Management and Finance in Nineteenth-Century Spanish Ports

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Commercial and industrial development during the first half of the nineteenth century, together with the transition to steam at sea, had important consequences for ports. An increase in the average carrying capacity of vessels (see table 1) required greater depths of water, more berth space, and additional room for storage. Increasing vessel size, cost and operating expenses demanded important modifications to port infrastructure. Of all the technological changes that occurred, the two that arguably had the greatest impact on ports were the introduction of steam and the propeller. Both provided greater safety and manoeuvrability, as well as the ability to navigate independent of the force and direction of the wind; they also facilitated the development of large-scale liner shipping. A ll these changes promised to increase considerably the yield of the docks, but only if necessary investments were made.

Table 1
Ratio of Mean Tonnage of Nineteenth-Century Steam and Sail, Various Countries

Country	Year	Mean Steam Tonnage/ Sail Tonnage
England	1840	17%
	1880	77%
France	1880	43%
	1890	53%
Germany	1875	11%
	1890	51%
Spain	1875	11%
	1883	52%
	1890	70%

Source: José Alcala Zamora y Queipo de Llano, "Evoluciôn del tonelaje de la flota de vela espafiola durante los siglos modemos," in *Estudios del Departamento de Historia Moderna, Universidad de Zaragoza* (Zaragoza, 1975).

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It is undisputable that the two main contributions of steam to the development of trade and industry in the nineteenth century were improved regularity and increased speed. While it is likely that the increase in the size of the ships was a function of a growing volume of goods requiring transport, as Gordon Jackson has argued, it is difficult to distinguish cause and effect.[1] What seems certain is that the introduction of steam to both land and sea transport slashed distances between markets and hence had a significant impact on the economic development of port cities. Between 1827 and 1850 the value of Spanish foreign trade grew by two and one-half times, the greater part of which passed through the ports. From 1869 the export of ore and food to Great Britain and France and the import of coal were especially important.[2]

Spain was a country that incorporated the new steam technology into its fleet fairly quickly. In 1892 only 6.7% of the voyages in Spanish foreign trade were made by sail vessels; by 1901, this had dropped to a minuscule 1.85%. This meant that the need to invest in new port infrastructure occurred relatively quickly. Nonetheless, this adaptation was carried out slowly despite a number of ambitious projects.[3]

Organization and Management of Spanish Ports

Spain has 3318 kilometres (km) of coastline, two times the frontier that joins it to France and Portugal (1664 km). It is thus not surprising that its 199 ports handled seventy-five percent of Spanish foreign trade.[4] One of the major ports was Bilbao, through which in the last twenty years of the nineteenth century flowed thirty-five percent of the tonnage in Spanish foreign trade. Most of this was with Great Britain. Indeed, annual British tonnage entering Bilbao exceeded that of any other foreign port except Antwerp and New York.[5] Barcelona moved a smaller volume of goods but with a greater market value.

Until the beginning of the nineteenth century the most important Spanish ports, like Barcelona, Bilbao, Valencia, Seville, and Cadiz, were governed by the "Consulates of the Sea" dating from the sixteenth century. These ports looked after all aspects of navigation: vessel movements, mooring and safety, maritime aids, berths, port construction, dock and pier maintenance, dredging, and the like. In the other Spanish ports, responsibility for these tasks fell to the Hydraulic Military Engineers, who were governed by the General Ordinances of the Navy, approved in 1793, and the "Rules for the Repair of Maritime Ports" of 1781, in which port development was left exclusively to the Navy.[6]

In the first third of the nineteenth century port works were given to the Road, Channel and Port Engineers Corps, created in 1836. They were turned over to the Commerce, Instruction and Public Works Ministry in 1847, and to the Public Works Ministry, when it was created on 20 October 1851.[7] At the same time, everything having to do with construction and conservation in ports, what we might call the "static elements" of maritime transport — maintenance of depth, loading and unloading operations, facilities, and so on — was given to the Engineers, leaving control over the "mobile elements" — vessel movements, anchorage, dockage, berths, towage and maritime aids — to the Navy Ministry. This dichotomy of responsibility often led to ministerial rivalries.[8] The absence of a sole institution to coordinate activities caused constant conflicts over the management of port resources and often condemned Spanish ports to lamentable conditions and obsolete facilities.

Until 1852, finance for most of the new construction, repair, conservation and dredging fell to local authorities, such as the Provincial Deputation, Board of Trade or municipality.[9] A good portion of the funds came from a set of duties, but these were abolished in December 1851. The new law of 17 December 1851 was designed to the various interests; as such, it can be considered the first true port law in Spain. Under this statute ports were divided into two categories: "general interest" ports, in which construction was paid for from the state budget, and "local interest" ports, where repairs were financed by local bodies. Being designated a general interest port not only involved a recognition of the importance of its commercial functions but also guaranteed that the financial resources for construction would come from the general budget. As a result, the battle to ensure that a port was so designated became a priority for local authorities. Once they achieved this status, development was financed through anchorage and loading and unloading duties that were collected by the state for "the dredging, conservation and other port repairs."[10] These funds were kept strictly separate from other monies in the Treasury.

But this method of finance created a vicious circle for many Spanish ports: large numbers of ships were necessary to generate the economic resources with which ports could make improvements to their infrastructures, yet many of these vessels were unable to use the ports until these renovations were made. Moreover, although the law established that the general interest ports would be state financed, the condition of the public purse often made this impossible.[11] While the state was to collect the duties "without mixing them or confusing them with the other income from the general, provincial or local taxes," the temptation to use the funds for other purposes proved too strong.[12]

The strategy followed by the port of Valencia is instructive, since it allowed a start on improving the port of Grao without waiting for funds from the state.[13] In June 1856 dues for this port had already been approved but the repairs were being delayed because much of the revenue had been diverted to other projects.[14] Since the state had entrusted the management and administration of the ports classified as provincial to the Deputations, on 7 January 1869 Valencia managed to be declared a provincial port, and the Deputation with the needed funds took charge of it. The economic management remained in the hands of the Deputation, which was allowed to keep all the duties previously conceded and, more important, to decide on the necessary improvements without having to get approval from the state.

Twenty years after the first port law appeared — and in the face of a crisis in port construction — Harbour Boards were created, which permitted the state to manage the ports indirectly. While these Boards were dependent on the Public Works Ministry, they had their own legal status. As well, they were allowed to collect and spend a special tax on goods passing through the port and were given control over administration and finance. The Boards also nominated their own Engineering Directors and fixed the remuneration of the staff. All groups concerned with port activities were represented. In addition to the Engineering Director, most Boards included the Naval Commander, Captain of the Port, two provincial delegates, two municipal councillors, two members of the Commercial Section of the Board of Agriculture, Industry and Commerce, five members of the Chamber of Commerce, and representatives of groups like the Spanish Maritime League as well as mining, shipping and shipowning interests. The first Harbour Board was created in Barcelona on 11 December 1868. Thereafter, similar structures were established in

Tarragona, Seville, Santander, Palma de Mallorca, Almeria, Bilbao, Gijon, Huelva, Malaga, Cartagena, and Coruna; by the end of the century, there were sixteen in all.

Port Finances

It is difficult to establish consistent series on income and expenses for all Spanish ports in the second half of the nineteenth century.[15] The source that should have been valid — the Public Works Statistics that contained Annual Statements of Public Works from 1854 — in fact presents heterogeneous data. In relation to income obtained from the various duties, it is possible to establish - by provinces but not by ports — series of the products that yielded these taxes between 1852 and 1868. But thereafter, the old duties were replaced by an unloading levy which, unfortunately, was not reported in the statistics. This prevents the calculation of a correlation between improvements made and increases or decreases in the economic yield of the docks or wharves. Expenses, on the other hand, were broken down in different ways in each province from 1845 to 1855: some simply used heads such as equipment employed and staff, while others reported them on the basis of the type of work undertaken (repair, conservation, dredging and so on). From 1870 the data became more homogeneous, although sometimes information is on the provincial rather than the port level. Despite the fact that the greater part of port finance came from the Harbour Boards, in the statistics there is no way until the 1890s to tell what was paid for by the Boards and what was financed by state grants. It is thus quite difficult to come to any definitive conclusions. An alternative source is the reports filed by each Harbour Board; these will be the subject of a subsequent investigation.

When vessels arrived in a port, they had to pay various tariffs for the different services they used. Sometimes the Public Works Ministry asked for information about these fees because, due to the multiplicity of arrangements, it was difficult to know with any accuracy what was being collected. This diversity was due in great part to the type of port: for example, in a river port like Bilbao or Seville, tariffs were higher, thus increasing costs. The dues were paid on the basis of different factors, some of which pertained to the ship and others to the goods. Table 2 shows the tariffs for the port of Bilbao.[16] Not all were obligatory, however. The quarantine duty, for instance, only had to be paid by ships obligated to enter the *lazaretto,* and small vessels were exempt from some services.

Of all the tariffs in table 2, only the last three were specifically to finance the ports. Anchorage dues were based upon ship tonnage while loading and unloading fees were relative to the weight of the goods.[17] To avoid the multiplicity of taxes and the complex way of collecting them, in 1868 anchorage, light, health, and loading and unloading dues were abolished and replaced by a single navigation tariff. This new duty separated navigation into three classes: "cabotage" (domestic trade between the ports of the peninsula, the Balearic Islands and the Canary Islands); "great cabotage" (commerce between Spanish ports and the rest of Europe, including the coasts of Mediterranean Asia, Mediterranean Africa, and Africa as far as the Cape of Bojador); and "high" seas (shipping between Spanish ports and the rest of the world not included within the great cabotage class).

Although the funds collected with these two taxes should have been used to improve and repair ports, this did not happen during the years following the promulgation of the law. Average annual income for Spanish ports from the 1850s to the mid-1860s was £2,763,425 (in 1994 money), while annual expenses averaged £1,532,218.[18] But in the second half of the 1860s investments in ports increased exponentially. While income rose by only sixty-three percent, they grew five-fold, with new construction predominating.[19] After 1870 investments to enable Spanish ports to cope with the new needs of shipping continued to grow and were never less than eighty percent of total expenses.

Table 2
Spanish Port Charges, 1860s and 1870s

Dues	Applied To
Notice of Water	For all Vessels
Right of Marker (Head Pilot)	Gross Tonnage
Pilot Boat (To get practice)	Tonnage, depth and number of launches
Pilot boat along the river	River Sections and Tonnage
Health	Castilian Quintal or tons of goods
Quarantine	Number of days and tonnage
Moorings charges	Sail/Steam and tonnage
Tow rope	Couple of bulls and km of river
Tugs	Tonnage and river sections
Berth	Tonnage
Loading and unloading	Castilian Quintal or tons of goods
Port Construction duties	Tons and kinds of goods

Source: Natividad de la Puerta Rueda, *El puerto de Bilbao como reflejo del desarrollo industrial de Vizcaya, 1857-1913* (Bilbao, 1994).

Table 3
Construction as a Percentage of
Total Port Expenses, 1850-1900

Years	Construction/Total Expenses
1850-1860	60%
1860-1870	95%
1870-1880	87%
1880-1890	87%
1890-1900	84%

Source: Derived from Annual Statements of Public Works, various years.

After their creation the Harbour Boards were also allowed to collect an additional tax for the exclusive use of the port where it was collected. This allowed the most important ports to undertake improvements that had been delayed for many years. The new tax meant that there were two classes of taxes related to trade: one that the state collected directly and another of a local nature. Even so, while approximately 2.52 billion pesetas (1994 prices) were collected through port duties between 1874 and 1884 (£12,600,000 sterling), 864 million pesetas (£4,320,000 sterling) were expended. In other words, only thirty-four percent of revenues actually went into port improvements.[20]

Figure 1 shows the progressive evolution of expenditures in the second half of the nineteenth century. While goods and ship tonnages both rose, the widening gap between the two was due to the fifty-three percent of vessels in the iron ore to Great Britain that returned in ballast and the many vessels carrying coal to Barcelona that cleared that port in ballast. In the last quarter of the century, there were three ports that, because of the importance of construction undertaken, were considered general interest ports of the first category: Bilbao, which handled thirty-five percent of total Spanish foreign trade in the 1880s;[21] Barcelona, through which thirty percent of the value of foreign trade flowed in the same period; and Valencia, where improvements were earliest and which in the 1860s accounted for thirty percent of new port construction. In the last third of the nineteenth century, about twenty percent of the ships entering Spanish harbours came into one of these three ports. Moreover, the three of them dispatched forty-three percent of the volume of goods; forty-five percent of the value; and more than fifty percent of the customs duties (see figure 2). With the improvements in the three ports, 23.3 km of wharf space were built in Bilbao (a river and tidal harbour), 3.3 km in Barcelona and 3.7 km in Valencia. All the ports then had water depths of between twenty-five and eighty feet.[22]

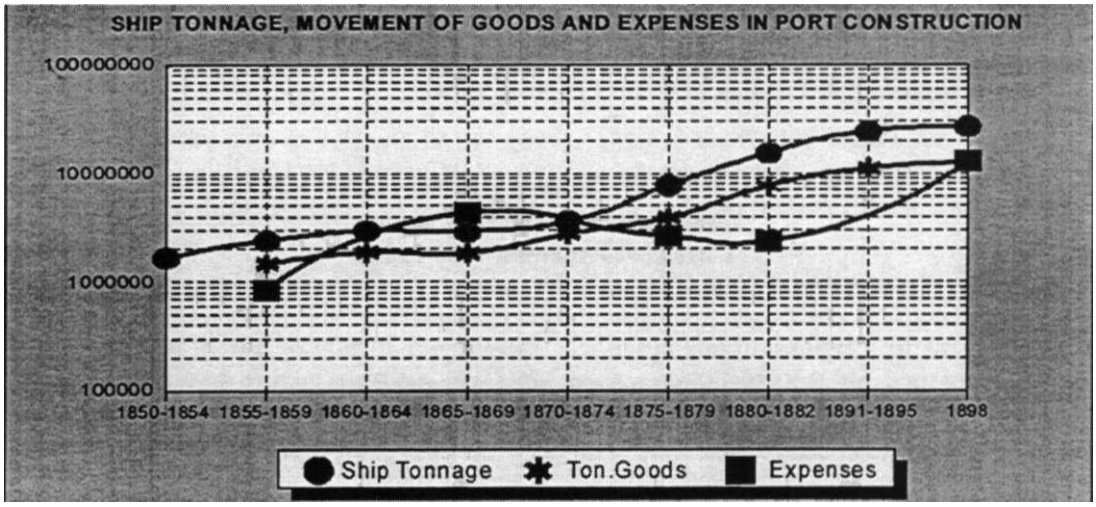

Figure 1: Growth in Spanish Navigation, 1850-1898 (semilogarithmic scale).

Source: Annual Statements of Spanish Public Works.

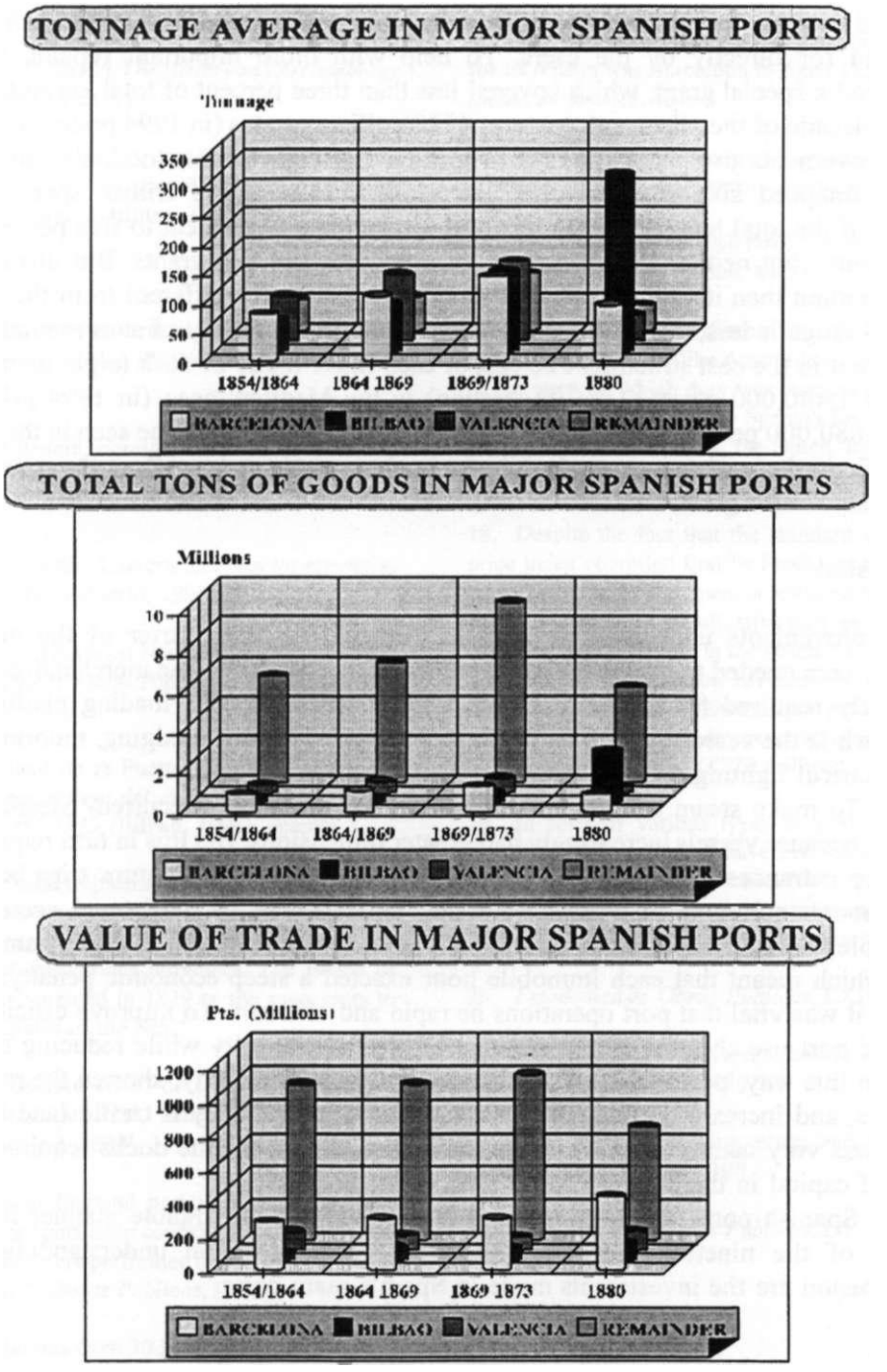

Figure 2: Shipping and Trade in Major Spanish Ports, 1854-1880.

Source: See figure 1.

Such improvements, however, were paid for by the special port duties on goods collected directly by the Harbour Boards; in other words, construction in Spanish ports was paid for directly by the users. To help with more important repairs, the state authorized a special grant, which covered less than three percent of total expenditures. In the last decade of the nineteenth century, 4728 million pesetas (in 1994 prices) were spent on improvements to Spanish ports (£24 million sterling). Of this total, sixteen Harbour Boards financed sixty-three percent. Barcelona, Valencia and Bilbao spent forty-six percent of the total budget. Bilbao received a state grant equivalent to five percent of the investments, but neither Valencia nor Barcelona received any grants. But this might be less important than it seems. The Mediterranean coast is very different from the Atlantic; the tidal range is less, the wave force is lower, and the frequency of storms smaller. This is reflected in the cost structure. The cost of each linear metre of dock (eight metres deep) is about 1,440,000 pesetas (£7,200 sterling) in the Mediterranean (in 1994 prices) and about 2,880,000 pesetas (£14,400 sterling) in the Atlantic.[23] As can be seen in the graphic, the traffic in these ports increased while the improvements and therefore the resources for their finance also grew.

Conclusion

The improvements undertaken in Spanish ports in the last quarter of the nineteenth century were needed to cope with increased trade and shipping. The merchandise handled frequently required facilities like steam derricks, sheds, special loading platforms and docks, while the vessels needed berths, increased water depths, dredging, mooring buoys, and electrical lighting.

To make steam navigation worthwhile, many changes occurred. Steamers were cheaper because vessels increasingly had greater dimensions. But this in turn required safe and deep entrances into the ports. As well, it was necessary that return trips be assured with enough commodities. This meant that ports had to be easily and economically accessible to a substantial hinterland. Finally, the capital sunk into a large steamship was high, which meant that each immobile hour exacted a steep economic penalty; for this reason, it was vital that port operations be rapid and efficient. To improve efficiency and to make port use cheaper, authorities had to increase capacity while reducing operating costs. In this way, port managers tried to reduce vessel inactivity, shorten the number of lay days, and increase throughput. A port was worthwhile only if traffic (and therefore trade) was very active. To achieve the maximum yield from the docks required a good stock of capital in the ports.

Spanish ports clearly progressed in a steady and remarkable manner in the last quarter of the nineteenth century. Especially relevant to an understanding of this phenomenon are the investments made in Spain's main ports.

NOTES

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is *El puerto de Bilbao como reflejo del desarrollo industrial de Vizcaya, 1857-1913* (Bilbao, 1994).

1. Gordon Jackson, *The History and Archaeology of Ports* (Tadworth, 1983).

2. Jesûs M. Valdaliso, *Los Navieros Vascosy la Marina Mercante en Espaha, 1860-1935. Una historia econômica* (Bilbao, 1991).

3. *Ibid.*

4. Direcciôn General de Obras Pûblicas, *Estadistica de Obras Pûblicas* (Madrid, 1897-1898), L.

5. Great Britain, Foreign Office, *Annual Trade, Diplomatic and Consular Reports* (London, various years).

6. Joan Alemany Llovera, *Los puertos espaholes en el Siglo XIX* (Madrid, 1991), 98.

7. Archivo Histôrico Nacional, Section Fondos Contemporâneos, Obras Pûblicas, Legislation, Leg. 1.

8. Natividad de la Puerta Rueda, *El puerto de Bilbao como reflejo del desarrollo industrial de Vizcaya, 1857-1913* (Bilbao, 1994), chapter 3.

9. "Provincial Deputations," first created in 1833, are corporations elected by the citizens with autonomy to operate, manage, and administer in the interests of the various provinces. The Board of Trades were created in 1829 as the successors to the "Consulates of the Sea."

10. Real Decreto de 17 de Diciembre de 1851, Art.7°, Garcia del Real, Timoteo, *Legislaciôn de puertos* (Madrid, 1880), 13.

11. While in England port improvements were made through particular concessions, in France and Spain repairs were performed directly by the State. *Estadistica de Obras Pûblicas,* L-LIX.

12. Regulations from 30 January 1852 for attachment of R.D. 17 December 1851, *Legislaciôn de puertos,* 17.

13. De la Puerta Rueda, *El puerto de Bilbao,* 107.

14. The first Spanish port to receive special duties for its repairs was Barcelona in April 1856. *Legislaciôn de puertos,* 381.

15. The first serious attempt to use this source is Alemany Llovera, *Los puertos espaholes.*

16. For full details on each tariff, see de la Puerta Rueda, *El puerto de Bilbao,* 44-53.

17. This practice was different from those used in most European ports, like Amsterdam, Rotterdam, or Antwerp, in which duty was charged on Moorsom tonnage. According to Spanish foreign trade statistics, the British navy, the Dutch, the Belgian and the Greek used the capacity of their ships.

18. Despite the fact that the standard wholesale price index compiled first by Professor Sardâ and then continued by the Spanish National Statistical Institute is not ideal for adjusting port revenues and expenses, it is used here in the absence of anything more appropriate. Annual revenues in 1994 currency were more than 90,000 million pesetas (£450 million). Port management expenses were around 74,000 million pesetas (£370 million).

19. In spite of various types of port improvements, for this analysis I have divided them into two groups: "new construction," which includes new docks, wharves, etc.; and "repair and conservation," which includes dredging, stores, etc.

20. *Estadistica de Obras Pûblicas,* LXIII.

21. "Estadistica de puertos," *Revista de Obras Pûblicas,* XXXI (1883), 196-199.

22. Despite 199 ports being recognized, trade was conducted through only 108.

23. *Estadistica de Obras Pûblicas,* LV.