7

Measuring GDP, 1850–1958: Demand Side

Measuring aggregate economic activity through the expenditure side represents adding up all final products or sales to final demand. Ideally, each expenditure component should be computed with actual data from households, firms and public administration. Unfortunately, lack of direct evidence renders such a task impossible and the so-called commodity flows approach provides a second-best alternative.[1] This method uses output figures for agriculture and industry that are adjusted to include imports and to exclude exports in order to derive estimates of consumption and investment. An implication is that the GDP output and expenditure estimates are not independent from each other.

I will succinctly describe the procedures and sources used to derive estimates for private and public consumption of goods and services, domestic investment and net exports of goods and services. In all cases, except for net exports of goods and services, the same method employed in the output approach to obtain GDP levels will be followed. That is, in order to compute annual nominal GDP, the level for each expenditure component in 1958 was backcasted with the yearly variations of Laspeyres quantity and Paasche price indices and the resulting series added up. For investment, private consumption and gross domestic

expenditure quantity indices at 1913, 1929 and 1958 relative prices were constructed and, then, a single index for each demand component was obtained by splicing the three volume indices using a variable weighted geometric average. A volume index of real GDP results from adding up its component indices with weights from 1958 national accounts.

A word of warning is necessary. GDP estimates from the expenditure and output sides are not coincidental. Since it is widely accepted that measurement errors tend to be smaller when the production approach is used, I have chosen GDP computed from output side as the 'control final', and private consumption, the largest expenditure component, was adjusted so GDP from the demand side conforms to GDP derived from the supply side.

7.1   Consumption of Goods and Services

Consumption represents the part of final output used up for its own sake. Current expenditure on goods and services by consumers (households and non-profit organizations) and by public administration (central and local government) can be distinguished. While tastes, incomes and relative prices will determine household consumption, political motives are behind public consumption (Beckerman 1976).

7.1.1   Private Consumption

To derive yearly estimates of private consumption, quantity and price indices were constructed for its major components: foodstuffs, beverages and tobacco; clothing; current housing expenses, including the rent of dwellings, heating and lighting, plus current expenses on household maintenance; household consumption of durable goods; hygiene and personal care; transport and communications; leisure; and other services including education and financial services. Most of the available evidence for private consumption's components comes from output estimates to which net imports were added. I will discuss briefly the construction of indices for each consumption component. Paasche price indices were

computed for each private consumption component using, unless otherwise stated, the same method and evidence described for agriculture and industry in the previous section.[2]

Foodstuffs, Beverages and Tobacco

This was still the main component of private consumption by 1958 and includes bread and cereals, meat, fish, milk, cheese and eggs, oil and fat, potatoes, legumes, vegetables and fruit, coffee and cocoa, and sugar, plus beverages (beer, wine, brandy) and tobacco. Evidence on quantities and prices gathered to compute output in agriculture and in food industry in the previous section together with net imports has been used to produce constant and current price series of foodstuffs consumption.[3] Major consumption groups in national accounts (CNE58) were disaggregated into its individual components using the input–output table for 1958 (TIOE58). Consumption, in most cases, was estimated from final output figures, that is, total output less seed and animal feed, to which net imports were added.[4] Wheat and rice milling output were accepted as indicators for bread and cereals. Evidence on meat consumption in capital cities was used to cross check estimates of total consumption on the basis of meat output plus net imports.[5] Fish captures plus net imports were used for fish consumption. For milk, cheese and eggs, output figures were used. For oil and fat, evidence on the proportion of human consumption of olive oil and its derivatives was employed.[6] Data on final output less net exports were used for potatoes, legumes, vegetables and fruits. The consumption of sugar (both cane and beet) was obtained by adding up output and net imports.[7] Imports were accepted for the consumption of tobacco, chocolate (cocoa) and coffee.[8] Quantity indices were computed with 1870, 1890, 1913, 1929 and 1958 benchmarks and, then, spliced into a single index using variable weighted geometric averages in which the larger weight corresponds to the closer benchmark (see expression 12). Individual price series were taken from the section on output. A Paasche price index was derived from current values (in index form) and the chain Laspeyres quantity index.[9]

Clothing and Other Personal Articles

The output and price series for clothing and shoemaking were accepted and aggregated with weights from 1958 national accounts (CNE58). For clothing, a spliced index for the whole period under consideration was constructed using 1913, 1929 and 1958 weights.

Housing Current Expenses

Under this label, dwelling rents, heating and lighting, and maintenance expenses are included. For rents paid for dwellings and for those imputed when occupied by their owners, quantities and prices from the output series were accepted. For heating and lighting, figures on domestic consumption of electricity and gas are provided by Anuario(s) Estadístico(s) since 1901 and 1930, respectively. I have computed figures for the earlier years by extrapolating consumption levels with the rate of variation for electricity and gas total output. Domestic consumption of coal was also added, but lack of direct evidence led me to assume that household consumption of coal evolved as total coal consumption. Prices were taken from the output estimates. Household maintenance expenses were computed by adding up domestic services and the consumption of non-durable goods with 1958 input–output weights.[10] Output and price estimates for domestic services were employed. Non-durable goods consumption was estimated through backward projection of 1958 levels, taken from the input–output table (TIOE58), with the rates of variation of its output, under the arbitrary assumption that household consumption represented a stable proportion of its production.[11]

Household Consumption of Durable Goods

Household consumption of durables was approximated with furniture consumption. 1958 consumption levels were backcasted with rates of variation for timber and furniture output under the arbitrary assumption that the proportion allocated to private consumption was constant over time. Price indices for output were accepted.

Hygiene and Personal Care

The output and price series for health services were used to approximate the expenses on personal care.

Transport and Communications

Expenses on transport services included purchases of automobiles and transport and communications expenses. 1958 levels were projected backwards with the number of registered automobiles and the rate of variation in the number of registered cars and in transport and communications output, respectively.[12]

Leisure

The corresponding series for the output of restaurants, hotels and leisure services were accepted, while the paper industry's output was used to approximate books and periodicals consumption.[13] Weights were taken from the 1958 input–output weights (TIOE58).

Education, Financial and Other Services

The output of education services has been adopted for education and research consumption. The consumption of financial services was also approximated through its output. Liberal professions employment represented the consumption of other services. The price index for 'other household consumption services' was used back to 1939 and spliced with the cost of living index back to 1850 (de Ojeda 1988).

Nominal private expenditure on goods and services was derived by projecting the current value of each of its components in 1958 (CNE58) backwards with their quantity and price indices (expressed a 1858 = 100) and, then, adding them up.

An aggregate volume index of real private consumption was, then, computed. Quantity indices were, firstly, built up on the basis of volume
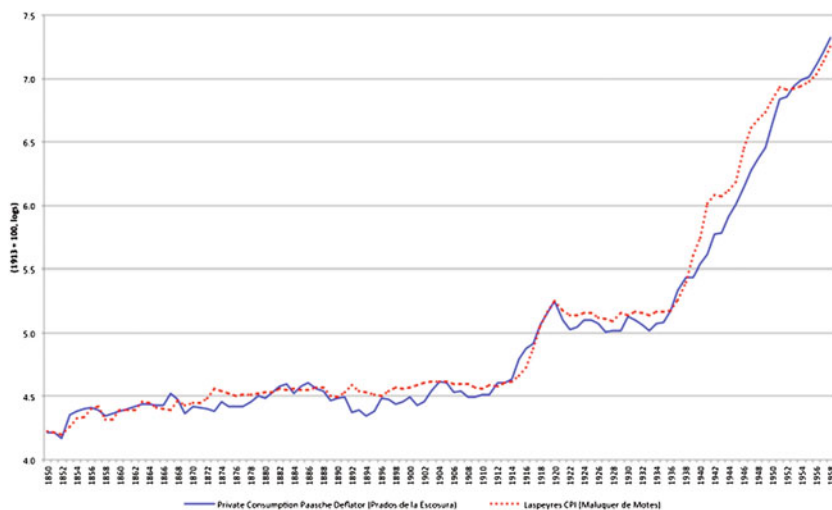
Fig. 7.1 Private consumption paasche deflator and laspeyres consumer price index, 1850–1958 (1913 = 100) (logs). *Sources* Private Consumption Deflator, see the text: CPI, Maluquer de Motes (2006)

indices for private consumption components at 1913, 1929 and 1958 relative prices and, later, spliced into a single index for 1850–1958 resulted from splicing all three segments using a variable weighted geometric average of quantity indices at 1913 and 1929 prices for 1913–1929, and at 1929 and 1958 prices for 1929–1958. An implicit deflator was calculated with current and constant price estimates. The resulting Paasche deflator of private consumption and Maluquer de Motes (2006) Laspeyres consumer price index are highly coincidental, somehow an unexpected result due to their different weighting (Fig. 7.1).

7.1.2 Public Consumption

Wages and salaries and purchases of goods and services by the central Government are both provided for the entire period 1850–1958 by Francisco Comín (1985), while no data on rents imputed to public buildings were available. Annual figures for local government consumption are only available from 1927 onwards, but scattered evidence

exists for 1857–1858, 1861–1863, 1882 and 1924.[14] I have rescaled central government figures with their ratios to local and central government consumption for these years.[15] Yearly public consumption at current prices was derived through backward projection of the level for 1958 (CNE58) with the annual rate of variation of central and local government consumption estimates. Nominal public consumption was deflated with the cost of living, a wholesale price index and the rent of dwellings deflator weighted with the shares of salaries, goods purchased and rents imputed to public buildings in 1958.[16]

7.2   Gross Domestic Capital Formation

The current output of goods and services devoted to increase the nation's stock of capital and, hence, to raise the future potential income flow is called domestic investment or capital formation. Fixed capital formation and changes in inventories are the components of domestic investment.

7.2.1   Gross Domestic Fixed Capital Formation

Gross fixed capital formation can be defined as capital expenditure on domestic reproducible fixed assets (including both new investment and replacement). More frequently, it is described as the value of purchases and construction of fixed assets by residents firms and government, and all durable production goods lasting more than a year, are included. In addition, major alterations of existing assets are considered capital formation and this includes all of those affecting buildings and construction. Inventories, in turn, refer to raw materials, work in progress and stored finished goods.

Gross domestic fixed capital formation was classified in the OECD national accounts system according to three criteria: products, branches of activity and institutions (CNE58). More detailed breakdown is presented in the contemporary input–output table for 1958 (TIOE58).

Given data constraints, the products criteria will be followed to compute historical capital formation in pre-1958 Spain. As for consumption, the way of constructing current and constant price series for gross domestic capital formation was to start from the 1958 benchmark level and to extrapolate each of its individual components back to 1850 with quantity and price indices.[17]

Two alternative ways are used in capital formation estimates: the expenditure and the commodity flows approaches. The expenditure approach establishes the actual investment by firms or by the government, and it is the most rigorous and data demanding one. Its large data requirements, however, make it also the less frequent procedure in historical accounts and in present-day developing countries national accounts. In the present historical estimates, this expenditure approach was exceptionally used for private investment (only for telephone communications). The alternative commodity flows method reaches investment figures by adding net imports to domestic output of capital goods. In other words, the commodity flows approach is not independent from the output method, but it is the only feasible way to compute investment in historical cases, aside from the most recent period or from those countries with exceptionally good records (i.e. the UK and the USA).

An additional difficulty comes from the lack of evidence on prices for capital goods. With the exception of unit value data from commercial statistics from trading partners (UK, France, Germany, the USA) and occasional evidence for bulky and expensive capital goods (locomotives, ships), deflators had to be constructed on the basis of input prices, wages and raw materials, combined with input–output weights (TIOE58). This means that usually no allowances are made for productivity change in capital goods' industries.[18]

In the classification by products, fixed capital formation is distributed into dwellings, other buildings, other constructions and works, transportation material and other materials (machinery and equipment). In the following paragraphs, a brief description of the sources and procedures used to construct quantity and price indices for the main categories of fixed capital formation and for variations in stocks are provided.

Dwellings and Other Buildings

Data restrictions prevent to consider dwellings and other buildings separately.[19] Capital formation in dwellings and other buildings is represented by the output index of residential and commercial construction, excluding repairs and maintenance expenses. The output deflator was used.

Other Constructions and Works

Roads, streets, sanitation, railways, docks, tunnels, bridges, dams, harbours and airports, drainage, irrigation and land improvement, electric installations, telegraph and telephone lines are all included in this category.

For capital formation in railway and road construction, hydraulic infrastructure and other works (maritime and harbours), output (quantity and price) indices have been accepted.[20]

Land improvement was approximated, in addition to central government investment on irrigation and drainage (already included under hydraulic infrastructure), through fertilizer consumption and afforestation (after 1900).[21] Price indices were built up on the basis of input costs.[22]

Capital formation in gas and mining was computed under the arbitrary assumption that the capital–output ratio was stable over time.[23] First differences (excluding negative values) in the output series provide, hence, new capital formation to which scrapping is added to obtain gross investment figures.[24] Scrapping is computed assuming an average asset life of 50 years.[25] When evidence on scrapping, that is, new capital formation 50 years back in time, was not available, I assumed it was proportional to fixed capital formation. A price index was computed with input prices.[26]

Capital formation on electricity structures was assumed to represent 15% of total capital expenditure on electricity supply, and the level for 1958 was projected backwards with the rate of variation in installed capacity (kilowatts) to 1890, to represent new investment, while

scrapping was estimated assuming 60 years average life.[27] The deflator was constructed with input prices for construction costs (0.8) and costs of plant and machinery (0.2).[28]

For communications works, private investment in telephone buildings and works was assumed to represent 15% of total investment outlays over 1925–1958.[29] A deflator computed with construction materials and wages, combined with 1958 input–output weights, was used to derive constant price estimates.[30] For the years 1903–1924, real investment was extrapolated backwards with an index of investment. On the basis of the number of telephone offices, available since 1902, and assuming an average life above 60 years, real investment was computed as first differences from which a 3 year moving average was accepted as the investment index.[31]

Once quantity and price indices were built up for each major component of capital formation on 'other constructions and works', current price series were obtained by projecting 1958 levels (derived from CNE58 and TIOE58) backwards to 1850 with quantity and price indices that were, then, added up into a single series.[32] Quantity indices for total investment on 'other constructions and works' were, then, constructed on the basis of its components' indices with 1913, 1929 and 1958 weights, and a single index was derived through variable weighted geometric mean. The comparison between my estimates and those obtained by Herranz-Loncán shows a substantial degree of coincidence, although Herranz-Loncán series exhibits higher volatility (Fig. 7.2). An implicit deflator was derived from current and constant price indices.

Transportation Material

Under this concept, all expenses on ships, vans, commercial vehicles, vehicles for public transport, airplanes and rolling stock for railways and tramways are included. Purchases of transport vehicles for private use (i.e. automobiles) are not considered as investment but as private consumption. Given the dearth of reliable data, only capital formation in railway rolling stock, ships and road vehicles will be considered here.
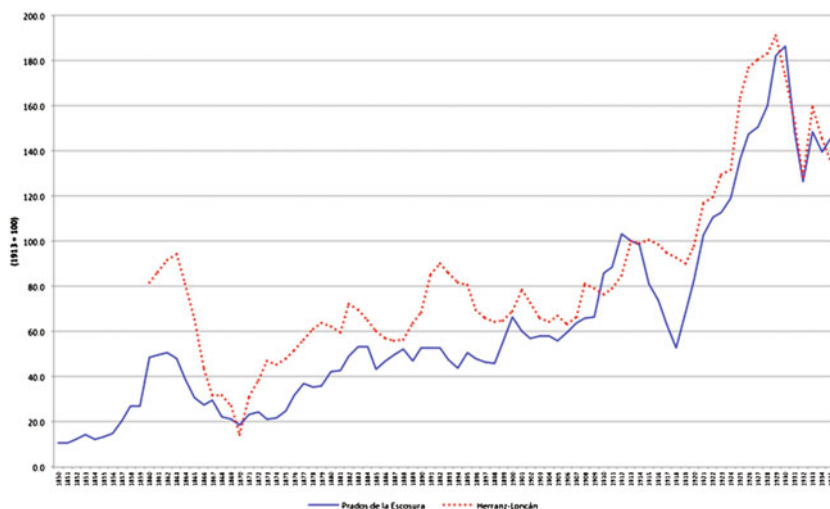
Fig. 7.2 Gross investment in non-residential construction volume indices, 1850–1935: Alternative Estimates (1913 = 100). *Sources* Prados de la Escosura, see the text: Herranz-Loncán (2004)

As for capital formation in railway rolling stock, new investment was derived as first differences from the stock of locomotives, cars and wagons to which scrapping obtained by assuming an average life for each type of asset was added.[33] Quality adjustments were introduced to allow for the locomotives' increasing power.[34] Quantity indices of investment in locomotives, cars and wagons were computed at 1913, 1929 and 1958 prices and, then, a single index was derived as a variable weighted geometric average. Current price estimates up to 1940 were obtained with quantities (unadjusted for quality) and available prices for locomotives, cars and wagons.[35] After 1940, data on current capital expenditure, available for Spanish state company, RENFE, were deflated with a price index constructed with input costs.[36] An implicit deflator was obtained from current values and the quality-adjusted quantity index.

The estimates of capital formation in merchant shipping include all sailing and steam ships.[37] No evidence on capital expenditure on shipping exists but yearly additions to tonnage can be computed through domestic production and net imports available from 1850 onwards.[38] A

quantity index for investment has been obtained by adding net imports to domestic output.[39] A quality adjustment constructed for Britain, adapted to the case of Spain, was introduced in the investment series.[40] Feinstein's price index (adjusted for exchange rate fluctuations between the sterling and the peseta) was used for 1850–1920 and a deflator was built using weighted input prices for 1920–1958.[41]

For capital formation in road vehicles (excluding automobiles owned for private use which are classified as consumer goods), domestic output (since 1946) plus imports (since 1906) were added up and backcasted to 1900 with yearly registered vehicles.[42] A deflator was built up with input prices for labour and construction materials.[43]

Current price series of fixed capital formation on transportation material were obtained through backwards projection of the 1958 levels for each of its components (derived from CNE58 and TIOE58) with their quantity and price indices that were, in turn, aggregated into a single series.[44] Quantity investment indices were constructed with 1913, 1929 and 1958 weights, and a single index was obtained as a variable weighted geometric mean. An implicit deflator was computed from current and constant price indices.

Other Materials

Machinery and equipment are the main components under this category, including electrical implements, tractors, office equipment and furniture, research equipment, construction and mining materials, and school and hospital materials. Dearth of data precludes estimating capital formation except for electric and non-electric machinery and equipment.

Mains and other plant and machinery were assumed to represent 85% of total investment outlays in electricity supply.[45] As capital stock was highly correlated with installed power, first differences in kilowatts of installed capacity were, hence, accepted as a proxy for new capital formation to which scrapping was added in order to obtain total capital formation.[46] Scrapping was derived assuming an average assets life of 30 years.[47] The deflator was constructed with input prices (copper, 0.5; engineering wages, 0.5) (Feinstein 1988).

Investment on telephone equipment and plant was obtained by assuming it represented 85% of total capital outlays by Spanish telephone company for the years 1924–1958.[48] A constant price series was computed with a deflator constructed with input prices and weights from the 1958 input–output table (TIOE1958).[49] Real investment was backcasted to 1903 with an investment index built from first differences in the number of telephone lines plus scrapping under the assumption of 30 years average (Feinstein 1988: 354).

As for non-electric machinery, while quantities and values are available for imports, no historical series exists for the production of machinery.[50] I have backcasted the level for 1958 with the rate of variation of an index of input consumption in the engineering industry computed through the commodity flows method. Iron and steel output plus net imports, from which iron and steel consumption in the construction of dwellings, shipping and railway rolling stock was deducted, are the basic series available to compute the output of machinery and equipment.[51] A 3 year moving average for the iron and steel available for machinery industry's consumption was computed to allow for stocks and, then, a quality adjustment of 0.5% per year was applied.[52] A machinery output deflator was constructed by combining engineering wages and steel prices with 1958 input–output weights.[53]

As for other components of fixed capital formation, investment on 'other material' (machinery and equipment) at current prices was obtained by extrapolating 1958 levels backwards with quantity and price indices for its components that, later, were added up into a single series.[54] Real indices for investment in machinery and equipment were constructed with its components' volume indices using 1913, 1929 and 1958 weights, and a compromise index was reached through variable weighted geometric mean. An implicit deflator was derived from current and constant price series.

Gross domestic fixed capital formation at current prices was obtained by adding up its components' nominal value. Quantity indices for fixed capital formation were constructed combining its main components at 1913, 1929 and 1958 prices that were, in turn, spliced into a single index using a variable weighted geometric average. An implicit deflator was derived from current and constant price series.

In order and to keep consistency with post-1958 national accounts, fixed capital formation was distributed into four main categories: residential structures (dwellings), non-residential structures (other buildings and other constructions and works), transportation material and machinery and equipment.[55]

7.2.2 Variations in Stocks

Purchases of raw materials for further elaboration, work in progress, or partially transformed products that are not on sale unless a final transformation takes place, plus stored finished goods for future sale, are all included in this category. Variations in livestock, agriculture, trade and manufacturing also are taken into account.

Lack of historical data on inventories has frequently forced researchers to look for short-cut estimates. In their pioneer contribution on the British case, Jefferys and Walters (1955: 7) assumed that the annual variation in the stocks value was 'equal to 40% of the first difference between national income estimates in successive years'. Feinstein (1972, 1988) assumed, in turn, that the ratio of stocks to output was stable over time and, hence, the change of final expenditure corresponded to stock building. For Spain, a similar approach was followed, and I accepted the rate of variation of final demand at current prices (GDP at market prices, derived from the output approach, plus imports of goods and services) to approximate stock building and spliced it to the level of variations in stocks in 1958 (CNE58). A wholesale price index was used to deflate the series.

Lastly, variations in stocks were added to gross domestic fixed capital formation to obtain total domestic investment.

7.3 Net Exports of Goods and Services

To compute GDP from the expenditure side, the net value of goods and services supplied to the rest of the world (excluding net returns to factors of production) should be added to consumption and capital formation.

Two main categories are included under this label: net exports of goods and services and non-residents expenses in Spain (net of resident expenses abroad). Free on board (fob) value of goods exported and imported, commodity transport services provided by residents to foreigners, and by foreigners to residents, and other incomes (insurance, communications, patents' royalties) derived from non-residents, and those paid by residents, are considered under traded goods and services. Under the second label are included consumption expenses in Spain by non-residents less expenditures of residents abroad, payments by non-residents to nationals for passenger transport services net of those payments by residents to foreign passenger carriers and any other net expenses by non-residents within Spanish boundaries.

Current values of exports and imports of goods and services for 1940–1958 are from Elena Martínez Ruíz (2003).[56] For the period 1850–1939, the sources and procedures used to construct current values for the main components of exports and imports of goods and services are briefly described below.

7.3.1 Net Exports of Goods

Free on board (fob) value of goods exported and imported needs to be computed. Data from Spanish official trade statistics have been corrected for quantity underestimation and price biases through a comparison of Spanish trade with its main trading partners on the basis of foreign and Spanish trade statistics by Prados de la Escosura (1986) for 1850–1913 (who included an estimate of smuggling through Gibraltar and Portugal), Antonio Tena Junguito (1992) for 1914–1935 and Martínez Ruíz (2003, 2006) for 1936–1939. Cost, insurance and freight (cif) imports were converted into fob imports to comply with balance of payments conventions.[57] In addition, exports and imports were grossed-up to include the Canaries, while trade between these islands and the Peninsula was excluded.[58]

7.3.2 Gold and Silver

Quantities of gold and silver as recorded in trade statistics (coins, bars and paste) are considered as monetary gold and silver and, therefore, non-monetary gold and silver trade was not included in the estimates of net exports of goods and services.[59]

7.3.3 Freight and Insurance

Freight income received for exports carried in Spanish ships less freight expenses paid for imports transported in foreign vessels constitute the first item to be computed under this label. Following North and Heston, the freight-value method, or freight factor, was preferred to the earnings per ton method.[60] Total freight revenues on exports and imports were first computed by applying freight factors to the fob value of exports and imports and, then, to ascertain freight income on exports (a credit for Spain) the share of tonnage exported carried under Spanish flag was used, while the share of imported tonnage in foreign ships was employed to compute freight expenses on imports.[61] In addition, freight income from carrying trade between foreign ports was assumed, following North (1960) and Simon (1960), to represent a percentage of freight earnings and a 10% of freight income on exports was accepted.[62] Port outlays by Spanish ships in foreign ports and by foreign ships in Spain's harbours as payments for port dues, loading and unloading expenses and coal are assumed to represent a fixed share of shipping earnings and expenses.[63] Foreign ships transported more tonnage than in Spanish vessels as they exhibited, according to Valdaliso (1991: 71), a more efficient transport capacity ratio. I assumed that more fully loaded vessels made smaller outlays per ship and, hence, port outlays by Spanish ships abroad (a debit) were established at 30% of the freight income on exports, while port outlays by foreign ships in Spain (a credit) were fixed at 20% of freight expenses on imports.[64] Finally, marine insurance income and expenses were computed under the widely shared assumption that underwriting follows the flag and exports in Spanish ships were, hence, usually insured by Spanish companies, while imports in foreign vessels

were insured by foreign companies.[65] I arbitrarily assumed that insurance rates were identical by Spanish and foreign companies and accepted those used by Prados de la Escosura (1986) for 1850–1913 and by Tena for 1914–1939, to which I added an extra 2% to include shipping commissions and brokerage.[66]

7.3.4 Tourism, Emigrants' Funds, Passenger Services and Other Services

Yearly income from tourist services was derived on the basis of expenses per visitor (net of Spanish tourist expenses abroad) calculated by Jáinaga for 1931, times the annual number of tourists and, then, reflated with a cost of living index to obtain current price estimates.[67] Unfortunately, the total number of tourists is only known since 1929 and was backward projected to 1882 with the rate of variation of passengers arriving by sea, while no tourism was assumed to exist over 1850–1881.[68]

Spain was a net emigration country over the late nineteenth and early twentieth centuries (Sánchez Alonso 1995, 2000). Emigrants carried small sums with them to cover their arrival expenses. It can be reckoned that, in 1931, emigrant funds to America represented, on average, 200 gold pesetas, that is, 400 current pesetas, including the fare and small amounts to cover arrival expenses.[69] If the fare represented around 340 current pesetas, 60 pesetas corresponded to emigrant's funds.[70] However, its author only added 'a small amount for unavoidable expenses', to the cost of the passage, and this sum is most likely an underestimate.[71] I, therefore, accepted a higher estimate of 100 pesetas for those emigrating to America and one-tenth, 10 pesetas, for those to Algeria (and to France) in the eve of World War I.[72] These average sums times the number of emigrants to America, Algeria and France cast a yearly series of emigrants' funds that were reflated with a wage index.[73]

In addition, revenues and expenses from passenger transport have to be taken into account. Fares paid by tourists carried by Spanish ships and by immigrants returning in Spanish vessels are included on the credit side, while fares paid by emigrants to foreign shipping companies represented a debit. The number of migrants provided by Sánchez Alonso

(1995) for 1882–1930 was completed up to 1939 with Spain's official migration statistics and those from the main destination countries, plus an estimate of migration for the years 1850–1881 on the basis of scattered foreign evidence.[74] The share of arrivals and departures in Spanish and foreign ships is provided by official migration statistics from 1911 onwards, and shows a stable pattern, roughly one-third of emigrants returned home under Spanish flag and three-fourths left in foreign ships, except during World War I when the distribution pattern was reversed.[75] These shares were accepted for the nineteenth and early twentieth centuries. The fares for trips to Argentina, Cuba and Algeria are obtained from Vázquez, Llordén and official emigration statistics.[76]

Lastly, Government transactions (credits and debits) were taken from official accounts were added up (Instituto de Estudios Fiscales 1976).

Total exports and imports of goods and services at current prices were reached by adding up its components. Constant price values were obtained with price indices for commodity exports and imports.[77]

7.4   Gross Domestic Product at Market Prices

A yearly series of nominal gross domestic product at market prices was obtained by adding up individual indices for private and public consumption, capital formation and net exports of goods and services. A GDP volume index was constructed by weighting each expenditure series with their shares in nominal GDP in 1958. An implicit deflator was derived from current and constant price GDP series.

However, the resulting GDP estimates from the demand side do show discrepancies with those obtained through the supply side. As discussed before, it is widely accepted that both in present time developing countries and in historical accounts measurement errors are smaller when GDP is computed from production rather than from expenditure.[78] Hence, I have chosen GDP derived from the output approach as the control final and adjusted private consumption (at both current and constant prices), the largest expenditure component, so GDP from the expenditure side equals to GDP derived through production.[79] The consumption structure remained, however, unchanged.

7.5   Gross National Income

Net payments to foreign factors must be added to gross domestic product in order to compute gross national income. Martínez Ruiz (2003) provides the data for 1940–1958. Jáinaga's contemporary estimates of net factor incomes, converted from gold to paper pesetas, were accepted for 1931–1934.[80] Due to the dearth of data, only very crude estimates of foreign capital incomes (dividends and interest payments to private foreign capital and external debt service), on the debit side, and of Spanish labour returns abroad (wages and salaries), on the credit side, could be carried out. These are the main components of net factor payments abroad, as neither Spanish investments abroad nor foreign labour in Spain was significant over the long period considered.

Assessing returns to Spanish labour employed abroad is a complex task because labour incomes (wages and salaries), the relevant concept for GNI estimation, have to be distinguished from emigrants' remittances, a variable not included in the calculation.[81] Actually, such a distinction can only be made since 1917. For the period 1850–1913, I accepted that only 5% of those migrating to America and 60% of those migrating to Algeria returned within the year.[82] The next step was to assess the amount that, on average, was brought home by returning Spanish workers after 1 year, or less, away from home. I computed an average sum that was taken home by the temporary emigrant or sent annually by the long-term emigrant to their relatives and friends.[83] García López (1992) presents the most comprehensive estimates for the years prior to World War I, 250–300 million pesetas as an annual average over 1906–1910, that amounts to 340–400 pesetas per emigrant (either returning home or sending remittances). I accepted 400 pesetas per emigrant as a benchmark that was, then, projected backwards and forward with a nominal wage index constructed for the destination countries and adjusted for exchange rate between the peseta and each destination country's currency.[84] Finally, returns to Spanish labour abroad were obtained by multiplying the annual sum per head times the number of emigrants returning home within their first year abroad.

On the debit side, three main items can be distinguished: the external debt service, dividends and interests paid to railway shares and debentures owned by foreigners, and returns to foreign factors in mining, to which crude estimates of incomes paid to foreign capital invested in insurance, tramways and utilities, were added for the twentieth century.[85]

Service payments on the external debt have been computed by applying specific interest rates to each class of Government bonds.[86] After the debt conversion of 1882 in which existing foreign debt was given in exchange for new bonds (at 43.75% of its nominal value), and simultaneously with the abandonment of gold convertibility of Spanish currency, debt repatriation started as Spaniards found more secure to invest in bonds serviced in gold pesetas as a shelter against currency depreciation.[87] Since 1891, when the peseta's depreciation took actually place, Spanish citizens purchased external debt bonds while foreign bondholders were trying to get rid of them. A government measure intended to cut short such a trend was the introduction of the so-called affidavit in 1898, which implied that only non-resident bondholders would continue receiving their interests in gold pesetas (or francs), while the rest would be paid in current pesetas (and offered to convert their external debt bonds into internal debt). As a result, the external debt fell, in 1903, to 52.7% of its volume in 1898; in other words, it proves that Spanish residents had purchased almost half Spain's external debt between 1891 and 1898. Hence, only half of the interest paid (52.7%) on external debt should be computed as payment to foreign capital invested in external debt over 1891–1898. Moreover, in so far debt service was in gold pesetas, the amount of interests paid (obtained by applying the interest rate to foreign debt in non-residents' hands) had to be increased by the depreciation rate of the current peseta with respect to the gold peseta over 1891–1914.[88] After World War I, unlike the experience of the 1890s, Spanish foreign debt in foreign hands tended to disappear. I have computed the share of interest payments that accrued to foreign citizens on the basis of Banco Urquijo data.[89] Fortunately, for the purpose of this study, railway companies were highly concentrated, and the detailed studies by Pedro Tedde de Lorca provide enough evidence to estimate dividends on share capital and interests on debentures paid to

non-residents.[90] Dividends paid to shareholders and interest payments on debentures issued by the three major railway companies are available from the mid-nineteenth century up to the Civil War.[91] Both the percentage represented by the three main companies in total capital invested in railways and the proportion of railways capital in foreign hands have to be ascertained in order to compute the returns to foreign capital invested in Spanish railways. Tedde de Lorca (1978, 1980) provides total capital shares and bonds held by the three major companies and its proportion in total investment, and, based on Broder's research, also the participation of French capital in total capital invested in 1867, at the time of network construction, and over the nineteenth century. Broder's (1976) estimates of foreign investment in railways allowed, in turn, to gross-up French railways capital to cover all foreign capital. For the interwar years, I have had access to estimates of the proportion of shares and debentures in non-resident hands.[92]

Foreign capital in mining was mainly British. On the basis of effective capital invested by British companies and cumulated total foreign investment in mining, it can be suggested that, over 1870–1913, more than half of all foreign capital in Spanish mining came from the UK, while the British share raised to three-fourths in the interwar years.[93] Decadal averages of dividend and interest payments to British companies are provided by Harvey and Taylor that were grossed-up to include all payments to foreign capital in Spanish mining for 1851–1913, assuming similar rates of return in non-British foreign investment, and using the estimated British participation in total foreign capital.[94] Estimates of foreign capital returns in mining derived through this procedure were, then, distributed annually with an index of non-retained value in Spanish mineral exports.[95] Dividend and interest payments from 1914 onwards were estimated by projecting the average level for 1911–1913 with an index of non-retained export proceeds.

Finally, crude estimates of incomes paid to foreign capital invested in tramways, electricity, gas and water supply, and insurance were carried out through backwards extrapolation of an estimate for 1931–1934 (Jáinaga) with the rates of variation of their output.[96] For foreign insurance companies, the volume of declared premia times the yield of British consols provided their yearly returns.[97]

The difference between credit and debit estimates provided the value of net payments to foreign factors abroad. To derive constant price series, the import price index was used as a way of assessing its purchasing power.[98] Gross National Income was, in turn, computed adding net factor payments abroad to gross domestic product at market prices.

7.6   Net National Income

Net National Income was obtained by subtracting capital consumption—provided in Prados de la Escosura and Rosés (2010)—from Gross National Income.

7.7   Net National Disposable Income

Net National Disposable Income was derived by adding an estimate of net transfers to the rest of the world to Net National income. Emigrants' remittances constituted its main historical component in Spain. Not all emigrants sent money home while being abroad. In historical estimates, it is usually accepted that most of those who established themselves abroad stopped sending money after 5 or 6 years either because they have already paid for their debts or because they planned to invest in the receiving country. I arbitrarily assumed that emigrants only sent money home within their first 5 years and computed emigrants' remittances by multiplying the estimated average sum per emigrant times the cumulative figure of emigrants arrived in the last 5 years, after deducting those migrants who returned home within 1 year.[99]

Notes

1. The commodity flows approach is common in present time developing countries (Heston 1994) and in historical national accounts. Cf. the pioneering work by Jefferys and Walters (1955) on the UK, extended by Deane (1968) and Feinstein (1972), and more recently, the research by

Carreras (1985) on Spain, Vitali (1992) and Baffigi (2013) on Italy, and Smits, Horlings and van Zanden (2000) on the Netherlands.

2. Unfortunately, prices are, unless otherwise stated, wholesale prices and not retail prices, as national accounts convention establishes.

3. Net imports, that is, retained imports less domestic exports, were taken from Estadística(s) del comercio exterior. Gallego and Pinilla (1996) provide agricultural trade figures at 1910 prices for main commodity groups in the years 1850–1935, and I have drawn on their figures whenever necessary.

4. The description of the construction of output figures is presented in section III of the essay.

5. Gómez Mendoza (1995) provides estimates of meat consumption for 1900–1933. Anuario(s) Estadístico(s) provide consumption figures from 1921 onwards.

6. García Barbancho (1960: 299).

7. Martín Rodríguez (1995) supplies quinquennial average estimates of sugar consumption from 1855 to 1904. I constructed annual consumption estimates for the nineteenth century on the basis of Martín Rodríguez estimates, imports of sugar and data on domestic production.

8. Alonso Alvarez (1993, 1995) provides current values of legal consumption of tobacco. Anuario(s) Estadístico(s) present evidence for 1901–1958. Estimates of smuggling through Gibraltar and Portugal for 1850–1913 are provided in Prados de la Escosura (1984).

9. Incidentally, the Paasche deflator for foodstuffs, beverages, and tobacco matches closely Maluquer de Motes (2006) Laspeyres index of foodstuffs.

10. Weights were 0.5518 for domestic services and 0.4482 for non-durables.

11. Household consumption of non-durable goods included chemicals (0.6748), construction materials (0.2225) and rubber goods (0.1027). Weights are taken from TIOE58. Prices from output estimates were employed.

12. An alternative measure would be tax revenues on land transportation, petroleum and gasoline, and on post, telegraph and telephone services. However, changes in the tax rate make impossible to employ available evidence without a previous adjustment of tax returns for changes in fiscal pressure.

13. Prices used were the cost of living index for restaurants, hotels and entertainment, and the paper industry deflator. TIOE58 weights were 0.2102, entertainment (films and theatre performances, bullfights and radio broadcasting); 0.6291, hotels and restaurants; 0.1607, books and newspapers.

14. I am indebted to Francisco Comín for kindly supplying me with his unpublished figures.

15. Fortunately, the ratio ranges from 0.63 to 0.70, in a diminishing order. I have log-linearly interpolated the ratio, and I used it to re-scaling central government's expenditure correspondingly. No data exist for the Civil War years (1936–1939). I assumed public consumption was at its peak during those years and adopted its ratio to private consumption during World War II years.

16. Weights come from TIOE58 and they are 0.6791, cost of living; 0.2995, wholesale price index; 0.0214, the rent of dwellings deflator.

17. This is a similar method to the one followed by Feinstein (1972: 184) for late nineteenth and early twentieth century Britain.

18. Cf. Feinstein (1988: 262).

19. See construction industry in section III.

20. For railway and road construction, the use of output as investment constitutes a wide definition of capital formation that includes maintenance and hence it implies a short life of assets. See the section on non-residential construction industry.

21. The sources for fertilizer consumption are Gallego (1986), Barciela (1989) and Estadística(s) del comercio exterior (see footnote 56 for details). For afforestation, the sources are GEHR (1989) and Barciela (1989).

22. For land improvements deflator, wages were allocated 0.5 and material input prices 0.5 (0.25 for construction materials and 0.25 for fertilizers). For afforestation, material input prices were approximated with the agricultural deflator. Weights were computed from the 1958 input–output table (TIOE58).

23. I follow here Feinstein (1988: 281–285, 303).

24. The sources for gas and mining output are provided in the section on the output approach.

25. Unfortunately, it was not possible to distinguish between buildings and work, on the one hand, and plant, machinery and equipment, on the other, that do have different asset lives (60 and 30 years, respectively, in

the case of Britain, according to (Feinstein 1988). Given the longer life of assets in developing countries, I assumed a 50 year average for both buildings and plants and machinery. As a consequence of this decision, capital formation in other construction and works is overexaggerated, as it also includes plant and machinery in gas and mining. However, such an upward bias is small given the size of capital formation in mining and gas.

26. Weights taken from TIOE58 were 0.49, construction materials and 0.51, mason wages.

27. The 15% share of total investment outlays and 60 years average life are taken from (Feinstein 1988: 305), for the case of Britain. The value of capital expenditure in electricity supply comes from Banco Central (1961). Installed electric power is available since 1901 in Reseña Estadística (1952) and Anuario(s) Estadístico(s). Given its high correlation with electricity output (0.95 over 1901–1913), the installed capacity was backcasted with electricity output to 1890. For electricity output, see Carreras (1983, 1989).

28. Cf. Feinstein (1988). Construction costs include wages (0.51) and construction materials (0.49). In turn, plant and machinery include steel (0.44) and wages (0.56).

29. Capital expenditure by Telefónica, at current prices, for 1925–1958 was kindly supplied to me by Nelson Álvarez. The number of telephone offices is available since 1902 and, assuming a life average above 60 years (Feinstein 1988) assumes 100 years, investment can be computed as first differences. A 3 year average ($Yt = (Xt − 2 + Xt − 1 + Xt)/3$) was estimated to smoothing the investment series.

30. TIOE58 weights are 0.49, construction materials; 0.51, mason wages.

31. A 3 year moving average of the form, $Yt = (Xt − 2 + Xt − 1 + Xt)/3$, was used to smooth the series. Gómez Mendoza (1989) provides data on telephone centres. It should be bear in mind that (Feinstein 1988) assumed a 100 years average life, but 60 years is enough to make my computational procedure acceptable as the period under consideration (1903–1958) is shorter and, hence, no scrapping has to be taken into account.

32. The level of capital formation on other constructions and works for 1958 provided in CNE58 was distributed among its components using TIOE58.

33. Evidence on rolling stock comes from Gómez Mendoza (1985b, 1989) and Muñoz Rubio (1995). No negative first differences were accepted. Average life of locomotives was estimated in 50 years while for cars and wagons 40 years was assumed, based on evidence presented in Cordero and Menéndez (1978: 298–299). Feinstein (1988: 313) accepted shorter lives for rolling stock in Britain (30 years). For 1850–1860, rolling stock deflated imports from Britain were used to project 1861 investment levels backwards to 1850.

34. Cf. Average power of locomotives (steam, electric and diesel engines) was used to construct a quality index. Evidence is provided in Cordero and Menéndez (1978: 292–293) and Muñoz Rubio (1995: 306).

35. The reason to excluding quality-adjusted quantities is that improvements in quality are already incorporated in locomotive prices. Prices for 1900–1935 are presented in Gómez Mendoza (1985b). Prices were backcasted to 1877 with a deflator constructed on the basis of input prices, weighted according to Gómez Mendoza's estimates and, again back to 1850, with unit values from imports of British rolling stock. Unit values for rolling stock imports from Britain were obtained from the UK Annual Statements of Trade and Navigation. The weights used are locomotives, 0.55, engineering wages; 0.45, iron; for cars, 0.35 wages; 0.41, iron; 0.27, wood; and, for wagons, 0.4 wages; 0.48, iron; 0.12, wood.

36. Muñoz Rubio (1995) provides RENFE investment expenditure at current prices. The inputs and their weights are wages (0.5), steel (0.4) and wood (0.1). Weights come from TIOE58.

37. Warships are not considered here and they are included under current public consumption expenditure, following the national accounts' convention.

38. An exception is Valdaliso (1991) for Vizcaya.

39. The years covered are 1850–1936 and 1940–1958. It was arbitrarily assumed that no investment took place over 1937–1939 (it should be remember that warships did not represent capital formation but public consumption). The sources are (Valdaliso 1991), Carreras (1989), Gómez Mendoza (1985a) and Anuario(s) Estadístico(s). Carreras' output estimates have been revised upwards with Gómez Mendoza's estimates over 1855–1914. For 1850–1854, the output level of 1855 was accepted as a crude approximation.

40. Cf. Feinstein (1988: 338–339). The position of Britain as a major shipbuilder and the fact that Spain's fleet was imported to a large extent over the studied period justifies accepting the British quality index for Spain. I adjusted it to Spain's case by extending the yearly rate of quality improvement for 1901–1913 (0.83%) up to 1936, with no change over 1936–1950, and a slight increase in the rate (to 1%) for 1950–1958.
41. Prices for 1850–1920 are presented in Feinstein (1988: 338–339, col. 5). For 1920–1958, input prices are weighted according to the 1958 input–output table (TIOE58), 0.38, engineering wages; 0.62, steel prices.
42. The sources are López Carrillo (1998), Apps. 1–7 (registered industrial vehicles, 1945–1958; imported vans, 1925–1945) and Estadística(s) de Comercio Exterior.
43. TIOE58 weights are 0.23, engineering wages; 0.77, steel prices.
44. The 1958 level of capital formation on transportation material is provided in CNE58 and was distributed among its components using TIOE58.
45. Distinguishing between buildings and plant and equipment is difficult, and I had to estimate capital formation for structures and plant and machinery from the same installed capacity series (see the section on other constructions and works). Investment expenditure is available since 1953 (Banco Central, 1961). The series of installed power cover the period 1901–1958 and the sources are Reseña Estadística and Anuario(s) Estadístico(s). Given the high correlation (0.987 over 1901–1935) between electricity output and installed power, the former was used to backcast the estimates to 1890. Electricity output comes from Carreras (1989).
46. Negative first differences were excluded. A 2 year average, $Yt = 0.5Xt - 1 + 0.5Xt$, was computed to smoothing investment.
47. Asset life for electricity supply means and other plant and equipment are 25 and 20 years, respectively, in the British case (Feinstein, 1988: 305). I assumed a longer average life, 30 years, in the case of Spain.
48. Investment expenditure by Spanish telephone monopoly was kindly provided by Nelson Álvarez.
49. Weights, according to TIOE58, were 0.25, copper; 0.25, steel; 0.5 engineering wages.

50. Unfortunately, such difficulty is frequent in historical studies. See, for example, Cairncross (1953), Lewis (1978), and (Feinstein 1988) for the UK, and Smits et al. (2000) for the Netherlands.

51. The estimates of iron and steel consumption in rolling stock and shipbuilding were computed using conversion coefficients provided by Gómez Mendoza (1982, 1985a, b). For dwellings, Schwartz (1976) provides the iron and steel consumption per building in 1958 that has been downward adjusted for earlier years when the consumption of iron and steel was significantly smaller.

52. The form of the moving average is Yt = (Xt − 2 + Xt − 1 + Xt)/3. The quality adjustment or allowance, as Feinstein, put it, 'for the upward trend in the degree of fabrication' has been previously employed in Lewis (1978) and Feinstein (1972, 1988).

53. According to TIOE58, weights were 0.44, engineering wages; 0.56, steel prices. For machinery imports, the plant, machinery and equipment deflator for Britain constructed by Feinstein (1988) was adopted over 1850–1920 (adjusted for exchange rate fluctuations between the sterling and the peseta). After 1920, an input cost index was used with equal weights for engineering wages and steel plates.

54. The level of capital formation on other materials for 1958 provided in CNE58 was distributed among its components using 1958 input–output table (TIOE58).

55. Dwellings were split from 'other buildings' by projecting their benchmark levels with the same volume index for 'dwellings and other buildings' and, the resulting 'other buildings' series was, then, added to 'other constructions and works' to conform an index for non-residential structures. The investment levels for each type of capital formation in 1958 were obtained from TIOE58.

56. The author kindly supplied her data.

57. Official imports for 1850–1913 have been now corrected with a coefficient derived from a sample of Spain's main trading partners instead of with coefficients obtained from commodity and country samples for primary products and manufactures, respectively, as in Prados de la Escosura (1986). The change was introduced to maintain consistency with Tena Junguito (1992) and Martínez Ruíz (2003) estimates for 1914–1958. It must be stressed that the new results are almost identical to the earlier ones. Minor changes have also been introduced in Tena Junguito (1992) series by choosing different freight indices in the

construction of freight factors. Thus, the 1913 export freight factor (ratio of freight costs to the value of commodities traded) from Prados de la Escosura (1986) has been extrapolated with iron ore freights (from (1998), expressed in index form, as the numerator, and the export price index, as the denominator. As regards imports, Tena Junguito (1992) freight factor for 1926 has been projected over time with a freight index computed as a trade weighted average of coal and wheat freights (tons imported are the weights) and the import price index.

58. Neither Tena Junguito (1992) nor Martínez Ruiz (2003) included the Canary Islands into their Spanish trade estimates. I rescaled their revised trade series with the Spain and Canary Is. to Spain ratio. This procedure implies the arguable assumption that quantity and price biases in Peninsular Spain (and Balearic Is.) trade are similar to those in Canary Is. trade.

59. There are serious doubts about how gold and silver exports and imports were recorded in official trade statistics (Tortella 1974: 121–122). It could be argued that, since Spain never was part of the Gold Standard, trade in gold and silver should be treated as non-monetary. The fact that Spain behaved in practice as country member of the Gold Standard led me to consider gold and silver exports and imports as monetary.

60. North and Heston (1960). Cf. also Simon (1960) to whom I tried to follow as closely as the data permitted. Freight factor is the ratio of freight costs to the current value of traded commodities.

61. Freight factors are taken from Prados de la Escosura (1986) for 1850–1913 and from Tena Junguito (1992), revised according to the procedure described above, for 1914–1939. The distribution of tons exported and imported between Spanish and foreign ships for 1850–1935 comes from Valdaliso (1991). I assumed the distribution for 1940 (in Anuario Estadístico) was representative for the Civil War years.

62. Alternatively, Sudrià (1990) estimates for the period 1914–1920 are available in those cases in which the earnings per ton method were used. No substantial differences emerged from the two methods with Sudrià's showing lower levels.

63. For similar assumptions for the USA and the Netherlands, cf. Simon (1960) and Smits et al. (2000).

64. The idea that more fully loaded ships made smaller outlays is taken from (Simon 1960). These figures roughly correspond to those accepted by Smits et al. (2000).

65. This assumption is borrowed from (Simon 1960). It could, however, overexaggerate Spain's earnings from marine insurance, as it was rather common for Spanish ships to be underwritten by foreign companies.
66. Tena Junguito (1992: 39) assumed a constant 0.5% of trade value for 1914–1939. I accepted his estimate for 1920–1935 but assumed that the insurance rate evolved with the freight factor over the World War I and the Spanish Civil War years.
67. Jáinaga (1932) reprinted in Velarde (1969). Tourist numbers from 1929 onwards are taken from Fernández Fúster (1991). The implicit assumption here is that real expenses per tourist remained constant tourists over time. The implicit assumption here is that real expenses per tourist remained constant over time. The cost of living index has resulted from splicing Ojeda's (1988) index for 1909–1913 with Reher and Ballesteros (1993) for the previous years.
68. For passengers arriving by ship, cf. Nicolau (2005). The low numbers in the early 1880s allow the presumption that tourism was not economically significant by mid-nineteenth century.
69. Computed from Jáinaga (1932).
70. Vázquez (1988) provides third class fares to Cuba (325 pesetas), Argentina and Brazil (356 pesetas) in 1930 that yield an average of 340 pesetas.
71. This figure, 60 pesetas, corresponds to a lower bound estimate of the average funds brought by Italian immigrants into the USA in 1892, according to Simon (1960: 676–677).
72. The one-tenth ratio derives from comparing fares to America (Vázquez 1988) with those to Algeria (Ministerio de Trabajo 1935) in 1934. These are roughly similar to the lower bound figures produced by Marolla and Roccas (1992: 252), for Italian emigrants to America and Europe in 1911. Llordén (1988: 62), on the other hand, provides a larger sum for Spanish emigrants' funds in the 1860s, 125–200 pesetas, once the fare is deducted.
73. Agricultural wages (Anuario(s) Estadístico(s)) were used for 1913 and 1925–1939 and were linked to mason wages for the rest of the time span considered (Reher and Balleste 1993).
74. For 1850–1881, figures of Spanish inmigration in Argentina, Uruguay, Brazil, and the USA, provided by these countries' official statistics were completed with emigration to Cuba in 1860–1861 from Anuario(s) Estadístico(s) that was assumed to remain constant over the period.

Emigration to Algeria was derived from Spanish arrivals in Alger and Oran for the years 1872–1881, while the figures for 1850–1871 were estimated under the arbitrary assumption that the share of emigrants remaining in Algeria after 1 year was similar to the one over the period 1872–1881 (25%). Estimates for returned migration were computed by assuming that the average returns from America for 1869–1873 were acceptable for 1850–1868 while 92% of emigrants to Algeria returned home within the first year. A consistency check of the yearly migration data was performed using the migration balances from population censuses along the lines described in Sánchez Alonso (1995). Data for returned migration from America, 1869–1881, were taken from Yáñez (1994: 120). Data on presents the data on migration to Algeria, 1850–1881, come from Vilar (1989).

75. Ministerio de Trabajo (1934: 491) provides data for 1925–1934. Consejo Superior de Emigración (1916) offers evidence for 1911–1915. The actual percentages used were 0.354 for returned migration under Spanish flag (0.646 for World War I years) and 0.764 for emigrants in foreign ships (0.276 during World War I).

76. Cf. Llordén (1988) for fares to Havana over 1862–1876; Vázquez (1988) provides lowest fares to Cuba, Brazil and Argentina for 1880–1930 at 1913 prices that have been reflated to obtain current price fares using the same Sardá (1948) wholesale price index he employed to derive constant price fares. Missing years were interpolated (1862 fares to Cuba were accepted for 1850–1861; fares to Argentina prior 1880 were assumed to moved along fares to Cuba). I assumed that fares to Algeria moved along the fares to America and that the fares ratio Algeria/Argentina in 1934 (Ministerio de Trabajo 1935) was stable over the considered period. I also assumed that tourist fares from Europe moved along migrants' fares.

77. Export and import price indices for 1850–1913 are provided by Prados de la Escosura (1988), where a chain price index for Spanish exports to Great Britain was accepted as Spain's export price index, and an average of export price indices of Spain's main partners weighted by their shares in Spanish imports was employed as import price index. For the years 1914–1958, the export price index is taken from Anuario(s) Estadístico (s) and the import price index has been computed as an average of export price indices of Spain's main partners weighted by their shares in Spanish imports. The deflation of current values has been preferred to

the available quantity indices for 1914–1958, as the latter are built up on the basis the official trade statistics in which quantities and prices are mismeasured (Cf. Tena Junguito 1992).

78. Statistical evidence on production seems to be more reliable than on expenditure or income. Heston shows that more than 80% of developing countries use the production side GDP as their control total. Assessments of Spanish national accounts prior the mid-1960s concur with this view (Schwartz 1976: 456; Uriel and Moltó 1995: 73). Historical national accounts estimates confirm this assertion, see, for example, Baffigi (2013), van der Eng (1992: 348), and Batista et al. (1997) on the cases of Italy, Indonesia and Portugal, respectively.

79. By 'control total' is meant that 'estimates from alternative approaches are adjusted to conform to this total' Heston (1994: 33).

80. Cf. Chamorro and Morales (1976) where Jáinaga's full set of estimates were published. Velarde (1969) reprinted Jáinaga (1932) balance of payments estimates for 1931.

81. Net current transfers are needed in order to compute Net National Disposable Income.

82. Evidence on transatlantic emigrants returned after less than a year abroad is presented in Yañez (1994) for 1917–1921 and 1925–1930 and in Ministerio de Trabajo (1935: 14) for 1926–1934. It represents between 3.5 and 6.2% of total emigration to America, averaging 5%. Yáñez (1994: 225–227) provides higher shares, 7.8 and 6.6% for 1917–1921 and 1925–1930, respectively. I accepted the average for 1917–1918 for 1914–1916 and the share for 1934 was extended to 1935. For the period 1850–1913, I accepted 5% and for 1922–1924, I log-linearly interpolated the percentages for 1921 and 1925 while no return emigrants were assumed during the Civil War (1936–1939). For the share of emigrants to Algeria returning within a year, Bonmatí (1989: 135) points to 59% of total emigrants.

83. Unfortunately, no distinction can be made between short- and long-term migrants. Contemporary estimates are collected in Chamorro (1976), for 1899, 1900 and 1904; Vázquez (1988) for 1906, 1908–1913 and 1920–1922; and García López (1992), averages for 1906–1910 and 1920–1921. Lastly, those by Jáinaga for 1931–1934 were reprinted in Chamorro and Morales (1976).

84. Nominal wages for Argentina are collected in Williamson (1995). Zanetti and García (1977) provide nominal wages for Cuba from 1903

onwards. French nominal wages from Williamson (1995) are used for emigrants to France and Algeria. The trading exchange rates of the peseta against the peso, the French franc and the US dollar are computed on the basis of Cortés Conde (1979), Della Paolera (1988), and Martín Aceña and Pons (2005). I assumed that no labour returns were sent home during the Civil War years (1936–1939).

85. Muñoz et al. (1978: 209–213). Electricity alone represented 19%. Foreign capital in railways and mining reached 42% of the total. Altogether, the sectors included here constituted two-thirds of all foreign capital invested in Spain in 1923.

86. External debt and the interest rates applied are provided in Fernández Acha (1976).

87. Cf. Sardá (1948) for a detailed evaluation of Spain's external debt in the late nineteenth and early twentieth century.

88. The exchange rate of the peseta against the French franc is provided in Martín Aceña and Pons (2005).

89. Banco Urquijo (1924) provides evidence on the declining share of Government bonds in non-residents hands during the post-World War I years.

90. Cf. Tedde de Lorca (1978, 1980) for research on Norte, MZA and Andaluces, the three main railway companies. Evidence on foreign investment in railways has been gathered in Broder (1976).

91. Tedde de Lorca (1978), Appendices IV-9 and IV-18 provides the data on dividends and interests paid by Norte and MZA, while Tedde de Lorca (1980), pp. 44–45, presents the same evidence for Andaluces.

92. The information on the shares deposited in order to participate in MZA shareholders meetings (1891–1935) comes from Pedro Pablo Núñez Goicoechea who kindly provided it to me. Vidal Olivares (1999: 628–639) presents similar information for scattered years for the Norte railway company. Tedde de Lorca (1980: 31–34) offers quantitative evidence on the decline of debentures in foreign hands during the interwar years.

93. Cf. Harvey and Taylor (1987: 197), for British capital (effective share capital and debentures and mortgage bonds). Cumulated total foreign investment (excluding railways) and cumulated French investment in mining was derived from Broder (1976). When only French and British capital in mining are considered (the large majority of it), the British share ranged from 63 to 73% over 1870–1900, the mining boom era

(and only 22–41% in the earlier period 1851–1870). When, alternatively, Broder's estimates of non-railway investment from other countries are cumulated, British capital represented from 52 to 61% over 1870–1900 (22–31% in 1851–70). Evidence in Muñoz, Roldán and Serrano (1976) indicates that British capital was above 50% in the years 1900–1913 (53% on average for 1900 and 1912), while its contribution rose up to three-fourths in the interwar years (76.6% on average for 1923 and 1931).

94. The British participation in total foreign capital was assumed to be 30% in 1850–1870, 60% in 1870–1890 and 50% in 1890–1913 (see the previous footnote for justification).

95. Non-retained exports represent the value of exports receipts that accrued to foreign productive factors used in mining production and, therefore, are not kept in Spain. Non-retained values over total mineral export proceeds represent 0.35 for iron ore, 0.40 for lead, 0.49 and 0.625 for copper pyrites before and after 1896, 0.54 for mercury, according to Prados de la Escosura (1988) who took them from González Portilla (1981), Broder (1981), Harvey (1981) and Nadal (1975), respectively. Recent revisionist work by Escudero (1996) suggests that these shares should be revised upwards and Témime et al. (1982) pointed out that 70–75% of export proceeds were not retained in Spain. Escudero (1998) has estimated that the share of foreign returns in Basque iron ore mining represented 39.5% (204 million pesetas) of its total over 1876–1913, to which should be added the differential between market prices and much lower preferential prices (that foreign mining companies charged their matrix firms abroad) times the quantities sold at preferential prices, approximately 200 million pesetas, so the share of non-retained exports would be over half of total export proceeds. I have used, then, non-retained shares of 0.55 for iron ore, 0.90 for lead, and 0.73 for pyrites.

96. Tramway revenues are provided in Gómez Mendoza (1989). For utilities, see section III.

97. Frax and Matilla (1996) provide the declared value of insurance premia by foreign companies for 1907–1937 that was backasted with the number of foreign companies to 1850. The yield of British consols was taken from Mitchell (1988).

98. I follow Feinstein (1972) who suggested deflating those components of the balance of payments for which no specific deflators are available by an import price index to ascertaining their purchasing power.
99. Following Simon (1960) I have attributed double weight to the last year of each 5 year period considered. Due to lack of data, no distinction has been made between the sum brought back home by the emigrant who returned home within his/her first year abroad and the average remittances sent during the first 5 years abroad by the rest of emigrants.

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