The Services Sector

1700–1870

Chapter 1.8

for *An Economic History of Modern Europe,*

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October 26-28, 2007

Vol. I: 1700-1870

Part II.

8. Services

The services sector, comprising finance, commerce, and transportation as well as the professional services in law, education, and medicine, may not have grown substantially as a share of Gross Domestic Product save in the leading industrial and commercial powers of Europe over the period 1700-1870. Nevertheless, the advances that took place in the services sector of the leading maritime countries of Europe stimulated economic development throughout Europe. Moreover, the internal structure of the services sector changed dramatically in the leading countries. From mainly female labour in relatively self-sufficient households, shops, and farms the service sector drew in increasing numbers of male labourers who had to be both numerate and literate to fulfill their functions as clerks, scribes, mariners, and accountants in the growing market economies of Europe. The commercial revolution arising from the opportunities of long-distance trade created in the two centuries before 1700 increasingly penetrated into the local markets throughout continental Europe in the following 170 years. In the process, the dominant form of employment in the services sector switched from local and household services required by largely self-sufficient households and villages engaged primarily in agriculture and handicraft manufacturing to specialized commercial, financial, and transportation services organized among specialized centers of production and commerce. The increased specialization that gradually spread throughout Europe led to continued advances in productivity in services as well as in agriculture and industry.

This chapter argues, in fact, that "Services" were the most dynamic sector in the European economy throughout this period. While the industrial revolution occurred in Great

Britain when heavy industry recovered from the military demands of the Europe-wide wars of 1793-1815 and directed its output into civilian goods, industrialization did not dominate the economies in the rest of Europe until after 1870. In contrast, the British innovations in providing services in finance, steam transport both on land and sea, and wholesale distribution, were more readily adopted in the rest of Europe. The diffusion of improvements in finance, transport, and wholesale distribution led to continued dynamic growth of the Services sector throughout Europe.

The importance of productivity advances in "Services" for growth in the general economy was not recognized as clearly then as it is now. Only in recent decades on the heels of the stunning improvements in information and communications technology have economists begun to identify the importance of improvements in finance for overall economic growth, as well as the continued importance of trade in goods and services among nations, regions, and localities for encouraging and sustaining continued growth in per capita income. While trade was recognized as the engine of economic growth by many economists of the eighteenth century, the importance of financial innovations for facilitating trade was typically not, as illustrated by Adam Smith's classic, *The Wealth of Nations*.

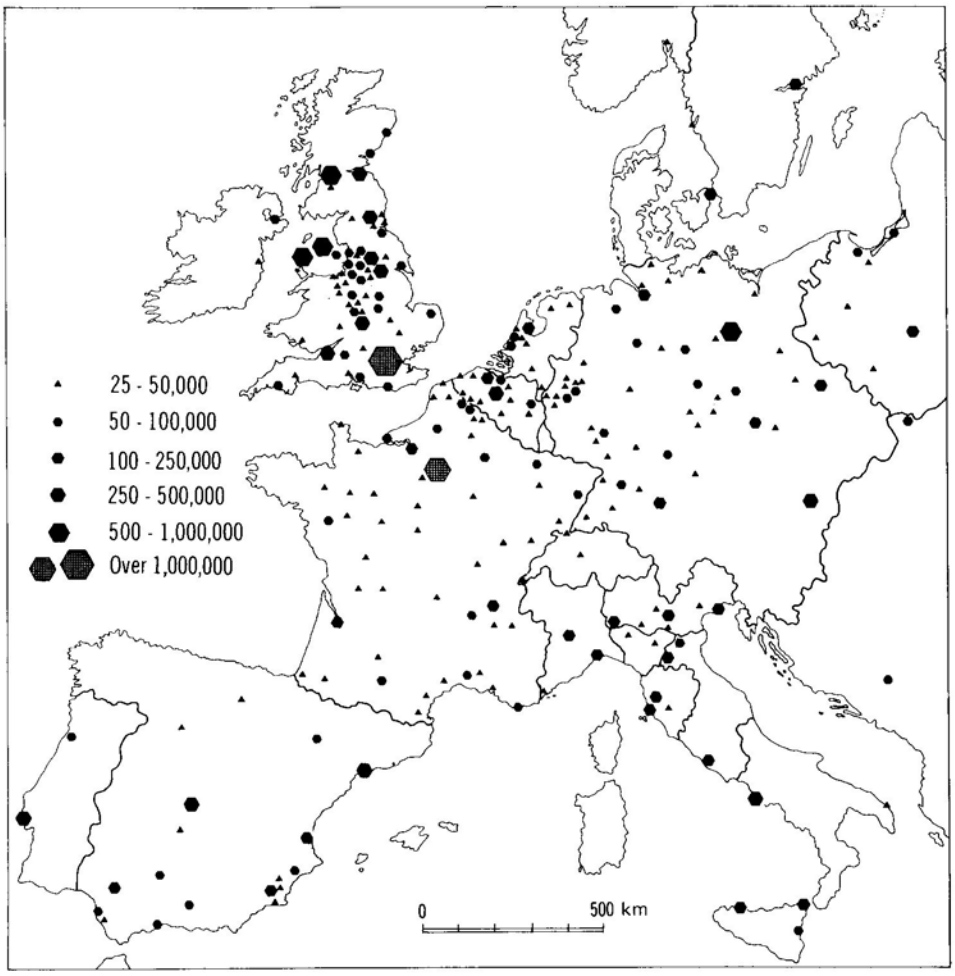
Economic well-being, however, measured as the satisfaction derived from current consumption by everyone in an economic unit (indicated by the prices they are willing to pay), depends upon the "right" goods and services being delivered at the "right" place at the "right" time for the ultimate consumer. Getting everything "right" in an economy is the function of the Services sector as a whole and each component has a useful and complementary role to play, from finance to shipping to distribution at the wholesale and retail levels. The major components of the services sector – finance, transportation, communication, and distribution – comprise the

largest and still growing part of the domestic product, capital stock, and labor force of all advanced modern economies. The rise in the share of Services within European economies in the period 1700-1870, however, was overshadowed by the more dramatic rise of manufacturing and the decline of agriculture. In 1700, the services sector in its modern form appeared primarily in Europe's cities, which were only beginning to show signs of the urbanization that would continue to increase to the present.

From the year 1000 to the year 1700, cities with over 2,000 inhabitants had risen from 13.7% to 16.2% of Europe's much increased population. (Bairoch, p. 219) Urbanization, and the institutional innovations in the provision of services by the rising cities within Europe, was concentrated in the port cities of the Mediterranean and Atlantic, and the capital cities of the mercantile empires of Spain, Portugal, Britain, France, and the Netherlands (Acemoglu, et al.).

The wars of the eighteenth century created little change in the overall level of urbanization for Europe as a whole. Urbanization fell slightly to 15.5% in 1800, but rose in countries winning the wars, especially Britain, and fell in countries losing, mainly Belgium (then the Austrian Netherlands), the Netherlands, and Portugal. Urbanization in the rest of Europe remained largely unchanged, save for the occasional port cities (Italy and Spain) and capital cities in eastern Europe. St. Petersburg and Vienna, for example, grew at the expense of lesser provincial towns. (Bairoch, Table 13.1, p. 215) The nineteenth century, however, saw an accelerating pace and widening pattern of urbanization throughout Europe, especially after industrialization took hold in Great Britain after 1830.

Europe on the eve of the Industrial Revolution 325



10.4. Urban map of Europe during the first half of the nineteenth century. This was a period of very rapid urban growth, and size categories can be regarded as only very approximate

Source: N. J. G. Pounds, *An Historical Geography of Europe,* Cambridge: at the University Press, 1999, p. 325.

Therefore, we divide our time span into at least three epochs. The first covers much of the eighteenth century when the volume of trade increased and productivity in agriculture rose in the most advanced economies of Europe. The third covers the renewed expansion of trade and rising productivity in industry in the decades leading up to 1870. The intervening epoch includes the historical changes in trade patterns and practices that led to the transition from advances in agriculture to improvements in industry. Defining the limits of the transition period, however,

depends on which factors were critical to the continued advances in the productivity and structural changes in the services sector, and where they occurred within Europe. As leadership in the provision of services in finance, communications, transportation, and distribution shifted from the Dutch Republic to Great Britain over the entire period and because advances in Britain were shaped by the changing demands of the wars the British fought, this chapter takes the transition period as 1763-1815. The first date marked Britain's defeat of France in the competition for empire in both the East and West Indies at the end of the Seven Years War; the second date marks Britain's final defeat of Napoleon in the competition for commercial empire in the European continent, as well as the collapse of the Spanish empire in the Americas.

In addition to the well-known improvements in technology that occurred throughout the period 1700-1870, innovations in trading institutions (the "rules of the game") and mercantile organizations (the "teams playing the game") occurred as well. Within that period, however, innovations in institutions and organizations were subject to different constraints within the political architecture of Europe as it changed to accommodate the eventual rise of the secular nation-state. For finance in particular, the increasing demands of war finance that culminated with the French Revolutionary and Napoleonic Wars from 1793 to 1815 drove innovations first in public finance and then in the provision of payments services generally. Financial innovations, both public and private, facilitated not only the waging of conflict during the wars, but also the expansion of the services sector during the wars and then the rapid recovery of economic activity during peacetime.

Throughout the period 1700-1870, returns to investment in physical and human capital devoted to services were never subject to diminishing returns during peacetime. In wartime, the increasing scale of conflicts both at land and on sea led to economies of scale in important parts

of the services sector, especially shipping and distribution. The disruptions of war and the changes in national boundaries and policies that resulted from the treaties that ended the wars did alter the incentives for merchants and their financiers for innovating within each country. The net effect, however, was to encourage migration of capital and labour within the services sector to the winning side. The wars, less frequent but increasing in scale and scope compared to previous centuries, determined the location and direction of innovations in the service sector, especially for finance, communications, and land transport. Unlike previous wars in Europe, however, the wars of the eighteenth and nineteenth centuries did not deter continued investment in services by permanent destruction or dislocation of population or infrastructure. Indeed, the logistical demands of Europe's wars, which were fought over wider areas than ever before, required the mobilization of greater resources to the point of conflict. The increased ability of states to finance the enlarged demands of modern warfare helped sustain progress in the technology and institutions of the services sector, while altering permanently its structure and significance for economic growth throughout Europe.

The total volume of goods transported within and beyond Europe rose dramatically and at an increasing pace from the end of the seventeenth century to 1870. Existing services expanded in the face of rising output while new services were added to accommodate changes in the geography and range of production. New goods found markets and new lands were brought into production because of falling costs of moving goods. Improvements in many of the technologies of transportation combined with capital investment, especially in infrastructure, and shippers taking advantage of economies of scale to bring greater efficiency to transportation. The improvements came in an atmosphere of government support for and subsidy of enhancing

transportation, driven by theoretical arguments for the advantages of a healthy shipping sector and growing international competition, a by-product of the creation of nation states.

The development of wholesale distribution networks in Europe, however, was neither a steady nor a uniform process. Between 1700 and 1870 deep interregional differences persisted and probably deepened across Europe. The crucial question remains in which ways improvements in financial services and transport penetrated local, regional and inter-regional markets. Can technological and institutional advances in finance and transport alone explain the shifts in European market geography between the early 18th and the middle of the 19th centuries?

Measuring the efficiency of wholesale distribution is largely an exercise in indirect analysis. Instead of trying to measure exactly partial or total factor productivity in the wholesale distribution sector, economic historians take advantage of the fact that the output of the sector is essentially equivalent to the level of transaction costs existing in the economy. In other words: an increasing efficiency of wholesale distribution was equivalent to falling transaction costs for all other sectors in the economy and in general it is easier to establish transaction costs as a part of the cost function of other sectors than as the output of wholesale trading. For economic historians, there are at least three ways to approach the productivity of distribution in the past. Each of them is subject to serious limitations but when they are combined a picture of the pattern of European market development emerges. The most traditional way to analyse market efficiency from an economic point of view is to measure deviations from the law of one price, i.e. the assumption that tradable goods should cost a consumer the same in geographically diverse markets if these markets were fully integrated.[1] If prices diverge over long periods of time, then, the differences can be interpreted as the cost of transacting among the markets.

1 K.G. Persson, *Grain Markets in Europe, 1500-1900: Integration and Deregulation* (Cambridge: Cambridge University Press, 1999)., pp.91ff.

Transactions costs include the amount of time and money needed to procure information about the market, the cost of shipment, the legal fees involved, and the costs of accounting for diverse currencies and measures. There are a myriad of other costs that occur in the process of trading as well, often to protect cargo from theft, pilferage and the traders from extortion by corrupt officials.

The second way to approach the efficiency of markets is to analyze the organisational changes that occurred in wholesale distribution. Throughout the 18th century the fast growing intercontinental and colonial trades were in many parts of Europe subject to often strongly regulated merchant 'companies', such as the English, Dutch, Danish and Swedish East India Companies or the Spanish Casa de la Contratación. Within Europe, however, the picture was more varied; corporate and state control of internal markets was increasingly on the defensive in the later 18th century and it all but disappeared by the mid-19th century.

Finally, economic historians have studied the introduction of new goods into the European markets. The impact of early globalisation was making itself felt across Europe with consumers becoming familiar with and regular consumers of a more varied list of goods, from colonial stimulants such as cacao and tobacco to non-European goods adapted into European agricultural production such as maize or potatoes. Supply created its own demand and notably more sophisticated consumer behaviour became apparent over this period.

Services Sector, 1700-1763

Finance

By 1700, European leadership in financial innovation, especially with respect to war finance, was passing from the Dutch Republic to England. The essentials of the financial revolution in England were to implement the most efficient aspects of Dutch mercantile finance

within a much more centralized tax system centered on London, while taking full advantage of the superior payments system already developed in Amsterdam. The initiative came from the duress of war finance that Britain's new king in 1688, William III, placed on the resources available to the English monarchy as he consolidated his authority with the help of his numerous Dutch advisors who had assisted him as Stadholder of the Dutch Republic in his previous wars with France. William dealt first with the forces of the deposed monarch, James II, in England, Scotland, and Ireland and then with the forces of the French monarch, Louis XIV on the European continent. The export of silver needed to finance his troops on the Continent forced Britain to reform its monetary policy with a general recoinage in 1696. Paying off the short-term debt William had accumulated in the first few years of warfare then required Parliament to adopt the device of long-term debt serviced by specific excise taxes as in the Dutch Republic (and earlier in Spain). Founding the Bank of England in 1694 proved unexpectedly important and useful. Like the Exchange Bank of Amsterdam founded in 1609, which by 1700 was providing efficient payment services for the wholesale trade of Amsterdam and then of much of western Europe from the Mediterranean to the Baltic, the Bank of England provided the merchants coming to the port of London bank deposits that could be freely transferred from one account to another. Unlike the Exchange Bank of Amsterdam, which maintained 100 percent reserves against each account in its Specie Kamer, the Bank of England had the possibility of expanding the money supply of the kingdom because it could keep only a fraction of its silver or gold on hand to redeem its notes, which were kept in general circulation due to their convenience.

In addition to providing final payment for foreign bills of exchange drawn by merchants abroad to pay their suppliers in England, the Bank of England could discount bills presented to it before they were due for final payment by providing the payee its bank notes rather than coins of

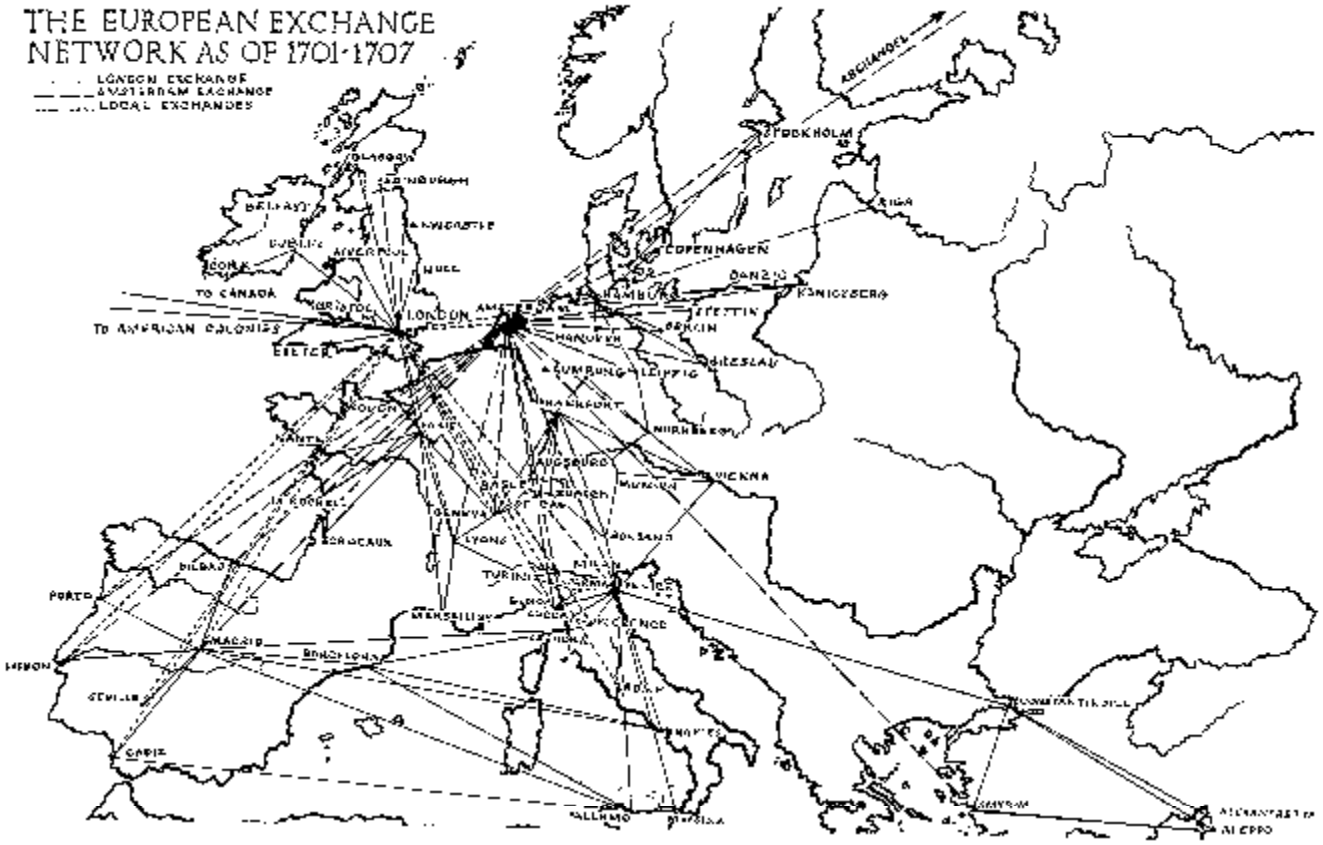
the realm. In the initial stages, this service primarily facilitated finance of William III's armies that were waging war on the continent with English currency. For the remainder of the eighteenth century, the bank's discount facility helped finance wholesale trade and capital market transactions during peacetime and then to provide subsidies to Britain's European allies during wartime. (Dickson, 1967; Roseveare, 1991). From 1700 through 1763 then, European merchants could combine the payments capabilities of the Bank of England and the Amsterdam Exchange Bank to finance trade throughout Europe.

The significance of the increased negotiability of foreign bills of exchange drawn on either Amsterdam or London was that it allowed multilateral settlement of trade balances to occur in place of the previous system of bilateral settlements. This meant that persistent payments deficits by one part of Europe against another, for example the persistent deficit of England with the Baltic, could be settled by surpluses earned in another part of Europe, for example the English re-export of sugar and tobacco produced in its American colonies to continental Europe. Multilateral settlement of differences in merchant accounts had long been recognized as a more efficient way of organizing payments systems. But in previous centuries, access to these giro services in Barcelona, Florence, Venice, Genoa, or Lyon were limited to local citizens and selected foreign merchants. Initiatives to encourage trade through Antwerp and then Amsterdam had broadened access to the exchange banks there to include anyone willing to make a deposit in silver or gold, coin or bullion. Every increase in use of these services by merchants from any part of Europe increased the potential for trade as well. The result was to provide the basis for continual improvements in the extent of the market within Europe for all goods produced anywhere in the world. By 1720, manuals produced for the

benefit of European merchants instructed them on the methods of drawing and paying bills of exchange throughout Europe. (See Figure 1, from Sperling, 1962)

From 1700 to the end of the Seven Years War in 1763, the seaborne commerce of Europe prospered both in peace and war thanks to improved productivity in sailing ships and handling transshipments at ports. Europe from the Baltic to the Levant benefited from the growth of seaborne trade as merchants found that they could pay for goods purchased for export from any region in Europe that was connected to the emerging network of payments with bills of exchange payable in Amsterdam or London. The bills paid in Amsterdam or London, mainly to the accounts of wholesale merchants in the Bank of Amsterdam or the Bank of England, covered the costs of imports of Dutch or English goods from their overseas commercial empires. The process was described in elaborate and practical detail for British merchants in Alexander Justice, *A general treatise of monies and exchanges; in which those of all trading nations are particularly describ'd and consider'd*.**.** London, 1707. Justice described the local currencies, weights, and measures used in all the cities of Europe shown in Figure 1.

Sugar and tobacco especially were bulk goods in heavy demand throughout Europe, adding to the already rising demand for pepper and other spices in addition to the continued demand for salt. The distribution channels created by the competing East Indies companies of the Dutch, English, French, Danish, and Austrians continued to expand into the rest of Europe over the rest of the eighteenth century, albeit with serious disruptions and dislocations during the War of the Spanish Succession (1702-13), the Great Northern War (1700-1721), War of the Austrian Succession (1740-1748) and the Seven Years War (1756-1763). Throughout this period of increasing demands of war finance, however, commercial credit continued to be available at low interest rates, save for the occasional disruptions created by the demands of war



(Contemporary merchant manuals described means of payment between each pair of cities connected on the map.)

Source: Sperling, p. 8

finance from a belligerent state. The self-regulating beneficence of the resulting system of international payments by bills of exchange within Europe and between Europe and the various mercantile outposts established by Europeans overseas was described and extolled in Isaac Gervaise, (1720).

Gervaise, writing at a time when France and England were each exploring the possibilities of massive refinancing of their respective national debts, inveighed against the misuse of credit by governments, fearing it would disrupt the channels of commerce. The work of Flandreau et al (2008), however, demonstrates that commercial credit was available to merchants with contacts in Amsterdam at rates from 3 to 4% annually throughout the period 1688 to 1789 despite the increasing presence of state finance. True, there were occasional spikes created by the uncertainties of war, especially at moments when the outcome of the lengthy wars was uncertain. Because the increased debt issued by Britain (3% Consols) and Holland (bearer obligations) consisted of negotiable instruments easily transferred among merchants, war finance simply increased the possible means for settling their accounts with each other, regardless of nationality. Throughout the eighteenth century, London merchants enjoyed rates only slightly higher than in Amsterdam while Paris merchants had to endure higher rates, but still below those now required for merchants in Italy and Spain. Moreover, Paris credit arrangements, managed largely independently of the monarchy after reforms undertaken in 1726, provided more stability than either London or Amsterdam. (Flandreau, et al.)

Shipping

Significant improvements in transportation efficiency on both land and sea in years after 1700 preceded the transformation in shipping generated by the slow adoption of steam propulsion in the first seventy years of the nineteenth century. Moving goods over land was

always more expensive than moving goods over water. Simply, there was less friction between the liquid and the solid vehicle. In the years up to 1763 investment in better roads did not overcome the physical problem but did make land transport more efficient. Good roads pull traffic toward them so people on inferior roads might find themselves worse off because of the redirection of shipping. Losses though were compensated by overall improvements in efficiency. The extension of the road network and improvements in roads, especially those between major cities, made possible faster and more consistent shipping services including the tr[ldn1]ansport of people and mail in regularly scheduled coaches, the latter being an emerging feature of western Europe by 1763.

Short distance transport from farms to markets was the most resistant to improvements. The products of agriculture started their journeys carried by animals, including people, or in wheelbarrows or carts. The availability of more and bigger animals would have given farmers some help in getting their products to market but the gains were presumably small. Some farm products transported themselves. Massive cattle drives from Denmark to the Low Countries and from Hungary to western Europe might be declining from pre-1700 heights but the growing cities required increasing supplies of animals which made their ways along the roadways, spreading out to grazing lands around as they passed.[2]

Roads and bridges, long neglected, got new attention from governments and private investors in the first half of the eighteenth century. In 1716 the kingdom of France established a department of civil engineering responsible for roads and bridges. That led in 1747 to the creation of the *École des Ponts et Chaussées* in Paris to train new engineers who would improve

[2] Wilhelmina Maria Gijsbers (1999). *Kapitale ossen : de internationale handel in slachtvee in Noordwest-Europa (1300-1750).* Hilversum : Verloren, 485-499.

the quality of French land transportation. Government contributions to construction of roads of high quality drew praise for the French system as well as imitation from other states. In England it was private entrepreneurs who were the source of most major road improvements, especially those involve longer distances. The turnpike trusts anticipated returns on their investments from the tolls paid at the pikes set up along the way where collectors in booths received fees. Charging for the use of roadways and footpaths was not an eighteenth century novelty but the scale of road construction and the contribution to overall transport efficiency were unprecedented. Over long hauls, distances of about 300 kilometers, improved roads could lead to at least a doubling of productivity in land transport by the 1760s and a tripling by the 1830s. There were significant gains from a shift to using wagons in place of pack animals, something made possible by better roads. There were also gains from bigger and better animals to pull the wagons and better organization as firm size among shippers grew.[3] Pavement was created or improved increasing speed especially in poor weather and making possible the use of wagons. In the Austrian Netherlands new brick or stone roads replaced mud tracks. The Habsburg monarchs increased the road network from 200 kilometres of paved road in 1700 to nearly 2,850 kilometres in 1793.[4] As elsewhere in Europe with improvements a network of paved roads emerged making longer distance shipment practical as well as consistent. Better all-weather roads also served, as in the case of the Austrian Netherlands, to redirect trade.

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[3] D. Gerhold, (1996). Productivity change in road transport before and after turnpiking, 1690-1840. *Economic History Review*, 49, 494-511.

[4] Michael-W. Serruys,AUrban networks on the move. The Austrian Netherlands' transit policy and the influence on the commercial flows between the Southern Netherlands and the Dutch Republic (1713-1789),@ Paper given at the Seventh European Social Science History Conference 27 February, 2008.

Governments also promoted investment in inland transport by water. The Dutch Republic in the sixteenth and seventeenth centuries created a system of canals that could carry bulk cargoes as well as passengers on regularly scheduled routes, all while controlling the flow of water to prevent flooding.[5] In the seventeenth and even more in the eighteenth century other European states imitated the Dutch pattern, using canals to supplement or supplant existing river transportation. People still exploited rivers, some of them rather modest, for floating goods downstream or for carrying goods on sailing barges. The difficulties of going upstream always presented problems in the narrow confines of rivers. Using poles and oars for propulsion meant large crews and undermined the advantages of moving goods by water. Canals solved the problem with vessels towed by animals who walked on devoted paths alongside the waterways. More powerful absolutist governments sought and exercised the power to clear away property rights so that canals could be built. Louis XIV's France embarked on an ambitious programme of canal construction including a canal to connect the Atlantic to the Mediterranean through the Midi which was completed in 1681. While French canals, often built with political purposes in mind, might have engineering and financial problems the products of the canal construction boom in the second half of the eighteenth century in England avoided many of those pitfalls. As with somewhat earlier building in the Austrian Netherlands the result was a network of interconnected waterways. Financing in England came from private investors, the sums required being sizeable given the scale of the work. (Deane and Cole, 237-38) Distances might be only scores of kilometres but any hills or uplands meant building a number of locks.

The shorter canals in areas with few gradients proved the most successful while ambitious projects that tried to emulate that success often fell short. Even a ruler with coercive

[5] Jan de Vries (1981). *Barges and capitalism : passenger transportation in the Dutch economy, 1632-1839.* Utrecht : HES.

powers and seemingly limitless drive like Peter the Great in Russia could not complete the projected canal to link the Volga and Don rivers in the first years of the eighteenth century. His successors, though, settled for less grand enterprises. Canal construction already had a formidable impact on inland transportation by 1763 but the impact only increased as kilometres of canals increased and connections among waterway systems became more common throughout Europe. Those connections, thanks to government support or necessary authorization, tended to be internal to states and so served to integrate markets within them. In states where governments could command large workforces and control wages one result was long canals with strategic purposes.

The expansion of ocean shipping services drew the attention of governments and thinkers in the eighteenth century. States throughout Europe introduced policies to promote shipping, conscious of the potential and anxious to accrue potential benefits from greater trade, from earnings from the sector itself, and from possible streams of income from easily taxed streams of commerce. The total tonnage of the European merchant marine grew rapidly more than doubling through the eighteenth century with the most rapid growth in northwestern Europe but with impressive expansion throughout the Continent.[6] The supply of shipping services grew even more rapidly as vessels spent more time each year at sea carrying goods. Various factors made it possible for ships and crews to work more effectively. Investment in port facilities including docks and cranes continued as did improvements in the organization of work in port. Guilds of cargo handlers were the norm and having their labour available when needed simplified as well

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[6] R. W. Unger, (1992). The Tonnage of Europe's Merchant Fleets 1300-1800. *The American Neptune* 52, 2??-??

J. L. van Zanden (2001). Early modern economic growth A survey of the European economy, 1500-1800. *Early Modern Capitalism Economic and social change in Europe, 1400-1800,* Maarten Prak, ed. London and New York: Routledge, ??.

as speeded up the handling of cargo. The port of London developed the first one way street scheme to move carts quickly through the narrow passageways on the left bank of the Thames and so speed up the flow of goods. New and lesser ports such as Liverpool, conscious of the possibilities, invested in harbour facilities and drew some of the growing trade away from crowded established ports.

The flow of information also improved. The speed of correspondence between merchants and their agents rose. Commercial and shipping information filled the pages of the growing number of newspapers. As well, the establishment of regular and predictable exchanges of certain goods through certain ports where cargoes were marshalled all made it easier for shippers to fill a larger proportion of their holds. The establishment of reliable trades made possible and promoted the development of back cargoes so vessels made return trips not empty but carrying paying goods. Those back cargoes could be handled at lower cost with the outbound commodities carrying a greater share of the total burden. Under those circumstances new trades developed and with them came new specializations in production. The improvements in ports and in information served to decrease turnaround time for ships and so made possible the more intense use of the capital sunk in ships. A sea-going ship was the largest single capital good of pre-industrial Europe, that is except for land.

Better ships also contributed to the increase in the supply of shipping services. Technical change was by no means on a scale with the late Middle Ages but in the eighteenth century shipbuilders elaborated and better exploited earlier breakthroughs. The sailing packet of about 500 tons with a standard rig of three masts carrying square sails on the fore- and mainmasts and a fore-and-aft sail on the sternmost- or mizzenmast was the workhorse of international and especially intercontinental trades. Better handling thanks to the greater use of the steering wheel

and a highly divided sail plan with many but smaller and easier to handle sails kept crew size down. Total sail area increased without increasing manpower because of the greater use of staysails, hanging from the lines already in place to hold the masts. On a number of routes, especially over short distance and where cargoes were more predictable and speed was not a critical factor, shippers increasingly used two masted ships. Brigs and snows and other vessels with less rig grew in tonnage but there was no increase in crew size.

The decline in piracy and the greater provision of enforced convoy protection during the many wars of the eighteenth century changed the character of navies but, more important, relieved shippers from the need to put guns and extra crew to handle those guns on their ships. Governments took ever more seriously the task of protecting ocean shipping and deployed more warships that could serve to protect merchant vessels and do so beyond as well as within Europe.[7] Charts became more easily available and more European waters were charted as governments promoted the creation of reliable maps of their own waters.[8] The sextant along with more abundant tables filling books on navigation gave sailors an easier way to translate the position of celestial bodies into estimates of their latitude. The development of reliable chronometers that could keep time at sea in the 1750s by the English clock designer John Harrison finally solved the problem of establishing longitude. For much shipping carried on over shorter distances and where landfalls were common the improved navigational aids served as a supplement to traditional knowledge and practices.

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[7] R. W. Unger (2006). Warships, cargo ships and Adam Smith: trade and government in the eighteenth century. *The Mariner's Mirror*, 92, ??-??.

Jan Glete (1993). *Navies and Nations Warships, Navies and State Building in Europe and America, 1500-1860*. Stockholm: Almqvist and Wiksell International, 1993.

[8] Arend W. Lang (1968). *Seekarten der südlichen Nord- und Ostsee*. Hamburg: Deutsches Hydrographisches Institut, 50-66.

Not all routes at all times were able to generate gains in efficiency and there is some doubt about the scale of gains as a whole.[9] However, the many changes in technology and organization apparently led overall to a dramatic improvement in the productivity of labour on board ship. Gains that were already being made in the sixteenth century spread widely in the eighteenth as more parts of Europe, from Norway to the Mediterranean found ways to increase shipping services significantly more rapidly than increase the number of men working in supplying those services. While best practice would generate a ratio of about 10 tons per man in the late seventeenth century by the 1760s that figure was rising, reaching 15 tons per man by the 1780s and 20 tons per man at the end of the century.[10] The regions of Europe that were best able to exploit the new efficiencies saw their merchant marines grow and saw a shifting of trade routes in their favour and with more rapid expansion of their ports. Centres of trade and especially long distance intercontinental trade continued to shift from the Mediterranean and southern Europe to the Northwest and especially to Britain which emerged with the largest merchant marine tonnage of any European state by 1763.[11] Growth in the French merchant marine and the revival of the Spanish one, thanks in part to more effective government policies, and the Dutch retention of significant tonnage accompanied the rapid growth in the British total. Many trade routes inherited from the Middle Ages declined or disappeared, a trend which began in the Renaissance thanks to improvements in ships. By the 1760s the rise in extra-European

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[9] R. R. Menard (1991). ATransport Costs and Long-Range Trade, 1300-1800: Was There a European ATransport Revolution in the Early Modern Era,@ *The Political Economy of Merchant Empires*, James D. Tracy, ed., Cambridge: Cambridge University Press, ???-??.

[10] J. Lucassen, J., and R. W. Unger (2000). Labour Productivity in Ocean Shipping, 1500-1850. *International Journal of Maritime History* 12, ???-??.

[11] R. Davis (1962). *The Rise of the English Shipping Industry*. Newton Abbot: Davis and Charles, ??-??.

trades and the improvements in shipping practices along with the actions of newly confident and more effective governments combined to create a new complex of trade routes and trading relationships and new specialization in production and in commerce.

Distribution

The relative stagnation of urbanisation rates in Europe over the course of the 18th century conceals notable shifts in the inter-regional and international distribution of urban agglomerations. The winners *par excellence* were Europe's ports – followed as distant seconds by several state capitals.12 Amongst erstwhile at best smallish coastal places towns like Glasgow, Liverpool, Nantes and Cadiz had by the early 1800s about 75,000 inhabitants having increased their population by a factor of anything between 2.5 and 11. Many medium-sized ports in 1700 such as Hamburg, Bordeaux or Barcelona doubled their population. At the top end, London's population increased over the 18th century from 575,000 to 865,000 and that of Naples' from 216,000 to 427,000.13

This exceptional growth of port towns mirrored the importance of long-distance trade and the way in which Europe's increasing integration with the rest of the world fed into the transformation of the European hinterland. Exceptions to the rule, however, demonstrate the lack of uniformity of any European experience in the 18th century. Amsterdam, Europe's prime commercial hub of the 17th century, stagnated throughout the 18th century. One characteristic feature of European development was the successive leadership of different regions throughout time.

12 Daron Acemoglu, Simon Johnson, and James Robinson, "The Rise of Europe.," *American Economic Review*, Jan de Vries, *European Urbanization, 1500-1800* (Cambridge: 1984).
13 de Vries, *European Urbanization*.

By 1700 many regions especially in southern and central Europe were only just emerging out of a phase of disintegrating markets.14 Wars and economic dislocation during the late 16th and much of the 17th century meant that only in the early 18th century did the process of increasing integration resume. Such integration became noticeable in several ways. Markets for grain, the most fundamental ingredient of European diets, had rarely been integrated beyond the regional level before. The exception to this rule was the large-scale shipments between the Baltic city of Gdansk and Amsterdam that had made up for grain deficiencies in the Netherlands since the late 15th century.15

Elsewhere in Europe local harvest failures could still have devastating effects in the early 1700s. Shortages led to price hikes and the high cost of transporting heavy goods like grains over larger distances and slow information flows meant that it took a long time for supplies from elsewhere to fill the gap. Local famines were the consequence. Persson has estimated that in the early 18th century a local grain supply shock in one western European market such as Paris might only have affected another one such as northern Italy with a delay of two to three years.16 As a result, volatility was high too; local shocks took a long time to trigger a response in the form of increased trade sufficiently large to arbitrage away the price difference.

Over the course of the 18th century adjustment times probably halved overall.17 This process was markedly faster within political boundaries than between them, change took place at very different speeds across Europe. English grain markets were probably fairly well integrated

14 David S. Jacks, "Market Integration in the North and Baltic Seas, 1500-1800," *Journal of European Economic History* 33, no. 3 (2004).
15 Milja van Tielhof, *The 'Mother of All Trades'. The Baltic Grain Trade in Amsterdam from the Late 16th to the Early 19th Centuy* (Leiden: Brill, 2002).
16 Persson, *Grain Markets*.
17 Ibid., p.100.

by the first half of the 18th century.18 In the 1770s Adam Smith claimed in his *Wealth of Nations* that “the prices of bread and butchers' meat are generally the same, or very nearly the same throughout the greater part of the United Kingdom."19 Price differentials between markets remained much larger elsewhere thanks to higher total transaction costs. Nevertheless, price movements were largely synchronised within the internal markets of France and Spain, indicating reasonably integrated markets after all even if true price convergence remained elusive in most of continental Europe in the 18th century.20 The comparative picture of market integration across European territories that we can get from grain price studies is less than perfect, however. While grain has the advantage of being a fairly homogenous product and easy to compare across space and time, it has the disadvantage that grain markets and bread prices were regulated in many parts of Europe. Therefore, one has to be cautious when using grain markets as a gauge for the functioning of distribution networks and wholesale markets in general.

At the same time, grain markets were in no way unique in being subject to both corporate and political regulation throughout the early and mid-18th century. Hence, they can serve as a useful example to understand the consequences of mercantilist policies on marketing networks. European towns had a long tradition in regulating the marketing of important foodstuffs. The aim of such policies was to provide a regular, affordable supply. This meant that not only the price of grain relative to wages was a concern to urban, regional and national commentators but also their volatility. The regulations employed could include fixed prices for grain and/or bread,

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18 C.W.J. Granger and C.M Elliot, "A Fresh Look at Wheat Prices and Markets in the Eighteenth Century," *Economic History Review* 20, no. 2 (1967).
19 Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (Oxford: reprint 1976).
20 Enrique Llopis Agelán and Miguel Jerez Méndez, "El Mercado De Trigo En Castilla Y Leon, 1691-1788: Arbitraje Espacial E Intervencion
[the Wheat Market in Castile-León, 1691-1788: Spatial Arbitration and Intervention]," *Historia Agraria*, no. 25 (2001).

urban storages, tight controls over grain trade in the urban hinterland, forced sale of grains and all kinds of ad-hoc measures against 'speculators'. Town or regional authorities sometimes engaged in government-sponsored missions to buy grain abroad, while international grain trade was prohibited or subject to very high customs rates in many places.

Throughout the early and mid-18th century voices against such regulation grew stronger. The charge was that they restricted the development of marketing networks. Proponents of free prices in grain and other goods argued that instead of guaranteeing plentiful supplies at low and stable prices, regulated trade and prices lowered supply and thus raised both prices levels and volatility. The history of the Netherlands, which had relied on open grain markets for centuries and enjoyed some of the most stable prices, seemed to contemporaries an instructive example. Also, in vastly larger urban centres administering any kind of market regulation became increasingly difficult.[21]

The 1760s saw large projects designed to abolish regional restrictions in the grain markets in both France and Spain.[22] The effects of this liberalisation, however, were disappointing in the short run. The experiments coincided with bad harvests. Given poor internal marketing networks large landowners and merchants could easily corner the market and their activities contributed to even higher prices and more volatility. Popular unrest occurred in both countries, costing the Spanish first minister his job and causing the withdrawal of reforms in France. As it turned out, 'free trade' within poorly integrated markets, where large producers could effectively influence prices, did not immediately produce the benefits that advocates of market liberalisation had expected.

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21 For a description see David R. Ringrose, *Spain, Europe, and The "Spanish Miracle", 1700-1900* (Cambridge and New York: Cambridge University Press, 1996)., chapter 10.
22 For France see Persson, *Grain Markets*., p.5ff, for Spain XX

While grain remained in many places subject to regulation by local or national governments other trades were still controlled by corporate organisations, especially in the German States, Central and Southern Europe. Guild based production had by no means been replaced everywhere and corporate privileges continued to impact on the marketing of many products before the 1760s, in particular those involving specialist skills. Traditional merchant guilds were disappearing in much of Europe. Yet, in some cases guilds transformed themselves relatively successfully in company like structures. The Compania General y de Comercio de los Cinco Gremios Mayores de Madrid e.g. acted by the 1760s as a deposit and credit bank, ran royal factories and acted as tax administrator, while engaging in trade on an international and national level.[23]

More importantly, large share of the new products introduced into European markets in the 18th century were actually supplied through regulated trade from colonial and other intercontinental markets.[24] The fast and successful introduction of new consumer goods into the diets and households of European consumers is probably one of the better indicators for the increasing efficiency of marketing within the continent. Historians of consumption have stressed the importance of lure of addictive beverages, such as cacao, coffee and tea, but also sugar for increasing economic incentives and altering diets and social behaviour. In 1725 barely one in five lower class house households in Paris had special pots and utensils for the preparation of tea or coffee. By 1785 almost half of the households counted on such items and were presumably consuming these beverages regularly.[25] Chinese porcelain and Indian textiles mutated from

23 Miguel Capella Martínez and Antonio Matilla Tascon, *Los Cinco Gremios Mayores De Madrid. Estudio Crítico-Histórico* (Madrid: Cámara Oficial de Comercio e Industria, 1957).
24 J.D. Tracy, ed., *The Rise of the Merchant Empires. Long-Distance Trade in the Early Modern World, 1350-1750* (Cambridge: 1990).
25 Cissie Fairchilds, "The Production and Marketing of Populuxe Goods in Eighteenth-Century Paris," in *Consumption and the World of Goods*, ed. John Brewer and Roy Porter (London and New York: Routledge, 1993).

exquisite goods available only to the upper classes to everyday utensils of increasingly fashion conscious middle and lower income groups.

And yet, the first important step in the creation of these entirely new patterns of consumption was that an increasing variety of goods had to be marketed across ever larger sections of European society. Remarkably, the distribution networks of those new products within European territories were rarely subject to any corporate control. In the most integrated internal markets of Europe, notably England, supply networks for rapidly changing fashion goods probably developed first. But many of the new products were quickly successful all over Europe and penetrated rural as well as urban markets and all social classes. This shows that the efficiency of wholesale distribution was more complex than relatively straight-forward price convergence or synchronization. It increasingly involved meeting more discerning consumer demands that asked for variety at low prices.

The driving force of the slowly increasing efficiency of marketing in Europe before the 1760s were probably at least in part improvements in transport services discussed above. However, in many sectors transport did not account for a very large share of total transaction costs before the later 19th century.[26] This suggests that much of the improvements in the early and mid-18th century had to result from economies made in other, very diverse services associated with wholesale distribution. Amongst these were better market information as provided by commercial publications such as price lists, financial innovations and most importantly agglomeration benefits derived from the larger commercial centres. Here know-how travelled fast, young merchants could be learn their trade from experienced peers, consumer

26 David S. Jacks, "Intra- and International Commodity Market Integration in the Atlantic Economy, 1800-1913," *Explorations in Economic History* 42 (2005)., p.401.

preferences revealed themselves more clearly, market news from all over Europe and beyond arrived regularly.

1763-1815

Finance

After 1763 and continuing through the Napoleonic Wars ending in 1815, commercial interest rates in all three centers of financial capitalism (Amsterdam, London, and Paris) began to rise and become more volatile. The increased presence of the English East India Company in competition with the Dutch and other minor companies trading from Europe to the East Indies, created uncertainties for the future patterns of distribution within Europe. Further, the increased pressure of state expenditures to consolidate the gains of the Prussians and British and to recoup the losses sustained by France and Spain after the war ended began to impinge upon the network of commercial credit. The pressure of European state finances upon European commercial payment networks continued to intensify through the succeeding wars of American Independence (1776-1783), the Fourth Anglo-Dutch War (1780-1784), the French Revolutionary Wars (1792-1802), and the Napoleonic Wars (1803-1815). The main effect of the wars on the financial systems of Europe, however, was to demonstrate the surprising usefulness of the capital market for British government debt. In each war, Britain's national debt continued to expand and helped to finance the successful outcome for Britain in each war up to the American War for Independence. Isaac de Pinto (1771) attributed Britain's success precisely to the useful role that Amsterdam's stockjobbers played in providing a liquid market for the new issues of British government debt that each war required. Increasing tensions between the Dutch and the British, however, cut off that symbiosis by the end of the American War, which culminated in the Fourth Anglo-Dutch War of 1780-1784.

The ultimate cause of British defeat in the American war from the perspective of war finance was the breakdown in the credit system of multilateral payments by bills of exchange that was the basis of British war finance through 1763. When Britain had to pay its mercenary troops in a country that refused to import British consumer goods and whose merchants saw little use for bills of exchange drawn on London, it had to export silver instead of consumer goods to the theater of war. Previously, when Britain hired mercenary troops on the Continent or granted subsidies to allied armies, the Bank of England provided bills of exchange to the quartermasters based in Amsterdam or Hamburg to supply the needs of those armies. Local merchants then redeemed the bills by using them to pay for imports of British manufactured goods and re-exports of goods from British colonies. In the case of the American war, British troops had to be paid with silver which otherwise would have supplied the East India Company's needs for settling its deficits with the East Indies.

When the French Revolutionary Wars broke out in 1793, the traditional techniques of British war finance worked well at first, leading to a huge increase in exports of cotton textiles, financed as before through Amsterdam and Hamburg. With the eventual success of French armies conquering Holland in 1795 and then defeating Prussia in 1806, these mercantile circuits of trade and, especially finance, were cut off from Britain. The Jefferson Embargo on the imports of British goods starting in 1808 reinforced the effects of Napoleon's Continental Blockade on the traditional means of British war finance, not to mention on its leading export sector, cotton textiles. Ultimately, the British system of finance had to be re-organized in order to continue to support a huge naval force continually at sea and a large army under the command of Wellington on land.

The accumulated strains upon the French public finances following the conclusion of the American War of Independence caused the entire monetary and financial structure of the country to collapse as the French revolution of 1789 unfolded. In sequence over the next four years from 1789 to 1794: 1) free banking was allowed to emerge as the previous system of privileges and tax exemptions was abolished; 2) price controls and restrictions on banking practices were then imposed as the revolutionary governments attempted to legitimize their regimes in place of the deposed monarchy; and, 3) finally, the issuance of *assignats* ran well beyond either the value of the church and *emigré* lands put up for sale as backing for them or the value of the stock of circulating specie in France that they had displaced. The hyperinflation that followed destroyed once again the private credit structure of France just as had the inflation during the Law episode in 1720. It also destroyed the credit of the state with no legitimate government in sight to reestablish political credibility á la Louis XV in 1723. Consequently, the Directory tried to implant in France the financial and monetary practices that had proved successful in England and the Netherlands. (Bordo and White, Hoffman et al.,Sargent & Velde, White (1995))

First, the debt was defaulted to the extent of two-thirds, to assure creditors that interest could be paid on at least the remaining one-third. Then a major currency reform was undertaken, replacing the now thoroughly discredited *livre tournois* with a new unit of account, the *franc germinal*, defined like the Dutch guilder in terms of both gold and silver with a fixed mint ratio. Finally, a public bank was established in 1801, the *Banque de France*. While it was required to maintain the value of the *franc germinal*, the *Banque* was also expected to help the government avoid fresh deficits by improving the efficiency of its payments system. In the event, French public finances maintained their solidity by virtue of Napoleon's military victories. The satellite kingdoms, subjected to the new tax regime of the French revolutionaries and required to accept

the *franc germinal* at fixed prices for military supplies, were able to support the continued war effort of France in a throwback to Roman style war finance. Chief among the satellite kingdoms was Holland.

The gratitude of the Dutch Patriots who had welcomed the entry of French troops into Amsterdam in 1795 had to be expressed financially to be meaningful to the French government. The specie reserves of the Exchange Bank of Amsterdam had been completely withdrawn by the time the French troops entered Amsterdam to avoid seizure by the French occupation troops. Repeated payments to support the French forces forced the Batavian Republic and then the Kingdom of Holland to create more and more annuities, now issued by the national government. In 1814, the Kingdom of the Netherlands consolidated them into 2½ percent perpetual annuities, modeled on the successful British example. Amounting to over four times the national income of the kingdom, however, only a small part of the annuities, the activated portion, could actually be paid by the government in any year.

The British reorganized its war finance in steps. First, the government increased greatly the annual tribute (reimbursement) levied upon the East India Company from sporadic levies to compensate the Royal Navy escorts to £10 million annually. Second, as French monetary reforms threatened to encourage a speculative return of funds to France at the end of 1796, the Bank of England was allowed to suspend convertibility of its banknotes into specie. The resulting “paper pound” lasted from February 1797 to May 1821, when the gold standard was formally resumed. Third, the government of William Pitt moved to competitive bidding among underwriting syndicates for placement of new issues of Three Percent Consols, with interest payments guaranteed against the increased revenues of the income tax. The income tax allowed the government to tap into the profits of European merchants now directing all their affairs from

London rather than dividing them among London, Paris, Amsterdam, and Hamburg. The existing liquid market for British debt allowed huge sums to be raised on the capital markets. (Neal, 1990, 1991)

As most of the money raised for war finance was used after 1803 for paying and supplying British forces directly, rather than laying out subsidies to Continental allies or hiring mercenary armies from Germany, domestic expenditures rose greatly. Entrepreneurs from all over Europe flocked to Britain to take advantage, either with direct or portfolio investment, of the profit opportunities that emerged in textiles, iron and steel, dockyards, waterworks, gas works, and agriculture. (Neal, 1990 & 1991) The flight to quality by the mercantile classes of French-occupied Europe, certain to be taxed heavily and dispossessed of privilege by Napoleon's forces, alit in large part in Great Britain. The result was to make London the new financial capital of Europe, displacing Amsterdam permanently.

Shipping

The wars that plagued Europe for many of the years between 1764 and 1815 and which involved large areas of the continent at various times no doubt disrupted transportation on land as well on rivers, canals, and the seas. The ever larger armies involved in those wars could only take the field and carry on extensive campaigns, in some cases travelling hundreds of kilometres, because of the long term improvements in transportation. The better logistics that allowed Napoleon to sustain almost annual French imperial military adventures grew out of the better roads and canals. The ability of Britain to undermine enemy efforts to dominate Europe depended on improvements in shipping which supplied troops overseas and brought in much needed tax revenue to sustain the military and naval effort.

The wars promoted investment in transportation. Napoleon's efforts to prohibit British trade on the Continent and British naval harassment of enemy shipping redirected exchange and increased the returns to inland commerce. Despite the actions of governments and despite the wars not just in western but also in central and eastern Europe many of the trends in transportation common to the years up to 1763 continued. The merchant marine grew in size with Norway-Denmark and Sweden starting to make a significant contribution to total European tonnage. They also were able to post productivity figures in the range of the best practice elsewhere. The construction of canals by no means stopped during the wars. Prussian policies to improve transportation in the western portions of the kingdom led to the connection of coal fields in the Ruhr to the Rhine river system.

After a lull in the 1770s there was a wave of new canal building in England in the 1790s. English skills in canal building drew the interest of continental states and in 1810 Sweden undertook, under the guidance of an English engineer, the construction of a waterway to span the country from the Baltic to the North Sea. In that case, as in earlier ones, strategic considerations were more important than engineering or commercial ones. The trends in the construction of roads and the rising productivity of land transport carried on through and after the end of the Napoleonic Wars. Using animal and wind power Europeans proved capable of generating significant gains in transportation efficiency into the 1830s. At that point though a new technology appeared which, by 1870, had transformed each sector of shipping services one after the other beyond recognition.

The steam engine James Watt developed and improved through the 1760s and 1770s had potential to supply motive energy. Transportation over land was the first to feel the effect of steam power. As early as 1801 an English engineer took a steam carriage from his home in

Cornwall to London. Reliability and the weight of the steam powered vehicle were problems solved by improvements in the machining of parts and in metallurgy. Heavier rails made it possible to use steam engines to haul coal out of mines and further technical improvements which allowed more of the energy to be transferred to the driving wheels made it possible for such engines to venture further from their principal source of fuel.

Distribution

From a point of view of the wholesale distribution of any good the continent wide military turmoil of the Napoleonic campaigns had to be a disaster. Military activity and occupations, naval blockades, general insecurity and the dislocation of local economies caused by the absence of able bodied labourers drafted into service and the presence of large armies that had to be fed all conspired to destroy existing marketing networks. Extremely volatile prices for staple foodstuffs and other goods alike were the consequence.[27] The dislocation was felt more in the 'new' goods with their dependence on intercontinental trades, which were severely affected. At least a partial setback in their distribution networks was the consequence. Even in England real earnings were subject to strong fluctuations during this period presumably limiting the market for non-essentials.[28] The existing supply lines established previously by regulated and joint stock commercial companies were largely interrupted. North, Central and South American Independence had transformed colonial trades into open supply chains. Consumer driven market development was seriously curtailed by the hardships endured by large parts of the European population during the Napoleonic Wars.

27 Kevin H O'Rourke, "The Worldwide Economic Impact of the Revolutionary and Napoleonic Wars," *CEPR Discussion Paper* 5079 (2005).
28 C.H. Feinstein, "Pessimism Perpetuated: Real Wages and the Standard of Living During the Industrial Revolution: A New Look," *Journal of Economic History* 58 (1998).

At the same time, the organisational structure of marketing networks had been radically transformed since the early 18th century. Where once regional fairs and local markets had linked wholesale and retail trades, beginning in England the travelling salesman became the agent of integration in the 18th century. Specialist factors represented increasingly large firms across the country, which were creating their own distribution systems. By the 1770s, even smaller English manufacturers from Birmingham or Sheffield cut out intermediaries by sending elaborate patterns and prices lists directly to retailers. The creation of the large industrial firm changed not only production but also the way in which marketing was organised.[29]

1815-1870

Finance

The dramatic success of British finance by the end of the Napoleonic Wars led other European states to imitate, as best they could given their diverse political structures, the key elements as seen by foreign observers. It was easy to set up public banks on the model of either the Bank of England or the Banque de France because their usefulness to the existing political authority in a country was obvious. It was harder to set up a credible national debt in the form of 3% Consols – a perpetual annuity required a perpetual source of tax revenue to service it and that required a permanent legislative authority, a parliament. Gradually, however, imitations were spawned – *rentes* in France funded by the taxes voted by Parlement, *renten* in the Kingdom of the Netherlands, and even perpetual annuities maintained as book entries in the Kingdom of Naples but marketed in Paris and Vienna by the Rothschild brothers. The House of Rothschild, a

29 M. J. Daunton, *Progress and Poverty : An Economic and Social History of Britain, 1700-1850* (Oxford, England New York: Oxford University Press, 1995)., p.231.

multinational family investment bank, indeed, proved to be the chief organization responsible for diffusing the basic elements of British finance to the rest of Europe.

The Rothschilds identified three elements necessary to sustain modern state finance. First was a credible commitment by the government to raise taxes earmarked for the payment of interest and eventual redemption of the government's outstanding debt. Second, was a credible public bank to maintain the monetary value of the government's unit of account for foreign investors (the main clientele for the Rothschild's multinational family partnership). Third, just to make sure the public bank did not shirk its duty by letting the mints debase their coinage or allow foreign coins to circulate freely, the Rothschilds also insisted on control of a country's mints, either directly or by monopolizing their supply of bullion. The success of their financial schemes became evident to investors and governments throughout Europe. For example, of all the foreign loans raised on the London capital market in the decade following 1815, only the loans underwritten by the Rothschilds continued to be serviced regularly.

The success of British finance, however, was not so obvious to the British authorities in 1815. Immediately, the income tax was repealed, the Bank of England was forced to resume convertibility of its bank notes in gold at the previous rate, and the East India Company had to accept the end of its monopoly on trade with the East Indies. Moreover, the massive increase in country bank notes that had arisen during the war was ended, given that these notes could no longer be redeemed in Bank of England notes. These were being withdrawn by the Bank to increase its gold reserves before resuming convertibility of its notes. The financial panic of 1825 that eventually resulted, however, was quickly resolved but with major changes in legislation that laid the basis for future developments in British finance. These were: 1) the beginnings of joint stock banking, 2) the establishment of Bank of England branches, 3) the cessation of re-

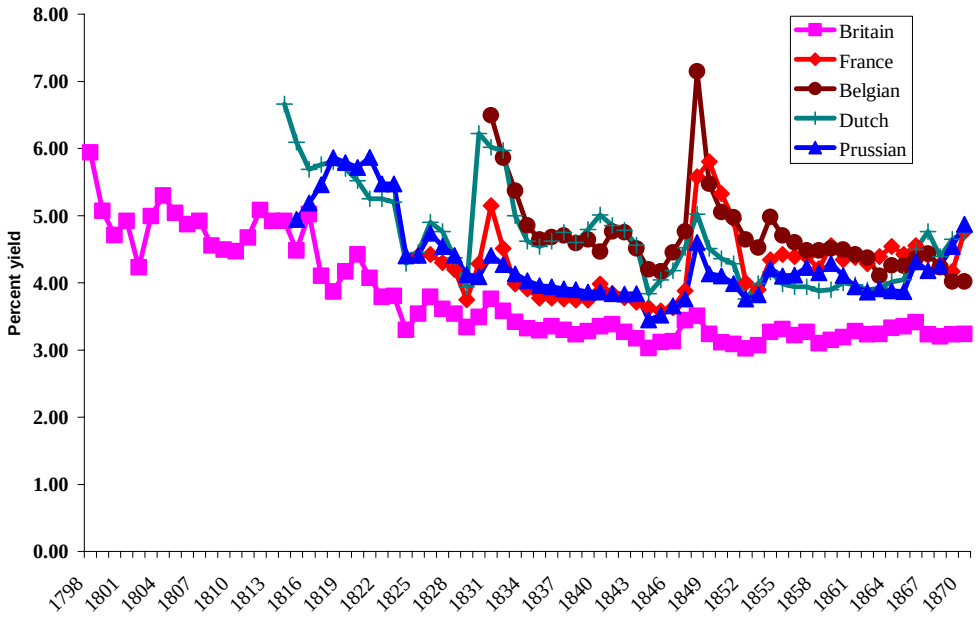
discounting of inland bills of exchange by the London private banks, and 4) the assumption of some central banking functions by the Bank of England. The combination of these four factors allowed the rise of the most distinctive feature of the British financial system in the later nineteenth century, the inland bill of exchange market, which was the focus of W. T. C. King's classic account (1936).

The rise of the inland bill of exchange market in London meant that the previous means of financing foreign trade with a four-party bill of exchange could now be modernized as well. Instead of paying immediately in local currency for a foreign bill of exchange to pay a foreign supplier in his currency, an importer could now ask his bank to arrange accommodation finance with the bank of the exporter. In the eighteenth century, an exporter in Amsterdam would have had to wait for his importer in London to draw a bill, then wait for the bill to be remitted to him, when he could then present it to the foreign payer on whom it was drawn in order to get his acceptance of the obligation to redeem the bill in local currency at the agreed date. Only then did the exporter in Amsterdam have a negotiable instrument suitable as a means of payment to his local creditors. Under acceptance house practices in the nineteenth century, however, the Amsterdam exporter could get immediate payment from his bank upon showing the order from the importer in London. The bank in Amsterdam then ordered the importer's discount house in London to pay it the sum it had promised the exporter. The London house, in turn, would charge the London importer the amount, plus its service fee, but in British currency kept on account.

The vast increases in trade, both domestic and foreign, enabled by the new payments system installed in London especially benefited exporters based there, as they could assure themselves of payment most readily. The response by importers, however, was not so positive. Tariffs were raised everywhere, even in Britain with the reimposition of Corn Laws that kept out

the cheaper wheat now available again from continental Europe. Tariffs raised by the new customs union of the United States (the Tariff of Abominations in 1828) created a model for the German Zollverein of 1834, which protected agriculture and industry within the German Confederation from British and French competition while eliminating internal barriers to trade among the German states.

Figure 2. Government Bond Interest Rates, 1789-1870.



Source: Homer & Sylla, History of Interest Rates, 3rd ed., 1991.

The attempts of continental countries to follow the example of Britain in creating a stable market for their long-term government debt were valiant, but undermined by recurring political uncertainties – repeated regime changes in France, the breakup of the Kingdom of the Netherlands with the creation of Belgium in 1830, and the continued expansion of Prussia after the revolution of 1848. Not until the universal adoption of the gold standard by the European followers after 1870 could any of the European continental countries claim to have emulated the

British lead in finance, whatever may have been their accomplishments in agriculture or industry.

Shipping

After the conclusion of the Napoleonic Wars in 1815, the revolutionary application of steam power to engines was applied to shipping, first on land, then on rivers, and finally to ocean vessels. In 1825 in northern England a railroad of more than 38 kilometres went into operation, all the earlier ones being in mines or very short. By 1829 railroads capable of speeds of almost 60 kilometres an hour could serve as effective people carriers to go with the typical original function as vehicles for moving coal. Railroads could promote the construction of canal extensions to link with the new lines. In England in 1830 there were about 100 kilometres of railways opened to traffic. By 1846 the figure was over 1500. The following year construction soared and by 1860 there were more than 15,000 kilometres ready for use. The building of point-to-point lines led to the emergence of a railroad network with ever more places accessible. The range of goods carried expanded along with the geographic reach. The construction of right-of-way, the rails and the rolling stock including engines all represented a considerable capital investment. English railroad builders insisted on minimal gradients and so costs of construction were high and represented a much more sizeable sunk cost than had canals. (Deane and Cole) The advantages of rail transport and the sizeable capital investment led governments on the Continent to subsidize construction, something strongly urged by the German economist Friedrich List. The first French rail line opened in 1828 and starting in 1835 there was regular rail service in Belgium. Lines in various German states followed and Russia got its first public railway in 1836. In western and central Europe though more slowly in eastern Europe the connection of various lines created networks with standard track and interchangeable rolling

stock. A whole range of new goods invaded unfamiliar markets as the rails reached more parts of Europe. (Figures 3a, b, and c.)

As early as 1790 innovators had shown that the new improved steam engine could power a boat. The first commercially viable use of steam power on water came in ports and on rivers and canals. Steam powered tug boats made it possible for sailing ships to enter and leave port without having to wait for favourable winds and tides. That offered potentially sharp reductions

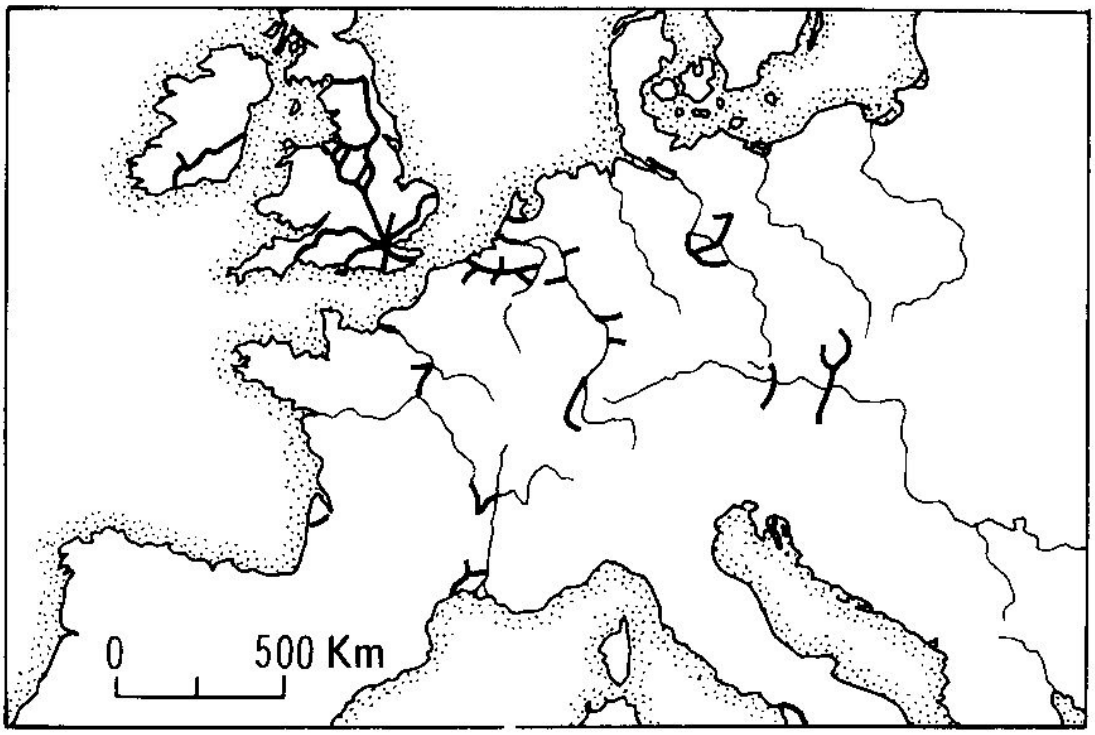


Figure 3a. Railways in Europe, 1840. (from Pounds, p. 433)

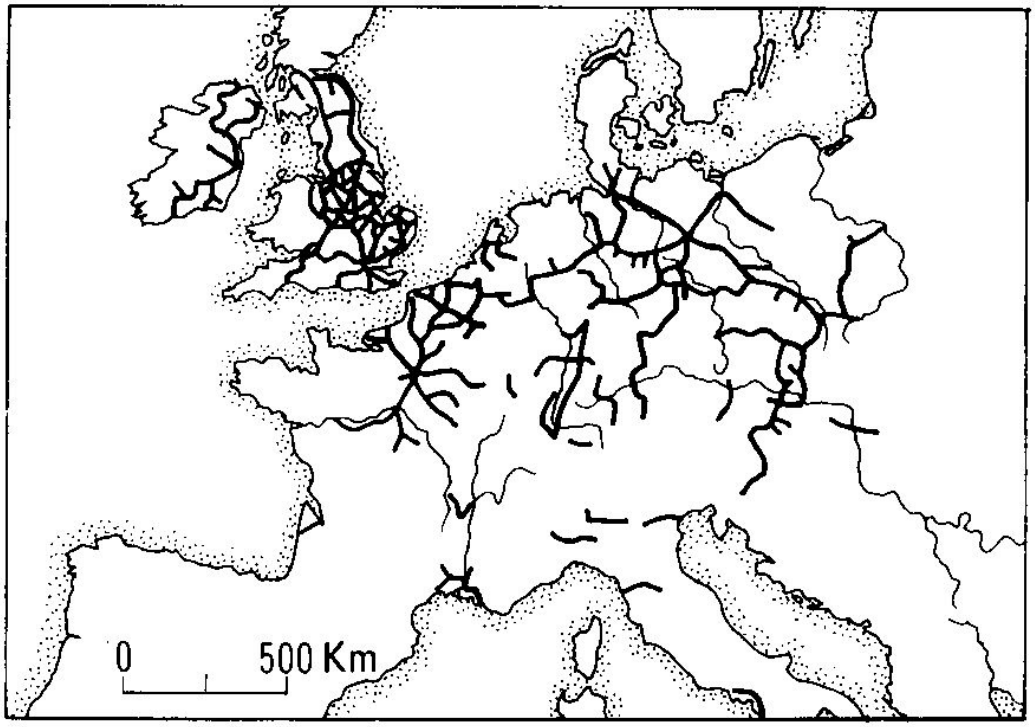
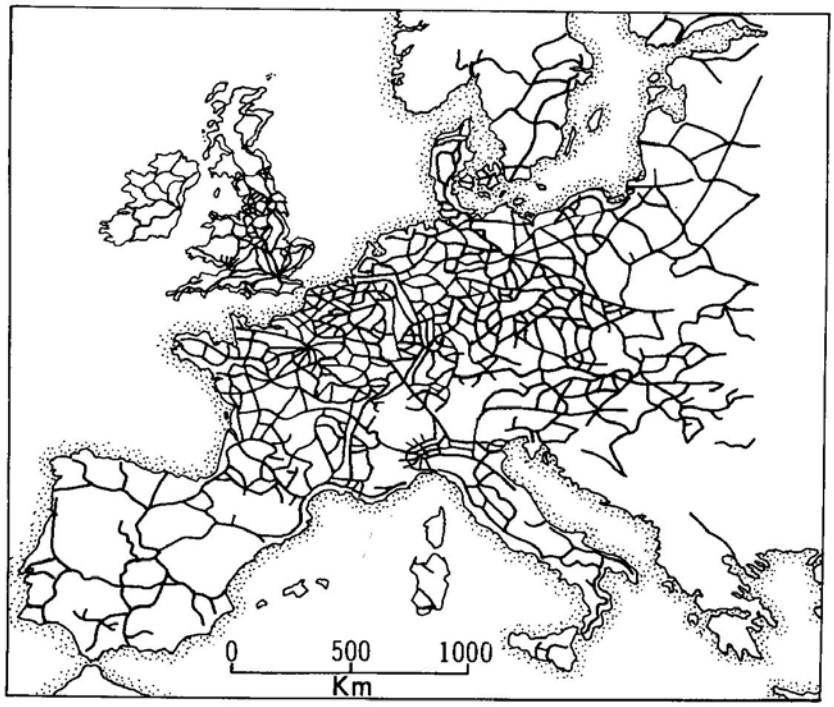


Figure 3b. Railways in Europe, 1850. (from Pounds, p. 433)



11.63. Railway development in Europe, 1880

Figure 3c. Railways in Europe, 1880. (from Pounds, p. 434)

in turnaround time, making those sea going ships even more productive. Steamboats were especially valuable as ferries and for short hauls on protected waters. They could go upstream against the current and consistently unlike the sailboats that preceded them. More frequent trips within a year and smaller and lighter engines made it possible for river boats to reach the highest rates of productivity increase in any part of the shipping sector in the nineteenth century.[30] The biggest problem for river boats and for all steam powered vehicles was the voracious appetites the engines had for fuel. The introduction of the tube boiler after 1835 and improvements in the pressure of steam engines, reaching 25 times their early nineteenth century levels by 1870, sharply reduced those fuel needs. So too did the development of the compound engine which reused steam in a second cylinder. That was first tried in 1825 and by 1870 triple and even quadruple compound engines were tried on sea going ships. Screw propellers were proven to be more effective by the 1840s. The greater efficiency of steam engines led to their increasing use on board ship up to 1870. In coastal and short distance trades they offered the possibility of service which could more or less keep to a regular schedule. Steam displaced sail on short hauls but not until the 1850s and 1860s and it was only after 1870s that sailing ships lost out to steam in long distance ocean trade.[31]

The slow success of steam at sea was in part the result of continued and simultaneous improvements in the efficiency of sailing ships, possible because of further technical advances in

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[30] James Mak and Gary M. Walton, ASteamboats and the Great Productivity Surge in River Transportation,@ *The Journal of Economic History*, 32, 3 (Sep., 1972), 623-629.

[31] C. Knick Harley, AThe shift from sailing ships to steamships, 1850-1890: a study in technological change and its diffusion,@ in Donald N. McClosky, ed., *Essays on a Mature Economy: Britain after 1840*, Princeton: Princeton University Press, 1971, 216.

light of the competition from steam and the effective use of steam to aid sailing ships.[32] Shipbuilders increased the use of iron first in supporting beams and then in hull planking. They also built some vessels for speed, culminating in clipper ships that could manage 22 knots under favourable conditions. They also developed four- and five-masted barks and schooners that piled on masses of canvas, were long and narrow as well as large compared to their predecessors but which used fore-and-aft sails so kept crew size under control. Travel times fell because sailing ships were faster and they did not have to wait to get in and out of port. Best practice could generate ratios of 30 tons per man or better in the shipping of a country, some three times that of the years around 1700. The growing efficiency of sailing vessels meant their numbers and tonnage grew. As late as 1860 steamboats made up less than 10% of the tonnage of the United Kingdom merchant marine.

The shift to steam began after 1870 so that by 1883 the share of steam ships was over 50%. The future was clear. Steam as a motive force transformed European transportation in the years from 1815 to 1870. Not only did its implementation on land and on water lower transport costs but that also opened many places in Europe and beyond to trade and exchange. Steamboats and steam locomotives contributed to the reorientation of trading patterns within and beyond Europe. Steam, however, appeared in the context of an already growing and improving and expanding shipping sector, subject to greater efficiencies generated by economies of scale, technological improvements, and better organization. The adoption and adaptation of steam to use in shipping is an indication of the advances already well under way in the sector in the years

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[32] C. Knick Harley, AOcean Freight Rates and Productivity, 1740-1914: The Primacy of Mechanical Invention Reaffirmed,@ *Journal of Economic History*, 48, 4 (1988), 861

Rosenberg, Nathan, "Factors Affecting the Diffusion of Technology," *Explorations in Economic History*, X, 1(Fall), 1972: ?-??.

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from 1700 through 1815. The sustained expansion of shipping, despite every greater efficiencies, meant rising overall employment in part because the sector itself grew so rapidly and in part because of the greater demand created by investment in infrastructure and equipment and by the greater production made possible by falling transport costs.

Distribution

After 1815 trends towards more integrated wholesale markets resumed but again the European experience remained divided. Jacks, using grain price data, argues that three patterns could be observed across European countries.[33] The first one is epitomised by Great Britain, where after the dust of war had settled, both intra-national and international integration improved markedly. The second could be represented by the Austro-Hungarian Empire, which experienced over the period 1815-1870 a process of improved internal distribution networks when we look at grain price behaviour as a measure. At the same time, the empire apparently was less well connected to the remaining European economies. And finally, Spain exemplified a European economy that became neither internally nor externally particularly integrated.

The determinants of such different paths were complex. Certainly technological improvements such as canals and railways impacted differently in the various European economies. Notably in parts of southern Europe canals never played a role and railways arrived late, and when they did the social savings they provided were probably relatively small.[34] Persistent political instability in countries such as Spain, which had three civil wars between the 1830s and 70s arising from inter-regional conflicts, were both a sign of poor political integration and a source of reinforced inter-regional market differentiation. International trade policy,

33 Jacks, "Intra- and International Commodity Market Integration."
34 Alfonso Herranz-Loncan, "Infrastructure Investment and Spanish Economic Growth, 1850-1935," *Explorations in Economic History* 44, no. 3 (2007).

discussed in more detail in chapter XX, probably accounted for some of the difference in integration across borders.

At the same time, after the 1820s trade barriers were – in different degrees of magnitude - reduced through the creation of customs unions, monetary unions, unified systems of taxation, most notably in the eventual creation of the two late nation states, Italy and Germany. The notable exception to this trend was surprisingly Britain, which introduced high tariffs on the grain trade in the aftermath of war. We lack systematic data on the impact of the unification of weights, measures and legal systems on trade volumes in the wake of the French conquest of much of continental Europe. Nor can we assess easily the outcome of widespread taxation reforms within European states as a response to the French assault, which proved that the jurisdictionally fragmented systems prevailing in much of late 18th century Europe was unfit for raising war finance.[35] Prussian and Austro-Hungarian reforms responded early in the 19th century while in Spain conflicts over regional customs and tax privileges led to civil war as late as 1872, which continued to disrupt internal marketing networks.

The size of the impact of politically devised customs unions after the 1830s is subject to some debate. The traditional emphasis on the German Zollverein or the Austro-Hungarian Customs union as instrumental in integrating internal markets has been challenged by recent research which claims that their effects on integrating European commodity markets were limited.[36] This would support the view that improvements in transport technology and financial services were more important in this period in lowering transaction costs than they had been in the 18th century. However, the divergent experience of countries such as Spain would suggest

35 Mark Dincecco, "A Quantitative Analysis of Fiscal Fragmentation and Centralization in Europe, 1700-1871," (Lucca: Lucca Institute for Advanced Studies, 2006).
36 John Komlos, *The Habsburg Monarchy as a Customs Union* (Princeton: Princeton University Press, 1983). and Carol Shiue, "From Political Fragmentation Towards Customs Union: Border Effects of the German Zollverein, 1815-1855," *European Review of Economic History* (2004). Shiue and Keller 2007

that such improvements in the absence of a more integrated institutional framework could not advance marketing networks on their own.

Around the middle of the 19th century a number of organisational and technological changes occurred that changed the transparency of European and global commodities markets substantially. Price lists and commercial papers had existed since the late 17th century. One of the most influential ones, Lloyd's List, had published ship-lists, prices and insurance quotes at least twice a week since 1734 but from 1837 onwards it appeared at least 6 days a week. Based on information from Lloyd's, Kaukiainen (2001) has estimated that the flow of flow of commercial information in Europe improved dramatically after the 1820s. The time it took a dispatch to reach London from the Baltic or the ports of the North Sea, France or the Iberian Peninsula had halved by the 1840s. By the 1870 those times were down to one-fifth of their 1820 values.[37]

37 Yrjo Kaukiainen, "Shrinking the World: Improvements in the Speed of Information Transmission, C.1820-1870," *European Review of Economic History* 5, no. 1 (2001), p.5.

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