.61 | 93.80 | 82.52 |
| 1838 | 108.75 | 111.18 | 109.96 | 117.66 | 114.34 | 115.99 | 92.43 | 97.24 | 94.80 |
| 1839 | 111.44 | 117.36 | 114.36 | 137.37 | 117.34 | 126.96 | 81.12 | 100.02 | 90.08 |
| 1840 | 105.53 | 107.29 | 106.41 | 122.35 | 102.80 | 112.15 | 86.25 | 104.37 | 94.88 |
| 1841 | 11.49 | 114.96 | 113.72 | 97.14 | 95.51 | 96.32 | 115.80 | 120.36 | 118.06 |
| 1842 | 107.93 | 111.52 | 109.71 | 97.89 | 102.96 | 100.39 | 110.26 | 108.31 | 109.28 |
| 1843 | 107.96 | 118.09 | 112.91 | 92.54 | 95.92 | 94.21 | 116.66 | 123.11 | 119.85 |
| 1844 | 109.66 | 112.05 | 110.85 | 99.62 | 95.87 | 97.73 | 110.08 | 116.88 | 113.42 |
| 1845 | 106.99 | 111.81 | 109.37 | 100.32 | 101.20 | 100.76 | 106.65 | 110.48 | 108.55 |
| 1846 | 105.66 | 106.01 | 105.83 | 101.03 | 100.92 | 100.97 | 104.58 | 105.04 | 104.81 |
| 1847 | 106.10 | 111.61 | 108.82 | 102.66 | 102.51 | 102.58 | 103.35 | 108.88 | 106.08 |
| 1848 | 102.30 | 102.51 | 102.40 | 92.23 | 89.68 | 90.95 | 110.92 | 114.31 | 112.59 |
| 1849 | 98.63 | 104.45 | 101.50 | 89.55 | 89.80 | 89.67 | 110.14 | 116.31 | 113.19 |
| 1850 | 104.35 | 96.13 | 100.16 | 95.50 | 95.39 | 95.44 | 109.27 | 100.78 | 104.95 |
| 1851 | 89.81 | 90.54 | 90.17 | 95.74 | 96.64 | 96.19 | 93.81 | 93.69 | 93.74 |
| 1852 | 95.00 | 93.37 | 94.18 | 93.28 | 92.14 | 92.71 | 101.84 | 101.33 | 101.59 |
| 1853 | 98.67 | 97.83 | 98.25 | 96.58 | 96.16 | 96.37 | 102.16 | 101.74 | 101.95 |
| 1854 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1855 | 105.22 | 113.76 | 109.41 | 96.89 | 95.87 | 96.38 | 108.60 | 118.66 | 113.52 |
| 1856 | 113.84 | 125.52 | 119.54 | 101.05 | 97.18 | 99.10 | 112.66 | 129.16 | 120.63 |
| 1857 | 115.96 | 129.99 | 122.77 | 102.90 | 94.29 | 98.50 | 112.69 | 137.86 | 124.64 |
| 1858 | 98.97 | 106.82 | 102.82 | 100.72 | 92.38 | 96.46 | 98.26 | 115.63 | 106.59 |
| 1859 | 100.24 | 103.12 | 101.67 | 103.61 | 91.45 | 97.34 | 96.75 | 112.76 | 104.45 |
| 1860 | 105.46 | 104.43 | 104.94 | 96.02 | 88.48 | 92.17 | 109.83 | 118.03 | 113.85 |
| 1861 | 101.35 | 106.69 | 103.99 | 101.93 | 89.02 | 95.26 | 99.43 | 119.85 | 109.16 |
| 1862 | 102.69 | 103.75 | 103.22 | 111.84 | 94.60 | 102.86 | 91.82 | 109.67 | 100.35 |
| 1863 | 113.28 | 113.01 | 113.14 | 126.85 | 103.58 | 114.63 | 89.30 | 109.10 | 98.70 |
| 1864 | 115.98 | 114.77 | 115.37 | 136.55 | 115.10 | 125.37 | 84.94 | 99.71 | 92.02 |
| 1865 | 100.55 | 104.70 | 102.60 | 126.97 | 111.12 | 118.78 | 79.19 | 94.22 | 86.38 |

## Table A3 (cont'd)

| | FOB Export Price Indices | | | FOB Import Price Indices | | | Net Barter Terms of Trade | | |
|---|---|---|---|---|---|---|---|---|---|
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1866 | 106.64 | 103.67 | 105.14 | 132.48 | 122.36 | 127.32 | 80.50 | 84.73 | 82.58 |
| 1867 | 109.11 | 108.03 | 108.57 | 121.00 | 111.18 | 115.99 | 90.17 | 97.17 | 93.60 |
| 1868 | 111.52 | 106.49 | 108.98 | 111.86 | 103.16 | 107.42 | 99.70 | 103.23 | 101.45 |
| 1869 | 105.02 | 106.48 | 105.75 | 113.74 | 105.32 | 109.45 | 92.33 | 101.10 | 96.62 |
| 1870 | 94.09 | 94.51 | 94.30 | 110.50 | 100.40 | 105.33 | 85.15 | 94.13 | 89.53 |
| 1871 | 110.44 | 116.91 | 113.63 | 107.06 | 100.40 | 103.68 | 103.16 | 116.44 | 109.60 |
| 1872 | 111.24 | 120.74 | 115.89 | 129.18 | 118.49 | 123.72 | 86.11 | 101.90 | 93.67 |
| 1873 | 110.57 | 120.86 | 115.60 | 138.97 | 127.49 | 133.11 | 79.56 | 94.80 | 86.85 |
| 1874 | 115.48 | 122.64 | 119.01 | 122.31 | 118.96 | 120.62 | 94.42 | 103.09 | 98.67 |
| 1875 | 107.71 | 125.60 | 116.31 | 101.65 | 109.58 | 105.54 | 105.96 | 114.62 | 110.20 |
| 1876 | 106.99 | 120.11 | 113.36 | 86.75 | 99.44 | 92.88 | 123.33 | 120.79 | 122.05 |
| 1877 | 106.84 | 119.78 | 113.13 | 82.73 | 94.61 | 88.47 | 129.14 | 126.60 | 127.87 |
| 1878 | 99.09 | 111.69 | 105.20 | 78.40 | 89.81 | 83.91 | 126.39 | 124.36 | 125.73 |
| 1879 | 93.55 | 107.11 | 100.10 | 70.94 | 79.29 | 75.00 | 131.87 | 135.09 | 133.47 |
| 1880 | 95.61 | 107.68 | 101.47 | 74.97 | 84.22 | 79.46 | 127.53 | 127.86 | 127.70 |
| 1881 | 92.09 | 105.56 | 98.60 | 72.22 | 79.93 | 75.98 | 127.51 | 132.07 | 129.77 |
| 1882 | 92.83 | 105.45 | 98.94 | 73.86 | 81.49 | 77.58 | 125.68 | 129.40 | 127.53 |
| 1883 | 92.97 | 103.73 | 98.20 | 74.98 | 80.60 | 77.74 | 123.99 | 128.70 | 126.32 |
| 1884 | 87.91 | 98.68 | 93.14 | 72.78 | 80.46 | 76.52 | 120.79 | 122.64 | 121.72 |
| 1885 | 78.71 | 90.05 | 84.19 | 71.28 | 81.09 | 76.03 | 110.42 | 111.05 | 110.73 |
| 1886 | 91.40 | 100.88 | 96.02 | 72.43 | 81.64 | 76.90 | 126.19 | 123.57 | 124.86 |
| 1887 | 74.75 | 85.38 | 79.89 | 67.80 | 77.74 | 72.60 | 110.35 | 109.83 | 110.04 |
| 1888 | 79.63 | 94.46 | 86.73 | 68.88 | 78.23 | 73.41 | 115.61 | 120.75 | 118.14 |
| 1889 | 76.48 | 89.41 | 82.69 | 74.45 | 83.27 | 78.74 | 102.73 | 107.37 | 105.02 |
| 1890 | 82.47 | 95.82 | 88.89 | 86.44 | 92.80 | 89.56 | 95.41 | 103.25 | 99.25 |
| 1891 | 80.17 | 92.37 | 86.05 | 81.63 | 88.49 | 84.99 | 98.21 | 104.38 | 101.25 |
| 1892 | 75.65 | 87.21 | 81.22 | 76.40 | 85.76 | 80.94 | 99.02 | 101.69 | 100.35 |
| 1893 | 71.59 | 82.50 | 76.85 | 71.15 | 80.36 | 75.61 | 100.62 | 102.66 | 101.64 |
| 1894 | 69.34 | 80.25 | 74.60 | 70.06 | 79.37 | 74.57 | 98.97 | 101.11 | 100.04 |
| 1895 | 70.14 | 81.24 | 75.49 | 66.09 | 76.47 | 71.09 | 106.13 | 106.24 | 106.19 |
| 1896 | 68.79 | 80.05 | 74.21 | 66.45 | 77.45 | 71.78 | 103.52 | 103.24 | 103.39 |
| 1897 | 70.62 | 83.48 | 76.78 | 69.56 | 82.06 | 75.55 | 101.52 | 101.73 | 101.63 |
| 1898 | 72.11 | 83.86 | 77.76 | 76.17 | 89.60 | 82.61 | 94.67 | 93.59 | 94.13 |
| 1899 | 72.46 | 86.74 | 79.28 | 82.65 | 91.33 | 86.88 | 87.67 | 94.97 | 91.25 |
| 1900 | 74.31 | 99.20 | 85.86 | 111.56 | 115.12 | 113.33 | 66.61 | 86.17 | 75.76 |
| 1901 | 73.53 | 98.93 | 85.29 | 97.03 | 105.32 | 101.09 | 75.78 | 93.93 | 84.37 |
| 1902 | 69.17 | 90.36 | 79.06 | 90.12 | 100.74 | 95.28 | 76.75 | 89.70 | 82.98 |
| 1903 | 67.29 | 89.83 | 77.75 | 88.46 | 100.15 | 94.12 | 76.07 | 89.70 | 82.61 |
| 1904 | 67.81 | 89.79 | 78.03 | 86.97 | 103.17 | 94.72 | 77.97 | 87.03 | 82.38 |
| 1905 | 68.24 | 89.88 | 78.32 | 86.88 | 103.57 | 94.86 | 78.55 | 86.78 | 82.56 |
| 1906 | 78.93 | 108.21 | 92.42 | 90.69 | 107.87 | 98.63 | 87.03 | 100.88 | 93.70 |
| 1907 | 82.10 | 113.88 | 96.69 | 99.09 | 114.37 | 106.46 | 82.85 | 99.57 | 90.82 |
| 1908 | 73.67 | 99.27 | 85.52 | 96.21 | 111.12 | 103.04 | 76.57 | 89.34 | 82.71 |
| 1909 | 74.84 | 99.60 | 86.34 | 89.63 | 105.06 | 97.07 | 83.44 | 94.80 | 88.95 |
| 1910 | 76.52 | 102.23 | 88.45 | 92.92 | 107.80 | 100.08 | 82.35 | 94.83 | 88.38 |
| 1911 | 78.58 | 105.05 | 90.86 | 102.56 | 116.19 | 109.16 | 76.62 | 90.41 | 83.24 |
| 1912 | 78.49 | 105.77 | 91.11 | 110.65 | 129.45 | 119.68 | 70.94 | 81.71 | 76.13 |
| 1913 | 81.25 | 108.59 | 93.93 | 119.56 | 139.65 | 129.22 | 67.96 | 77.76 | 72.69 |

Sources: See text and Tables A1 and A2.

## Table -A4

NET BARTER TERMS OF TRADE BETWEEN SPAIN AND BRITAIN, 1714-1913
(1854 = 100)   (FOB Export and CIF Import Prices)

| | FOB Export Price Indices | | | CIF Import Price Indices | | | Net Barter Terms of Trade | | |
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| 1714 | 35.99 | 68.51 | 49.66 | 236.38 | 246.55 | 241.41 | 15.23 | 27.79 | 20.57 |
| 1715 | 44.19 | 86.75 | 61.92 | 255.41 | 222.19 | 238.22 | 17.30 | 39.04 | 25.99 |
| 1716 | 50.14 | 84.54 | 65.11 | 243.27 | 220.39 | 231.55 | 20.61 | 38.36 | 28.12 |
| 1717 | 43.68 | 83.65 | 60.45 | 235.54 | 220.90 | 228.10 | 18.54 | 37.87 | 26.50 |
| 1718 | 32.30 | 59.54 | 43.85 | 221.85 | 240.22 | 230.85 | 14.56 | 84.79 | 19.00 |
| 1719 | 32.36 | 59.20 | 43.77 | 236.48 | 240.84 | 238.65 | 13.68 | 24.58 | 18.34 |
| 1720 | 38.89 | 71.94 | 52.89 | 237.18 | 243.82 | 240.48 | 16.40 | 29.51 | 22.00 |
| 1721 | 47.69 | 96.72 | 67.92 | 215.10 | 219.33 | 217.20 | 22.17 | 44.10 | 31.27 |
| 1722 | 48.39 | 100.97 | 69.90 | 223.40 | 219.85 | 221.62 | 21.66 | 45.93 | 31.54 |
| 1723 | 45.18 | 89.11 | 63.45 | 217.29 | 207.46 | 212.32 | 20.79 | 42.95 | 29.88 |
| 1724 | 46.14 | 89.67 | 64.32 | 237.26 | 220.28 | 228.61 | 19.45 | 40.71 | 28.14 |
| 1725 | 45.22 | 87.42 | 62.87 | 242.26 | 224.67 | 233.30 | 18.69 | 38.91 | 26.97 |
| 1726 | 45.52 | 89.81 | 63.94 | 223.10 | 226.68 | 244.88 | 20.40 | 39.62 | 28.43 |
| 1727 | 25.20 | 45.43 | 33.84 | 260.94 | 232.33 | 246.22 | 9.66 | 19.55 | 13.74 |
| 1728 | 23.50 | 40.87 | 30.99 | 257.66 | 230.17 | 243.53 | 9.12 | 17.76 | 12.73 |
| 1729 | 23.31 | 40.84 | 30.85 | 225.40 | 230.43 | 287.90 | 10.34 | 17.72 | 13.54 |
| 1730 | 39.16 | 75.84 | 54.50 | 209.24 | 203.62 | 206.41 | 18.72 | 37.25 | 26.41 |
| 1731 | 39.88 | 78.68 | 56.02 | 199.26 | 200.12 | 199.69 | 20.01 | 39.32 | 28.05 |
| 1732 | 40.47 | 79.05 | 56.56 | 199.93 | 201.27 | 200.60 | 20.24 | 39.28 | 28.20 |
| 1733 | 36.55 | 70.15 | 50.64 | 205.14 | 202.58 | 203.86 | 17.82 | 34.63 | 24.84 |
| 1734 | 37.04 | 69.31 | 50.67 | 218.96 | 210.13 | 214.50 | 16.92 | 32.98 | 23.62 |
| 1735 | 34.48 | 64.13 | 47.02 | 223.08 | 205.12 | 213.91 | 15.46 | 31.26 | 21.98 |
| 1736 | 34.95 | 64.98 | 47.66 | 208.69 | 201.33 | 204.98 | 16.75 | 32.28 | 23.25 |
| 1737 | 36.58 | 67.74 | 49.78 | 206.77 | 198.10 | 202.39 | 17.69 | 34.19 | 24.59 |
| 1738 | 35.85 | 66.87 | 48.96 | 202.97 | 194.86 | 198.87 | 17.66 | 34.32 | 24.62 |
| 1739 | 26.73 | 53.83 | 37.93 | 233.50 | 227.76 | 230.61 | 11.45 | 23.63 | 16.45 |
| 1740 | 30.68 | 57.28 | 41.92 | 214.01 | 232.36 | 223.00 | 14.34 | 24.65 | 18.80 |
| 1741 | 29.58 | 55.92 | 40.67 | 211.04 | 226.93 | 218.84 | 14.02 | 24.64 | 18.59 |
| 1742 | 31.57 | 56.13 | 42.10 | 198.30 | 224.09 | 210.80 | 15.92 | 25.05 | 19.97 |
| 1743 | 33.24 | 53.88 | 42.32 | 189.79 | 218.57 | 203.67 | 17.51 | 24.65 | 20.78 |
| 1744 | 31.27 | 54.43 | 41.29 | 196.17 | 220.01 | 207.75 | 15.94 | 24.74 | 19.86 |
| 1745 | 31.30 | 52.22 | 40.43 | 216.98 | 224.39 | 220.65 | 14.43 | 23.27 | 18.32 |
| 1746 | 28.70 | 48.44 | 37.29 | 218.04 | 223.29 | 220.70 | 13.16 | 21.68 | 16.89 |
| 1747 | 26.67 | 51.57 | 37.09 | 217.25 | 224.23 | 220.70 | 12.28 | 23.00 | 16.81 |
| 1748 | 34.53 | 58.51 | 44.95 | 219.76 | 224.92 | 222.33 | 15.71 | 26.01 | 20.21 |
| 1749 | 42.82 | 81.88 | 59.21 | 206.34 | 199.29 | 202.78 | 20.75 | 41.09 | 29.20 |
| 1750 | 40.07 | 75.35 | 54.95 | 208.34 | 199.60 | 203.92 | 19.23 | 37.75 | 26.94 |
| 1751 | 47.09 | 91.16 | 65.52 | 206.13 | 213.59 | 209.83 | 22.84 | 42.68 | 31.22 |
| 1752 | 43.44 | 82.52 | 59.87 | 206.24 | 213.18 | 208.68 | 21.06 | 38.71 | 28.55 |
| 1753 | 38.89 | 70.65 | 52.42 | 208.11 | 210.41 | 209.26 | 18.69 | 33.58 | 25.05 |
| 1754 | 38.14 | 76.91 | 54.16 | 207.55 | 209.25 | 208.40 | 18.38 | 36.76 | 25.99 |
| 1755 | 43.74 | 82.44 | 60.05 | 207.43 | 209.65 | 208.54 | 21.09 | 39.32 | 28.80 |
| 1756 | 42.71 | 80.03 | 58.46 | 215.17 | 205.41 | 210.23 | 19.85 | 38.96 | 27.81 |
| 1757 | 36.95 | 69.97 | 50.85 | 212.97 | 205.66 | 209.28 | 17.35 | 34.02 | 24.29 |
| 1758 | 37.52 | 69.63 | 51.11 | 231.51 | 223.30 | 227.27 | 16.21 | 31.18 | 22.48 |
| 1759 | 38.21 | 69.60 | 51.57 | 231.54 | 219.99 | 225.69 | 16.50 | 31.64 | 22.85 |

## Table A4 (cont'd)

| | FOB Export Price Indices | | | CIF Import Price Indices | | | Net Barter Terms of Trade | | |
|------|------------|----------|----------|------------|------------|------------|------------|------------|------------|
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1760 | 38.61 | 70.96 | 52.34 | 231.31 | 219.48 | 225.32 | 16.69 | 32.33 | 23.23 |
| 1761 | 34.82 | 68.94 | 48.99 | 231.26 | 218.50 | 224.79 | 15.06 | 31.55 | 21.80 |
| 1762 | 33.41 | 62.01 | 45.52 | 239.58 | 250.20 | 244.83 | 13.98 | 24.78 | 18.59 |
| 1763 | 41.74 | 81.11 | 58.19 | 249.72 | 239.45 | 244.53 | 16.71 | 33.87 | 23.79 |
| 1764 | 52.08 | 93.50 | 69.78 | 245.12 | 243.53 | 244.32 | 21.25 | 38.39 | 28.56 |
| 1765 | 54.71 | 96.79 | 72.77 | 244.98 | 242.72 | 243.85 | 22.33 | 39.88 | 29.84 |
| 1766 | 52.67 | 100.42 | 72.73 | 247.02 | 250.79 | 248.90 | 21.32 | 40.04 | 29.22 |
| 1767 | 47.03 | 94.52 | 66.67 | 246.96 | 239.52 | 243.21 | 19.04 | 39.46 | 27.41 |
| 1768 | 49.51 | 87.21 | 65.71 | 266.03 | 262.04 | 264.03 | 18.61 | 33.28 | 24.89 |
| 1769 | 51.15 | 98.99 | 71.16 | 265.74 | 260.39 | 263.05 | 19.25 | 38.02 | 27.05 |
| 1770 | 45.69 | 85.74 | 62.59 | 265.69 | 260.02 | 262.84 | 17.20 | 32.97 | 23.81 |
| 1771 | 52.18 | 91.23 | 69.00 | 265.68 | 261.42 | 263.54 | 19.64 | 34.90 | 26.18 |
| 1772 | 52.55 | 86.06 | 67.25 | 265.80 | 262.52 | 264.15 | 19.77 | 32.78 | 25.46 |
| 1773 | 50.92 | 85.79 | 66.09 | 276.23 | 271.95 | 274.08 | 18.43 | 31.55 | 24.11 |
| 1774 | 53.87 | 94.02 | 71.17 | 275.98 | 270.73 | 273.34 | 16.52 | 34.73 | 26.04 |
| 1775 | 51.06 | 87.27 | 66.75 | 281.45 | 273.04 | 277.21 | 18.14 | 31.96 | 24.08 |
| 1776 | 50.32 | 88.46 | 66.72 | 281.54 | 273.41 | 277.45 | 17.87 | 32.35 | 24.04 |
| 1777 | 61.69 | 112.15 | 83.18 | 282.59 | 274.39 | 278.46 | 21.83 | 40.87 | 29.87 |
| 1778 | 62.23 | 104.89 | 80.79 | 279.59 | 272.36 | 275.95 | 22.26 | 38.51 | 29.28 |
| 1779 | 61.66 | 109.52 | 82.18 | 290.52 | 283.68 | 287.08 | 21.22 | 38.61 | 28.62 |
| 1780 | 70.32 | 110.78 | 88.26 | [300.02] | [292.81] | [296.39] | [23.44] | [37.83] | [29.78] |
| 1781 | 64.32 | 98.17 | 79.46 | [297.65] | [290.64] | [294.12] | [21.61] | [33.78] | [27.02] |
| 1782 | 63.75 | 104.56 | 81.64 | [300.02] | [292.49] | [296.23] | [21.25] | [35.75] | [27.56] |
| 1783 | 36.73 | 58.31 | 46.28 | 300.90 | 291.54 | 296.18 | 12.21 | 20.00 | 15.63 |
| 1784 | 84.66 | 134.88 | 106.86 | 261.99 | 276.88 | 269.33 | 32.31 | 48.71 | 39.67 |
| 1785 | 81.62 | 136.98 | 105.74 | 269.23 | 277.83 | 273.50 | 30.32 | 49.30 | 38.66 |
| 1786 | 82.57 | 126.63 | 102.25 | 261.63 | 276.63 | 269.03 | 31.56 | 45.78 | 38.01 |
| 1787 | 80.40 | 128.46 | 101.63 | 260.46 | 277.37 | 268.78 | 30.87 | 46.31 | 37.81 |
| 1788 | 80.15 | 136.21 | 104.43 | 286.45 | 311.00 | 298.47 | 27.98 | 43.80 | 35.01 |
| 1789 | 77.32 | 126.04 | 98.72 | 286.81 | 309.10 | 297.75 | 26.96 | 40.78 | 33.16 |
| 1790 | 74.36 | 115.83 | 92.81 | 290.32 | 309.00 | 299.51 | 25.61 | 37.49 | 30.99 |
| 1791 | 82.37 | 130.11 | 103.52 | 291.92 | 312.78 | 302.17 | 28.22 | 41.60 | 34.26 |
| 1792 | 90.68 | 154.30 | 118.29 | 292.89 | 314.54 | 303.52 | 30.96 | 49.06 | 38.97 |
| 1793 | 83.21 | 125.18 | 102.06 | 317.01 | 314.48 | 315.74 | 26.25 | 39.81 | 32.33 |
| 1794 | 84.11 | 146.03 | 110.83 | 317.90 | 315.76 | 316.83 | 26.46 | 46.25 | 34.98 |
| 1795 | 80.75 | 135.79 | 104.71 | 316.54 | 311.58 | 314.05 | 25.51 | 43.58 | 33.34 |
| 1796 | 80.95 | 137.11 | 105.35 | 326.08 | 322.99 | 324.53 | 24.83 | 42.45 | 32.47 |
| 1797 | 87.47 | 128.83 | 106.15 | [298.81] | 428.44 | [357.80] | [29.27] | 30.07 | [29.67] |
| 1798 | 85.64 | 154.19 | 114.91 | [297.25] | 414.64 | [351.07] | [28.81] | 37.19 | [32.73] |
| 1799 | 98.19 | 163.59 | 126.74 | [348.79] | 384.25 | [366.09] | [28.15] | 42.57 | [34.62] |
| 1800 | 102.50 | 158.51 | 127.46 | [444.81] | 375.75 | [408.82] | [23.04] | 42.18 | [31.17] |
| 1801 | 120.74 | 177.10 | 146.23 | 465.12 | 397.18 | 429.81 | 25.96 | 44.59 | 34.02 |
| 1802 | 132.46 | 195.24 | 160.82 | 337.50 | 344.00 | 340.73 | 39.25 | 56.76 | 47.20 |
| 1803 | 138.22 | 208.19 | 169.63 | 368.81 | 392.87 | 380.65 | 37.48 | 52.99 | 44.57 |
| 1804 | 136.45 | 202.05 | 166.04 | 350.78 | 359.69 | 355.21 | 38.90 | 56.17 | 46.74 |
| 1805 | 136.37 | 205.88 | 167.56 | 349.24 | 350.87 | 350.05 | 39.05 | 58.68 | 47.87 |
| 1806 | 140.33 | 209.74 | 171.56 | 353.31 | 384.35 | 368.50 | 39.72 | 54.57 | 46.56 |
| 1807 | 137.92 | 203.78 | 167.65 | 352.60 | 391.74 | 371.66 | 39.12 | 52.02 | 45.11 |
| 1808 | 166.43 | 258.27 | 207.33 | 283.79 | 297.36 | 290.50 | 58.65 | 86.85 | 71.37 |
| 1809 | 307.76 | 284.36 | 295.83 | [300.01] | 327.05 | [313.24] | [102.58] | 86.95 | [94.44] |
| 1810 | 192.93 | 283.77 | 233.98 | [299.48] | 358.14 | [327.50] | [64.42] | 79.23 | [71.44] |
| 1811 | 153.67 | 225.77 | 186.26 | [292.08] | 357.13 | [322.97] | [52.61] | 63.22 | [57.67] |
| 1812 | 164.95 | 241.44 | 199.56 | 331.70 | 341.73 | 336.68 | 49.73 | 70.65 | 59.27 |
| 1813 | [170.98] | [248.19] | [206.00] | [333.25] | [343.30] | [338.24] | [51.31] | [72.30] | [50.91] |

## Table -A4 (cont'd)

| | FOB Export Price Indices | | | CIF Import Price Indices | | | Net Barter Terms of Trade | | |
|------|-----------|---------|--------|-----------|---------|--------|-----------|---------|--------|
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1814 | 157.61 | 228.79 | 189.89 | 346.22 | 354.21 | 350.19 | 45.52 | 64.59 | 54.22 |
| 1815 | 149.50 | 217.07 | 180.14 | 268.97 | 242.65 | 255.47 | 55.58 | 89.46 | 70.71 |
| 1816 | 129.84 | 164.10 | 145.97 | 243.38 | 231.43 | 237.33 | 53.35 | 70.91 | 61.50 |
| 1817 | 125.91 | 171.15 | 146.80 | 222.95 | 197.23 | 209.70 | 56.47 | 86.78 | 70.00 |
| 1818 | 126.33 | 168.83 | 146.04 | 220.99 | 189.77 | 204.79 | 57.17 | 88.97 | 71.32 |
| 1819 | 126.37 | 166.07 | 144.87 | 214.52 | 201.14 | 207.72 | 58.91 | 82.56 | 69.74 |
| 1820 | 124.18 | 137.38 | 130.61 | 194.29 | 190.03 | 192.15 | 63.91 | 72.29 | 67.97 |
| 1821 | 116.83 | 133.06 | 124.68 | 177.45 | 175.27 | 176.36 | 65.84 | 75.92 | 70.70 |
| 1822 | 116.83 | 139.64 | 127.73 | 164.36 | 160.84 | 162.59 | 71.08 | 86.82 | 78.56 |
| 1823 | 126.25 | 140.65 | 133.26 | 160.36 | 156.62 | 158.48 | 78.73 | 89.80 | 84.08 |
| 1824 | 112.83 | 126.70 | 119.56 | 159.31 | 151.02 | 155.11 | 70.82 | 83.90 | 70.08 |
| 1825 | 110.66 | 134.66 | 122.07 | 153.64 | 147.60 | 150.59 | 72.03 | 91.23 | 81.06 |
| 1826 | 110.02 | 128.97 | 119.12 | 142.75 | 139.16 | 140.94 | 77.07 | 92.68 | 84.52 |
| 1827 | 99.15 | 106.67 | 102.84 | 126.85 | 120.91 | 123.84 | 78.16 | 88.22 | 83.04 |
| 1828 | 97.38 | 102.78 | 100.04 | 121.90 | 115.63 | 118.72 | 79.89 | 89.89 | 84.27 |
| 1829 | 102.77 | 105.74 | 104.24 | 115.97 | 109.72 | 112.80 | 88.62 | 96.37 | 92.41 |
| 1830 | 97.49 | 103.23 | 100.32 | 113.16 | 107.74 | 110.42 | 86.15 | 95.81 | 90.85 |
| 1831 | 99.24 | 104.86 | 102.01 | 100.49 | 93.73 | 97.05 | 98.76 | 111.87 | 105.11 |
| 1832 | 98.85 | 109.69 | 104.13 | 103.23 | 97.23 | 100.19 | 95.76 | 112.81 | 103.94 |
| 1833 | 98.88 | 107.30 | 103.00 | 117.02 | 91.40 | 103.42 | 84.50 | 117.40 | 99.60 |
| 1834 | 105.96 | 112.32 | 109.09 | 112.41 | 115.55 | 113.97 | 94.26 | 97.20 | 95.72 |
| 1835 | 109.49 | 116.68 | 110.43 | 154.56 | 127.11 | 140.16 | 70.84 | 91.79 | 80.64 |
| 1836 | 122.34 | 124.02 | 123.18 | 144.54 | 118.80 | 131.04 | 84.64 | 104.39 | 94.00 |
| 1837 | 111.91 | 118.06 | 114.94 | 149.19 | 124.71 | 136.40 | 75.01 | 94.67 | 84.27 |
| 1838 | 108.75 | 111.18 | 109.96 | 118.24 | 115.04 | 116,63 | 91.97 | 96.64 | 94.28 |
| 1839 | 111.44 | 117.36 | 114.36 | 133.97 | 116.57 | 124.97 | 83.18 | 100.68 | 91.51 |
| 1840 | 105.53 | 107.29 | 106.41 | 123.62 | 105.62 | 114.27 | 85.37 | 101.58 | 93.12 |
| 1841 | 112.49 | 114.96 | 113.72 | 95.47 | 94.68 | 95.07 | 117.83 | 121.42 | 119.61 |
| 1842 | 107.93 | 111.52 | 109.71 | 96.02 | 100.83 | 98.40 | 112.40 | 110.60 | 111.50 |
| 1843 | 107.96 | 118.09 | 112.91 | 92.82 | 95.82 | 94.31 | 116.31 | 123.24 | 119.72 |
| 1844 | 109.66 | 112.05 | 110.85 | 98.01 | 94.91 | 96.45 | 111.89 | 118.06 | 114.93 |
| 1845 | 106.99 | 111.81 | 109.37 | 99.18 | 100.13 | 99.65 | 107.87 | 111.66 | 109.75 |
| 1846 | 105.66 | 106.01 | 105.83 | 100.58 | 100.56 | 100.57 | 105.05 | 105.42 | 105.23 |
| 1847 | 106.10 | 111.61 | 108.82 | 104.14 | 103.88 | 104.01 | 101.88 | 107.44 | 104.62 |
| 1848 | 102.30 | 102.51 | 102.40 | 90.11 | 88.14 | 89.12 | 113.53 | 116.30 | 114.91 |
| 1849 | 98.63 | 104.45 | 101.50 | 87.18 | 87.77 | 87.47 | 113.13 | 119.00 | 116.03 |
| 1850 | 104.35 | 96.13 | 100.16 | 91.13 | 92.01 | 91.57 | 114.51 | 104.48 | 109.38 |
| 1851 | 89.81 | 90.54 | 90.17 | 91.68 | 93.60 | 92.64 | 97.96 | 96.73 | 97.34 |
| 1852 | 95.00 | 93.37 | 94.18 | 91.27 | 90.67 | 90.97 | 104.09 | 102.98 | 103.53 |
| 1853 | 98.67 | 97.83 | 98.25 | 96.19 | 95.81 | 96.00 | 102.58 | 102.11 | 102.34 |
| 1854 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1855 | 105.22 | 113.76 | 109.41 | 94.97 | 93.89 | 94.43 | 110.79 | 121.16 | 115.86 |
| 1856 | 113.84 | 125.52 | 119.54 | 99.64 | 96.00 | 97.80 | 114.25 | 130.75 | 122.22 |
| 1857 | 115.96 | 129.99 | 122.77 | 99.66 | 92.12 | 95.82 | 116.36 | 141.11 | 128.14 |
| 1858 | 98.97 | 106.82 | 102.82 | 98.19 | 90.69 | 94.37 | 100.79 | 117.79 | 108.96 |
| 1859 | 100.24 | 103.12 | 101.67 | 101.10 | 89.62 | 95.19 | 99.15 | 115.06 | 106.81 |
| 1860 | 105.42 | 104.43 | 104.94 | 96.02 | 89.38 | 92.64 | 109.83 | 116.84 | 113.28 |
| 1861 | 101.35 | 106.69 | 103.99 | 103.78 | 93.58 | 98.55 | 97.66 | 114.01 | 105.52 |
| 1862 | 102.69 | 103.75 | 103.22 | 110.18 | 94.43 | 102.00 | 93.20 | 109.87 | 101.19 |
| 1863 | 113.28 | 113.01 | 113.14 | 121.30 | 100.64 | 110.49 | 93.39 | 112.29 | 102.40 |
| 1864 | 115.98 | 114.77 | 115.37 | 127.68 | 111.15 | 119.13 | 90.84 | 103.26 | 96.85 |
| 1865 | 100.55 | 104.70 | 102.60 | 121.50 | 106.62 | 113.82 | 82.76 | 98.20 | 90.15 |
| 1866 | 106.64 | 103.67 | 105.14 | 126.96 | 116.37 | 121.55 | 83.99 | 89.09 | 86.50 |
| 1867 | 109.11 | 108.03 | 108.57 | 117.12 | 107.19 | 112.05 | 93.16 | 100.78 | 96.89 |

| | FOB Export Price Indices | | | CIF Import Price Indices | | | Net Barter Terms of Trade | | |
|---|---|---|---|---|---|---|---|---|---|
| | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher | Laspeyres | Paasche | Fisher |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1868 | 111.52 | 106.49 | 108.98 | 109.84 | 101.24 | 105.45 | 101.53 | 105.19 | 103.34 |
| 1869 | 105.02 | 106.48 | 105.75 | 110.68 | 101.73 | 106.11 | 94.89 | 104.67 | 99.66 |
| 1870 | 94.09 | 94.51 | 94.30 | 107.95 | 97.61 | 102.65 | 87.16 | 96.82 | 91.86 |
| 1871 | 110.44 | 116.91 | 113.63 | 104.13 | 97.50 | 100.76 | 106.06 | 119.91 | 112.77 |
| 1872 | 111.24 | 120.74 | 115.89 | 124.62 | 114.05 | 119.22 | 89.26 | 105.87 | 97.21 |
| 1873 | 110.57 | 120.86 | 115.60 | 133.47 | 122.35 | 127.79 | 82.84 | 98.78 | 90.46 |
| 1874 | 115.48 | 122.64 | 119.01 | 116.19 | 115.13 | 115.66 | 99.39 | 106.52 | 102.89 |
| 1875 | 107.71 | 125.60 | 116.31 | 98.10 | 105.50 | 101.73 | 109.80 | 119.05 | 114.33 |
| 1876 | 106.99 | 120.11 | 113.36 | 82.75 | 95.66 | 88.97 | 109.29 | 125.56 | 117.14 |
| 1877 | 106.84 | 119.78 | 113.13 | 80.12 | 91.16 | 85.46 | 133.35 | 131.40 | 132.37 |
| 1878 | 99.09 | 111.69 | 105.20 | 76.79 | 87.01 | 81.74 | 129.04 | 128.36 | 128.70 |
| 1879 | 93.55 | 107.11 | 100.10 | 69.60 | 76.84 | 73.13 | 134.41 | 139.39 | 136.88 |
| 1880 | 95.61 | 107.68 | 101.47 | 74.61 | 82.50 | 78.46 | 128.15 | 130.52 | 129.33 |
| 1881 | 92.09 | 105.56 | 98.60 | 71.25 | 77.97 | 74.53 | 129.25 | 135.39 | 132.28 |
| 1882 | 92.83 | 105.45 | 98.94 | 71.72 | 78.40 | 74.99 | 129.43 | 134.50 | 131.94 |
| 1883 | 92.97 | 103.73 | 98.20 | 72.27 | 77.28 | 74.73 | 128.64 | 134.23 | 131.41 |
| 1884 | 87.91 | 98.68 | 93.14 | 69.37 | 76.40 | 72.80 | 126.73 | 129.16 | 127.94 |
| 1885 | 78.71 | 90.05 | 84.19 | 67.79 | 76.02 | 71.79 | 116.11 | 118.46 | 117.28 |
| 1886 | 91.40 | 100.88 | 96.02 | 68.73 | 76.16 | 72.35 | 132.98 | 132.46 | 132.72 |
| 1887 | 74.75 | 85.38 | 79.89 | 64.49 | 73.06 | 68.64 | 115.91 | 116.86 | 116.38 |
| 1888 | 79.63 | 94.46 | 86.73 | 66.23 | 73.86 | 69.94 | 120.23 | 127.89 | 124.00 |
| 1889 | 76.48 | 89.41 | 82.69 | 71.40 | 78.79 | 75.00 | 107.11 | 113.48 | 110.25 |
| 1890 | 82.47 | 95.82 | 88.89 | 81.22 | 87.45 | 84.28 | 101.54 | 109.57 | 105.48 |
| 1891 | 80.17 | 92.37 | 86.05 | 76.63 | 83.35 | 79.92 | 104.62 | 110.80 | 107.67 |
| 1892 | 75.65 | 87.21 | 81.22 | 71.79 | 80.69 | 76.11 | 105.38 | 108.08 | 106.72 |
| 1893 | 71.59 | 82.50 | 76.85 | 66.58 | 75.03 | 70.68 | 107.52 | 109.96 | 108.73 |
| 1894 | 69.34 | 80.25 | 74.60 | 64.90 | 74.22 | 69.40 | 106.84 | 108.12 | 107.48 |
| 1895 | 70.14 | 81.24 | 75.49 | 61.45 | 71.20 | 66.15 | 114.14 | 114.10 | 114.12 |
| 1896 | 68.79 | 80.05 | 74.21 | 62.07 | 71.70 | 66.71 | 110.83 | 111.65 | 111.24 |
| 1897 | 70.62 | 83.48 | 76.78 | 64.86 | 75.37 | 69.92 | 108.88 | 110.76 | 109.82 |
| 1898 | 72.11 | 83.86 | 77.76 | 71.25 | 82.18 | 76.52 | 101.21 | 102.04 | 101.62 |
| 1899 | 72.46 | 86.74 | 79.28 | 77.14 | 85.20 | 81.07 | 93.93 | 101.81 | 97.79 |
| 1900 | 74.31 | 99.20 | 85.86 | 103.14 | 106.53 | 104.82 | 72.05 | 93.12 | 81.91 |
| 1901 | 73.53 | 98.93 | 85.29 | 88.63 | 97.03 | 92.73 | 82.96 | 101.96 | 91.97 |
| 1902 | 69.17 | 90.36 | 79.06 | 82.10 | 93.19 | 87.47 | 84.25 | 96.96 | 90.38 |
| 1903 | 67.29 | 89.83 | 77.75 | 80.76 | 92.47 | 86.42 | 83.32 | 97.15 | 89.97 |
| 1904 | 67.81 | 89.79 | 78.03 | 79.33 | 94.63 | 86.64 | 85.48 | 94.89 | 90.06 |
| 1905 | 68.24 | 89.88 | 78.32 | 79.59 | 94.45 | 86.70 | 85.74 | 95.16 | 90.33 |
| 1906 | 78.93 | 108.21 | 92.42 | 83.34 | 97.67 | 90.22 | 94.71 | 110.79 | 102.43 |
| 1907 | 82.10 | 113.88 | 96.69 | 91.09 | 105.27 | 97.92 | 90.13 | 108.18 | 98.74 |
| 1908 | 73.67 | 99.27 | 85.52 | 88.06 | 102.72 | 95.11 | 83.66 | 96.64 | 89.92 |
| 1909 | 74.84 | 99.60 | 86.34 | 82.30 | 96.29 | 89.02 | 90.94 | 103.44 | 96.99 |
| 1910 | 76.52 | 102.23 | 88.45 | 85.26 | 99.23 | 91.98 | 89.75 | 103.02 | 96.16 |
| 1911 | 78.58 | 105.05 | 90.86 | 95.11 | 106.15 | 100.48 | 82.62 | 98.96 | 90.42 |
| 1912 | 78.49 | 105.77 | 91.11 | 104.06 | 118.47 | 111.03 | 75.43 | 89.28 | 82.06 |
| 1913 | 81.25 | 108.59 | 93.93 | 110.31 | 127.41 | 118.71 | 73.66 | 85.01 | 79.13 |

Sources: See text and tables A1 and A2.

## Table A5

### Counterfactual Export Price Indices and Net Barter Terms of Trade In The Absence of Devaluation (1874-1913)

| | Purchasing Power of the Spanish Currency Gold Pesetas per £ / Current Pesetas per £ | Counterfactual Export Price Indices (1854=100) | | Counterfactual Net Barter Terms of Trade (1854=100) | |
|---|---|---|---|---|---|
| | | Laspeyres | Paasche | Laspeyres | Paasche |
| 1874 | 101.71 | 113.54 | 120.58 | 97.72 | 104.73 |
| 1875 | 100.20 | 107.49 | 125.35 | 109.58 | 118.81 |
| 1876 | 100.04 | 106.95 | 120.06 | 109.25 | 125.51 |
| 1877 | 98.97 | 107.95 | 121.03 | 134.74 | 132.77 |
| 1878 | 99.32 | 99.76 | 112.45 | 129.92 | 129.94 |
| 1879 | 98.85 | 94.64 | 108.35 | 135.97 | 141.01 |
| 1880 | 100.32 | 95.30 | 107.34 | 128.56 | 130.94 |
| 1881 | 99.72 | 92.35 | 105.86 | 129.61 | 135.77 |
| 1882 | 97.47 | 95.24 | 108.19 | 132.79 | 137.99 |
| 1883 | 97.73 | 95.13 | 106.14 | 131.63 | 137.35 |
| 1884 | 98.15 | 89.56 | 100.54 | 129.12 | 131.59 |
| 1885 | 97.24 | 80.95 | 92.61 | 119.41 | 121.82 |
| 1886 | 97.28 | 93.96 | 103.70 | 136.70 | 136.16 |
| 1887 | 98.23 | 76.10 | 86.92 | 118.00 | 118.97 |
| 1888 | 97.58 | 81.60 | 96.80 | 123.21 | 131.06 |

Counterfactual Export Price Indices and Net Barter Terms of Trade In The Absence
of Devaluation (1874-1913)

| | Purchasing Power of the Spanish Currency Gold Pesetas per £ / Current Pesetas per £ | Counterfactual Export Price Indices (1854=100) | | Counterfactual Net Barter Terms of Trade (1854=100) | |
|---|---|---|---|---|---|
| | | Laspeyres | Paasche | Laspeyres | Paasche |
| 1894 | 83.03 | 83.51 | 96.65 | 128.68 | 130.22 |
| 1895 | 86.54 | 81.05 | 93.98 | 131.89 | 131.85 |
| 1896 | 82.26 | 83.62 | 97.31 | 134.73 | 135.73 |
| 1897 | 76.66 | 91.12 | 108.89 | 142.03 | 144.48 |
| 1898 | 63.71 | 113.18 | 131.63 | 158.86 | 160.16 |
| 1899 | 79.57 | 91.07 | 109.01 | 118.05 | 127.95 |
| 1900 | 76.78 | 96.78 | 129.20 | 93.84 | 121.28 |
| 1901 | 71.88 | 102.29 | 137.63 | 115.41 | 141.85 |
| 1902 | 73.23 | 94.46 | 123.34 | 115.04 | 132.40 |
| 1903 | 73.55 | 91.49 | 122.13 | 113.28 | 132.09 |
| 1904 | 72.13 | 94.01 | 124.48 | 118.51 | 131.55 |
| 1905 | 75.96 | 89.83 | 118.32 | 112.88 | 125.28 |
| 1906 | 88.00 | 89.70 | 122.97 | 107.63 | 125.90 |
| 1907 | 89.00 | 92.25 | 127.96 | 101.27 | 121.55 |
| 1908 | 88.06 | 83.66 | 112.73 | 95.00 | 109.74 |
| | | 81.08 | 108.17 | 98.76 | 112.34 |