

Business Cycles, 1700-1870

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Abstract

We review the salient features of European business cycles between c. 1700 and c. 1870. We begin by discussing the primary cause-and-effect relationships that characterized early modern cycles, and we offer empirical evidence concerning specific episodes. We then describe the changing nature of the cycle following the development of the financial sector – including fractional reserve banking – and the spread of industrialization. We review European cycles on a country-by-country basis to 1870, and we conclude with an evaluation of the time series properties of business cycles before 1870.

Business Cycles, 1700-1870

Introduction

In Western civilization, the periodic deviations from long-run trends in real economic activity, which we have come to know as business cycles, can be identified at least as far back as the sixteenth century.¹ The causes and consequences of these cycles have changed over time, and cycles before 1700 may have differed in effect, periodicity, and possibly magnitude from those after 1870; however, the most salient difference was in their causes. The literature the early cycles tends to associate them with **technological change**, **demographic shocks**, **specie flows**, **disruptions in trade**, **agricultural crises** (typically associated with climactic shocks), and/or **war**. In contrast, by 1870, the disruptions in **financial markets** and the **manufacturing sector** are usually the suspects responsible for swings in cyclical activity, though modern business cycle theory still links technological change with cyclical activity.

Scholarly study of the business cycle dates at least from Adam Smith, who discussed the causes of cycles by contrasting the fluctuations in the textile and corn markets, as well as the potential role of monetary shocks via specie flows (1966 [1776], Book 1: 66-75 and 35-55, respectively). By the late nineteenth and early twentieth centuries it had become common in scholarly circles to emphasize the length and supposed regularity of various economic cycles. Thus, Joseph Schumpeter (1939: 162-165) could organize cyclical behavior into five broad categories: Seasonal cycles that, driven as they were by the rhythms of the agricultural sector, typically ran their course in a calendar year. Kitchin cycles lasting three to five years were reflected,

¹ In major trading centers, such as Venice, cycles went back centuries (Lane and Mueller 1985), and they were not limited to the West (Chaudhuri 1985).

supposedly, in the behavior of financial indicators (for example, bank clearings and interest rates) and wholesale prices. Juglar cycles of ten years or so marked more fundamental changes in financial markets as well as demographic indicators. Kuznets cycles of roughly twenty years followed structural changes in key technologies, leading industries, and, especially, long swings in construction activity; and finally there were Kondratieff cycles, which were as long as fifty or sixty years and which represented historic shifts in the economy, such as the Industrial Revolution.

Although Schumpeter's approach can be found in European macroeconomic histories as recently as the 1980s (see, for example, Trebilcock 1981), subsequent studies, particularly those found in the economics literature, downplay or reject outright the systematic nature of those earlier categories, focusing instead on the statistical properties of key macroeconomic time series--including, real GDP and its components, price indices, trade data, and interest rates--or the causes and consequences of specific cyclical episodes. Tellingly, recent summaries of business cycle research neither mention nor cite Schumpeter's taxonomy (Basu and Taylor 1999; DeLong 1999; Long and Plosser 1983; Mankiew 1989; Plosser 1989; Romer 1999; and Zarnowitz 1999, to cite just a few). The primary objection to the earlier approach is its low predictive power. Indeed, the recent literature rejects the notion that there exists *a* business cycle outside of the historical context in which the cyclical activity occurs. In analyzing cross-country cycles covering roughly 130 years, Basu and Taylor observe, 'The interpretation of these results is not straightforward, since over such a long time span the structure of the economy has probably changed' (1999: 50-51). Similarly, Romer notes that 'Only by establishing how economic fluctuations have changed can we know the phenomena to be explained' (1999: 24). Following

the admonitions of this literature then, we focus on the changes in both economic structure and the causes of economic fluctuations between c. 1700 and c. 1870.

Today, macroeconomic data are universally organized along the lines of nation states. Key business cycle indicators--e.g. gross domestic product, major price indices, and unemployment rates--track national economic activity. Thus the rise of the business cycle as a notion of intellectual interest coincided with the rise of the nation state. Not coincidentally did Smith inquire about cyclical activity in his broader *Inquiry into the Nature and Causes of the Wealth of Nations*. Although, as we argue below, aggregate cyclical activity is tied to geographically specific markets, a decidedly micro notion, by the late-eighteenth century, the integration of the European economy was extensive enough that large cyclical shocks in specific markets in specific areas had ramifications for economic activity in other areas, often without regard to national boundaries; thus there emerged something like a pan-European cycle. In what follows, we document how this came about.

Cycles Before 1800²

Modern business cycle theorists emphasize the role of **technological change** as a key causal factor in so-called ‘real business cycles’ (McCallum 1989; Plosser 1989). In these models the cumulative (and thus aggregate) impact of a number of ‘micro’ technological changes, increases labor productivity and, via the labor-leisure tradeoff, leads to increased hours worked and output and thus an upturn in real economic activity. In this respect Jan de Vries’ (1994) notion of an ‘industrious revolution’ before the Industrial Revolution, as well as Joel Mokyr’s (1990, 1993)

² The dating here is admittedly arbitrary. Some scholars, notably Hoppit (1986), put the break earlier, around 1770. The work of Neal (1994) and Quinn (2004) suggests a slightly later break, around the early 1790s. We are not dogmatic about this.

characterization of technological creativity as the foundation of the Industrial Revolution itself, are not inconsistent with specific institutional or technological changes in specific geographical areas that could generate an upturn in the local business cycle through, for example productivity shocks. Through other factors, such as migration (see below), these shocks impacted other regions and countries.

Conversely, in some versions of modern business-cycle theory, layoffs are possible, as firms that experience technological change and positive productivity shocks do not increase output proportionally and thus might reduce hours and employment (Francis and Ramey 2005).³ A similar process appears to have been at work as Europe's agricultural sector modernized and increased productivity as employment declined. Of course, with such sweeping changes as characterized by expressions like 'Industrial Revolution' or 'Agricultural Revolution,' one must be careful 'to distinguish between growth and cycles' (Craig and Fisher 2000: 114). Indeed, broad institutional and technological changes are more likely to impact trends in growth than cycles. Although recent macroeconomic histories do not find substantial discontinuities in the long-run trend rate of growth until well into the nineteenth century, Mokyr himself notes, 'There is typically a long lag between the occurrence of changes in technology, even those of fundamental importance, and the time they start affecting aggregate statistics' (Mokyr 1993: 10). Thus, if nothing else the Industrial Revolution probably made modern business cycles possible.

Early business cycle theorists often interpreted **demographic change** as a major indicator of cyclical activity (for example, Juglar 1889 [1860]). Births, deaths, and net migration could all

³ Smets and Wouters (2007) obtain essentially the same result employing a different model with different assumptions.

reflect, as well as influence, aggregate economic activity. While an increase in the birth rate relative to the death rate could impact aggregate demand and aggregate supply in both the short run and the long run, quantitatively these impacts were small relative to the potential impact of a mortality crisis. In standard portrayals of the demographic transition, although pre-modern birth rates fluctuated, these fluctuations were typically small compared to fluctuations in death rates, which resulted largely from infectious disease.

‘[S]hort-run movements of fertility in early modern Europe were primarily responses to disturbances of the demographic equilibrium brought about by the mortality crises; their function was the speedy restoration of “normality.” With mortality, on the other hand, short-run instability was endemic and at the mercy of exogenous forces’ (Flinn 1985: 47.)

Among these exogenous factors, plague proved to be the most effective and persistent killer. It also created an early-modern pan-European cycle: ‘Bubonic plague epidemics moved around Europe throughout most of the period ... there were few years when the disease was not attacking somewhere’ (Flinn 1985: 51). Plague tended to affect the economy in two ways. One was through disruption of the labor market. The lost production of the sick and the dead impacted real output, and the specter of famine could follow plague even in the absence of a harvest failure. The second was through the disruption of trade. Plague typically entered through port cities, and the subsequent damage to trade--through lost labor, ostracism and quarantine--could be quite sharp. After the crisis of the fourteenth century, however, plague outbreaks tended to be more geographically localized affairs often moving from port to port. Still these episodes could be particularly troublesome when they hit several ports in the same

country at once. Also, epidemics could affect aggregate economic activity when they coincided with harvest failures (see below). As for specific episodes of mortality induced cycles, outbreaks in southern Italy (1743) and Spain (1799-1800) appear to have been largely limited to urban areas. However, the combination of plague and agricultural problems further inland led to major economic downturns in Sweden and the Baltic region of the continent more generally (1709-1710) and France (1720-22). Both of these episodes were associated with economic downturns elsewhere in Europe--though cause and effect are difficult to disentangle.

As for migration, on the whole, even prior to the great trans-Atlantic migrations, European migration during the period was quite large. This internal migration tended to be seasonal, revolving as it did around a long-run, rural-to-urban trend. However, as Brinley Thomas (1973) observed, this migration both responded to and was caused by real cyclical activity. Although Thomas's empirical work focused on the nineteenth century, his theoretical arguments apply for earlier periods. Institutional or technological change, broadly defined, that increased economic activity in a specific region would lower production costs, increase output and wages, along with the demand for labor, and lead to in-migration. Conversely, regions not experiencing this change would lose capital and labor and experience a downturn in the cycle. Thus via migration, countercyclical shocks are spread to other regions, and these shocks could be exacerbated by war and harvest failures (see below). Foreman-Peck notes in a review of Thomas that this 'central theme translates well as a real business cycle' (2006: 2).

Up to the eighteenth century, much of the traditional narrative of early modern European growth emphasizes the economic effects of New World **specie flows**, which caused the 'price

revolution' (Hamilton 1934). One must be careful to disentangle the impact of specie flows on price levels from their effects on real economic activity. In its simplest form disentangling these influences involves differentiating between anticipated and unanticipated flows. To the extent that the flows were anticipated, both sides of the market could have adjusted their price expectations to offset the effects of any resulting economic shock--the most conspicuous of which would have been inflation. Based on the logic of the quantity theory of money, one should be skeptical of placing too much weight on the association of specie flows and the resulting inflation with either economic growth or even real activity of a cyclical nature (Craig and Fisher 2000).

That said, to the extent that the magnitude or fluctuations in these flows were not fully anticipated, they represented an early modern version of a monetary shock. The specie was after all money, and discoveries of precious metals represented an increase in the purchasing power of the discoverer and provided one of the primary motives for the establishment of European-based, worldwide trading empires. It is hard to imagine that all of the effort expended on seeking gold and silver from the four corners of earth was to merely test the neutrality of money. Those who traded in precious metal, and the crown which derived seignorage from its coinage, received an initial windfall, which only subsequently manifested itself as a European-wide inflation. That initial windfall, however, would result in some deviation from the long-run trend in real economic activity, or as Cipolla put it, the specie flows 'acted as a stimulus to even greater [cyclical] activity during the long periods of development' (1972: 45).

The propagation of these monetary shocks and the magnitude of their real impact remain a subject of dispute, but the presence of *some* real impact is generally accepted (see the survey in Fisher 1989). It is likely that this impact was not unlike unanticipated money in a modern monetarist framework--namely that the specie flows, while arguably neutral in the long run, had a real impact in the short run. Indeed, the expansion of trade resulting from the quest for specie may well have contributed both to economic growth--that is to an increase in the long-run trend rate of growth--and to deviations from that trend--that is to business cycles. If nothing else, the specie flows served as a metric for expanding trade, and this expansion was itself associated with real economic growth and increasing international integration, which in turn provided a vehicle for cross-country influences on growth rates, business cycles, and in the end inflation: In short, a pan-European cycle.

The creation and expansion of New World (as well as African and East Indies) **trade** networks offers another mechanism by which early cycles could begin and be propagated. The trading companies were largely private, though publicly-sanctioned, enterprises that continued for roughly four centuries. In this way, international trade can reasonably be said to have increased the trends in the long-run growth rates of European countries. Associated with this positive trend, however, were occasional temporary deviations in the rate at which trade expanded. The disruption in trade was often a function of other factors that also caused cycles. Military action or plague, for example, caused short-term deviations from long-run trends, and the quest for specie proved a persistent driver of trade. In addition to its links to other causal agents, the expansion of trade could generate cycles in another, more modern, means--specifically, through financial markets.

Reviews of specific episodes of financial crises during this period often emphasize events surrounding the so-called ‘South Sea Bubble.’ The British South Sea Company was chartered in 1711 and, in what was essentially a debt for equity swap, assumed some of the national debt in return for monopoly rights in the overseas trade (Neal 1990). Subsequently in France, John Law, the Scottish adventurer *cum* financier, founded the *Banque Generale* (later the *Banque Royale*) and the *Compagnie d’Occident* (later the *Compagnie des Indes*), and took over the mint and the collection of taxes. According to Velde (2003: 1):

‘The operation resulted in the conversion of the existing French public debt into a sort of government equity. Strictly speaking, a publicly traded company took over the collection of all taxes in France, ran the mints, monopolized all overseas trade and ran part of France’s colonies. This company offered to government creditors the possibility of swapping their bonds for its equity, making itself the government’s creditor... Thus, bondholders became holders of a claim to the stochastic stream of fiscal revenues [from trade].’

The ambitious fiscal, monetary, and financial plans surrounding these companies were ultimately based on their profitability as trading enterprises. The debt for equity swaps only made sense as long as the companies generated returns from their real overseas activities, and their affiliated financial institutions could credibly manage their liabilities. The latter depended on the former, and when either failed, the system would fail. As Neal notes, ‘the South Sea scheme came to an end’ when the Bank of England pressured the South Sea Company’s correspondent bank to redeem its notes in specie or Bank of England notes (1990: 106). Similarly, in France, ‘It was a

crucial aspect of Law's scheme that the share price remain high' (Velde 2003: 28). Aside from Law's short-run manipulations, the only way to assure that was the flow of profits from the company's trading activities. When those failed to materialize, the scheme collapsed in the summer of 1720. The damage, which spread to Amsterdam through credit markets, was by many accounts real enough, and the downturn was felt throughout the economies of France and Britain; thus the connection between trade and finance, albeit public finance, resulted in swings in (pan-European) real economic activity.

While institutional and technological change, mortality shocks, migration, unanticipated specie flows, and disruptions in international trade all impacted the early modern economy, prior to the nineteenth century, **agricultural shocks** were the most frequent and arguably the largest sources of cyclical downturns. In order to understand the importance of agricultural events in the early modern cycle, it is important to note that, in terms of national income accounting, the agricultural sector tended to dominate other sectors of the economy. Using Britain, a relatively early economic developer, as a benchmark, something like 50 percent of the British labor force was still directly employed in agriculture in 1700, and the typical British agricultural laborer, one of Europe's more productive, produced enough food to feed himself and only two other people.⁴ So the overall economy was quite sensitive to agricultural shocks, the most prominent of which were significant short-run deviations from climatic norms. With the exception of the epochal changes that demarcate geological time, climatic events would seem to have a strong cyclical component, because as Craig and Fisher (2000) note, otherwise human populations would have

⁴ This is only an estimate based on figures in Allen (2004) and Wrigley (2004).

adjusted their economic activities in response to the effects of changes in long-run climatic trends.⁵

The most obvious climactic problems included late and early frosts and unusually dry or wet periods around or between sowing and harvest. These events could cover much of Europe or be highly localized. In either case, depending on the length and severity of the crisis, given the relatively high transportation costs at the time, the resulting crop failures would yield lower nutritional consumption, if not outright famine. This in turn would have made the human population more susceptible to disease (and hence to further reductions in economic activity). The crop yield-disease nexus was crucial in these largely agricultural societies. Disease could reduce labor inputs, thus reducing agricultural output, thus further exposing humans to the ravages of disease. Conversely, a harvest failure could lead to famine which exacerbated the risk of exposure to disease. Generally speaking, '[t]here was a close and exact correlation between food prices and mortality' (Flinn 1985: 51).

Beyond the local economy, the transmission of a weather-related agricultural shock could be quite complex. Poor yields associated with a crisis in one region would increase the demand for grain from other regions, which might well result in a cyclical upturn in those other regions, as the price and income elasticities of foodstuffs tend to be relatively low, a crop failure in one region could lead to windfalls in other regions. So, the impact of a crop failure on the business cycle of a national economy depended crucially on the geographical extent of the crisis. If it were quite local, then the net result might be merely a redistribution of income from one

⁵ Societies that failed to respond to these longer-run changes jeopardized their existence, a point on which Diamond (2005) elaborates.

agricultural area to another or from town to countryside; however, if much of country's agricultural sector were hit, then food would be imported under worsening terms of trade, *ceteris paribus* of course, and aggregate output would be negatively affected.

Furthermore, prior to the mastery and widespread use of steam power in manufacturing and transportation, the same weather problems that affected agriculture could impact manufacturing and trade. As Ashton explains in detail:

‘[S]ome industries were directly affected by changes in the weather. The frost that killed the sprouting corn, or the heavy rain that beat down the straw, might simultaneously put a stop to the water-wheels or interfere with the delivery of materials ... a fall in the output of copper in Cornwall and of broad cloth in the West Riding resulted from a great frost...Even industries that were carried on in various parts of the country were affected...In most years of dearth there was a sharp rise in the price of coal, not at the pit-head but in London and other urban centres. But, it was the severe weather preceding the harvest that was responsible’ (1959: 34-35).

As this observation suggests, understanding the impact of weather-related shocks is further complicated by their impact on the urban sector. As Europe industrialized and the share of economic activity taking place in urban areas expanded, urban populations became vulnerable to local crop failures. This had always been the case, but as agricultural productivity grew, each farmer supported a larger number of non-farm, and increasingly urban, households; thus the shock of each agricultural failure had the potential to be felt more broadly in non-farm sectors.

Supply shocks resulting in high prices and small quantities of foodstuffs were a constant threat to urban dwellers, and political leaders who faced their wrath. As one contemporary put it, ‘Who could forget the terrible years of soaring prices...that so harshly oppressed almost the whole of Europe’ (cited in Craig and Fisher 2000: 119). On the other hand, unusually low prices resulting from abundant harvests had their own risks. ‘If the price of corn became too low, the tenant farmer tended to leave his fields untilled...A crisis arose and soon spread to the towns simply because corn was sold too cheaply’ (Abel 1980: 11-12). Thus Craig and Fisher summarize the narrative accounts of agricultural crises: ‘In other words, if prices were too high that was bad for the economy, but if prices were low that was bad, too’ (2000: 120).

The confusion reflected in commentaries on early cycles is the result, at least partly, from reliance on prices as the main indicator of economic activity. This reliance derives from the relatively plentiful data on prices and the general absence of output figures. Of course, the timing and distribution of the impact varied depending on the nature of the shock, and observations about the nature of early cycles often reflect the distributional effects of short-run agricultural shocks. Given the inelastic demand for basic foodstuffs, a harvest failure will result in higher incomes for farmers who generate a disproportional share of the marketable surplus, which in most cases included those who own or manage larger farms and those in regions not affected by the poor weather. The redistribution is from urban consumer to the large or non-affected producer. Small farmers in the affected areas also suffered. Conversely, an abundant harvest, which is just another type of shock, would reduce farm incomes and confer a windfall on urban dwellers in the form of lower prices and greater quantities. Farmers who experienced a shortfall due to extreme local conditions in a year of general abundance would suffer the most in

this scenario, as they would see lower prices and smaller yields. With respect to a shock's impact on aggregate economic activity, however, of the two scenarios, the loss of agricultural output in the wake of the bad weather, if geographically large enough, was the most likely shock to produce a substantial decline in the business cycle more broadly.

As for specific episodes, other than Great Britain, there are few macroeconomic time series for European countries before 1800; however, narrative accounts as well as price and other data can be employed to identify various cycles, particularly after 1750. In Britain there were crop failures of varying degrees in 1708-09, 1724, 1727-1729, 1740, 1756-1757, 1771-1774, and 1792. Each of these coincided with a downturn in the broader economy. In France the years 1769, 1771-1772, and 1789-1790 appear to be particularly poor ones in the agricultural sector (Craig and Fisher 2000: 171 and 217-218).

Although financial crises revolving around fractional reserve banking systems were largely a feature of the later European economy (see below), there were crises in credit markets in the eighteenth century. These typically reflected real crises in either trade or agriculture or, as was the case in England and France in 1720 and France in the 1780s, in public finance (Hoppit 1986). A review of the historiography of Ashton (1955) identifies the following as years of crisis: 1701, 1710, 1715, 1720, 1726-28, 1745, 1761, 1763, 1772, 1778, 1788, 1793 and 1797. All but two of these episodes (1772 and 1788) involved the public sector in one way or another (Hoppit 1986: 45), and four of them (1710, the late 1720s, 1770s, and 1793) were associated with harvest failures. Although the exact timing of change remains subject of dispute, scholars of the era recognize that as the century progressed, the causes of cycles changed fundamentally. 'What

distinguishes [later] financial crises ... from those before is that they were in large part caused by economic growth' (Hoppit 1986: 51). This growth was disproportionately in the manufacturing sector, and was supported by the evolution of the financial sector (see below).

The early crises in public finance noted above were not entirely caused by trade problems. Indeed, often, in one way or another, they were associated with **war**. War could also lead to agricultural shocks, through either direct destruction or via the labor market as a result of conscription of the farm labor force just prior to planting or harvest. Of course there was another side to this: Destruction in one region could increase the demand for the products of another, unaffected region, leading to a windfall there. More generally, the economic impact of wars is often misunderstood. Although in modern times, it is not uncommon for standard measures of economic output, such as gross domestic product, to increase during wars, it does not follow that such increases necessarily result in increased economic well being for the citizens of the warring states. This, of course, is due to the greatly increased government consumption of scarce resources. Furthermore, almost inevitably, wars produce a negative effect on investment spending through 'crowding out'--though the extent to which crowding out was an important component of cyclical behavior associated with war-time public expenditures has been much debated in the literature (Crafts 1987; Mokyr 1987; and Williamson 1987).

The geographical area in which the war is fought may face economic disruption and the destruction of local infrastructure, circumstances that typically lead to a reduction in economic output. A war that disrupted agricultural production over a region of some size for a notable period of time would have had a potentially devastating effect on the economy; indeed, a short

war would produce a shock and a long war a significant, and possibly enduring, deviation from the long-run trend growth rate. In practice, disruptions took several forms. The confiscation of output by military authorities reduced current civilian consumption and, if the army remained in the vicinity, reduced the incentive for future production. Also fields, fences and structures were damaged by campaigns. Diseases were introduced and/or spread as a result of mixing different populations. Finally, farm labor was often conscripted, both at home and in conquered territories. Taken together, these negative effects on food production coupled with the exposure to new disease pools could lead to famine and/or a reduced capacity for work, both of which lowered output as well. Finally, it is also not necessarily the case that the economic growth that sometimes follows war is ‘caused’ in any meaningful economic sense by the war.

As for specific wars that most likely had some negative aggregate impact, they include the Great Northern War (1700-1721), the War of the Spanish Succession (1701-1714), the Wars of the Austrian Succession (1740-1748), Seven Years War (1756-1763), and the wars of the French Revolution from 1792.

What then can we make of this summary of the various causes and specific cyclical episodes before 1800? With the exception of Great Britain, we do not possess consistent time series for enough variables that would allow us to date downturns in the business cycles of European countries. However, conducting this exercise for the British economy is instructive. Using the narrative accounts cited above, and secondary sources, Craig and Fisher (2000) compile five annual series (industrial production, the crude death rate, and price, real wage, and stock price indices) from 1700 to 1750. For the years after 1750, they add to this list a profit index, the

number of bankruptcies, and changes in Bank of England liabilities--again, all from secondary sources. Under the assumption that declines in these variables are indicators of recession (with the exception of inflation, the death rate, and bankruptcies), Craig and Fisher identify the years in which industrial production declined by roughly two or more percent and at least two of the other indicators suggested a recession.⁶ Those years are:

1702	1705-06	1709-10
1714	1718	
1720-21	1724	1728-29
1734	1737	
1740-42	1745	
1754	1756	
1762	1765	1768
1770	1773-74	1778-79
1785-86		
1793-94	1797-98	

For the century as a whole, downturn occurred roughly every three to four years. This is a bit more frequent than one finds in Europe today. Of course, this might simply be the noise and biases of the indicators employed to identify downturns. Tellingly, the list reflects the specific episodes of trade, war, and agricultural problems that show up in various narrative accounts. However, there are considerably more downturns, than there were agricultural ‘crises.’ Given agriculture’s share of total output during the eighteenth century, one would be justified in concluding that our list has a few ‘false positives.’ At the same time, the agricultural sector was quite volatile, and that volatility would be reflected in overall economic activity. In any case, agriculture’s relative decline would mirror the increasing importance of the financial and manufacturing sectors, and in turn these would play a more important role in subsequent cycles.

⁶ There were three episodes in which the declines in industrial production were substantially less than two percent (1734, 1770, and 1785-86), but the number or magnitude of the changes in the other variables suggested recession, and there were two years in which only one other variable suggested recession, but the decline in industrial production was large enough to indicate recession (1702, 1706).

1800-1870

As agriculture's role in the business cycle diminished in the closing decades of the eighteenth century, a decreasing correlation between harvest failures and cyclical activity would prove to be a good indicator of a country's overall economic development. As we noted above, eighteenth-century downturns often had a financial component, largely through either public finance or the financial sector's connections to agriculture, and these crises typically reflected, rather than caused, real problems in agriculture, trade, or manufacturing. As the importance of banks expanded in financial intermediation, and as manufacturing's share of aggregate output expanded, increasingly, the business cycle was driven by developments in the banking and industrial sectors.

With respect to the growth of banking, using Britain as an early benchmark, as late as 1750, there were probably no more than a dozen or so banks outside of London (Neal 1994: 168). By 1775, there were still only 150 banks in England and Wales, with a total capital of £3.5 million (Cameron 1967: 33). By 1800, however, there were more than 400 banks with a combined capitalization of £5.5 million. While scholars might quibble with these figures, the point is that the growth of the banking sector was dramatic by almost any reasonable standard, and as both the breadth and depth of bank activities expanded so too did their customer base. In addition, bank assets grew faster than the overall economy, and financial markets evolved from a system dominated by commercial credit and delegated lending, transactions which were conducted by various financial intermediaries, to a system increasingly marked by external bank credit. This dramatic expansion meant that what happened in the banking sector was increasingly felt throughout the economy. Although the evolution of banking followed a varied path throughout

Europe (Cameron 1967; Craig and Fisher 1997, 2000), it was often the case that banking at the metropolitan core (in, for example, Amsterdam, Paris, Berlin, and Vienna) differed from the practice in the hinterlands. At the time the key to a successful bank was information, specifically information about the quality of the loans in the local economy--that is, literally, in the geographical neighborhood of where they issued loans. Although there might have been more opportunity for diversification in the secondary or re-discount market, the reputation of the issuer (i.e. the seller) of the bill mattered. The tendency of the largest and most important metropolitan banks to only discount 'blue-chip' loans has been a source of criticism in the literature (Craig and Fisher 1997).

Although the structure of the English banking system differed from those found elsewhere in Europe, the evolution of the system is instructive in evaluating the increasing role of banks in the business cycle. The Bank of England served as the government's bank, and the other London banks concentrated on underwriting government debt, issuing and trading in foreign bills of exchange, and maintaining a correspondent business with the non-London, or so-called country, banks (Neal 1994; Quinn 2004). In addition to issuing banknotes, the country banks served as the intermediaries between London and the hinterlands and 'between the savers (for example agricultural landlords) and investors (for example artisanal manufacturers)' (Neal 1994: 168). These banks were not large, but they were at the center of the agriculture-trade-manufacturing nexus, and as they increased in number, size, and importance so too did their role in the business cycle.

Despite the declining relative importance of agriculture, even as Britain and the continent industrialized, problems in financial markets were not divorced from those in the agricultural sector. With improvements in transportation and the general integration of the European economy, the impact of local crop failures was ameliorated by trade. Furthermore, as a result of the increases in agricultural productivity, fluctuations occurred around a higher mean level of production. Unless the entire continent was subject to the crisis, an unlikely event, food could be imported, at a higher price to be sure, but starvation and bread riots were increasingly a thing of the past. Still, country banks relied on agricultural surpluses to provide liquidity on the liability side of their balance sheets. The combination of a (locally) poor crop year unaccompanied by dramatically higher prices could dry up the flow of deposits. The result could be a general downturn. As Quinn observes ‘banks failed in waves of runs between 1810 and 1813 caused by bad harvests and the downturn in foreign trade’ (2004: 163). Depending on the strength of bank balance sheets (i.e. bank capital or net worth), the simultaneous liquidation of deposits and a decline in the value and liquidity of loans could transfer an agricultural problem into the financial sector, and from there the crisis could find its way into other sectors, trade being the most likely, as a general tightening of credit accompanied by higher interest rates could result.

As for specific episodes of stress in the agricultural sector, there were several in both England and France, and with the notable exception of the Low Countries, elsewhere in Europe agriculture still dominated aggregate output. In addition to the years cited above, there were poor harvests in England in 1808, 1816, 1829, 1831, 1837-38, and 1848. In France indices of agricultural production suggest that 1818, 1820, 1822, 1825, 1833, 1836, 1842, 1845-46, 1848-49, 1851, 1853, 1855, 1859, 1861, 1865, 1867, and 1870-71 were unusually bad years. Narrative

evidence yields specific years for other countries, but exactly how one interprets this information in terms its implications for European business cycles should be mitigated by three factors. First, the agricultural sector was of declining importance during this period. So, in terms of a shock's impact on aggregate output, it would be smaller in 1842 than 1742, *ceteris paribus*. Secondly, both the narrative and the quantitative evidence indicating a shock are subject to interpretation. Any historian familiar with the primary or secondary sources recognizes that hard times are not difficult to find, if that is what one is looking for. Thirdly, as discussed in the previous section, it is possible that what much of the narrative history considers a negative shock was in fact a windfall for at least a good portion of the agricultural sector. A decrease in the supply of foodstuffs can increase farm incomes. In short, before we leap from harvest failures to downturns in the business cycle after 1800 or so, we should first investigate what was going on in the banking and manufacturing sectors.

With respect to the rise of banking, in some ways, the experiences of the British South Sea Company and Law's assorted French institutions foreshadowed subsequent financial crises, in that among other things the crisis of 1720, like those of the nineteenth century, was linked to fractional reserve banks--the Sword Blade Company in England and the *Banque Royale* in France. It was pressures on both sides of their balance sheets that defined their role in the crisis. In the absence of a true lender of last resort, the rise of the small note-issuing bank in the late-eighteenth and early nineteenth centuries set the stage for any number of crises. Bad loans in an undiversified portfolio combined with the liquidation of deposits proved to be the bane of small fractional reserve banks into the twentieth century. On occasion these local crises could become large general crises. This was particularly true once the domestic and international banking

systems were linked through the specie-flow mechanism of the gold standard. As Garcia-Iglesias and Kilponen note, although the gold standard ‘may have contributed to economic growth,’ it also ‘affected the business cycle and variations of the economies joining’ the system. (2004: 4). If perceived as credible, the commitment to gold could improve the terms under which a nation’s borrowers received credit; however, such a commitment also tied the hands of the monetary authorities.

The Wars of the French Revolution and the Napoleonic Wars had a strong impact on the long-run trend in the English banking sector (Neal 1994; Quinn 2004). First, the suspension of convertibility and Parliament’s authorization of the issuance of small-denomination banknotes--important during a period in which specie was quite scarce--led to even further growth of the country banks. There were nearly 800 by the end of the wars. At the same time, the London banks, and especially the Bank of England severely rationed their discounting of bills emanating from the country banks. One might see in this an early effort to regulate the money supply, in that, at the margin, the Bank’s actions discouraged an over-expansion of notes during a wartime suspension of convertibility. With the continued growth of the industrial sector, itself at least partly related to wartime expansion (see below), the demand for credit in the industrial regions remained relatively high. Thus there emerged a booming market in the brokering of bills between the banks that were lending to manufacturers and those that were accepting deposits, which as a result of the wartime disruption of imports, and later the Corn Laws, were disproportionately in agricultural regions. The brokerage business arguably improved the efficiency of British credit markets and facilitated the expansion of the country banks, as they

grew in size and number. At the same time, '[t]he spread of commercial banking across Britain also brought banking panics' (Quinn 2004: 163).

Although every bank panic has its own story to tell, some scholars have attempted to identify common themes that run through each (Kindleberger 1989; Minsky 1982). According to this school of thought, the seeds of the panic are sown through a 'speculative boom' in some asset-- for example stock in a specific company, such as the South Sea Company; or a sector, such as canals or country banks; or in government debt. Investors (speculators, in the pejorative), seeking to capitalize on the further expected increase in asset prices turn to credit markets.

The 'boom is fed by an expansion of bank credit that enlarges the total money supply ... as the speculative boom continues, interest rates, velocity of circulation, and prices all continue to mount. At some stage, a few insiders decide to take their profits and sell out ... There may then ensue a period of "financial distress"... It is time to withdraw... The specific signal that precipitates the crisis may be the failure of a bank...' (Kindleberger 1989: 18-21).

Loans, and thus loan portfolios and banks themselves, were not homogeneous products. Information was crucial to the successful operation of a country bank. Some lenders may have had better information and made more accurate forecasts than others. However, once one institution began to fail, depositors at other institutions could put pressure on the fractional reserve system by liquidating deposits at otherwise perfectly sound institutions. Also, banks that were caught holding loans to firms that were facing a *temporary* downturn in their fortunes could be pulled down as well. The pressure from depositors to liquidate loans could unnecessarily

worsen a bad, but otherwise not critical, situation. The development of modern central banking would do much to alleviate these problems.

As for specific episodes of financial crises, the country banks first felt distress on a large scale in 1793 when the combination of a collapse in the market for canal debt and a decline in trade resulting from the onset of war between Britain, the Netherlands, and Spain on the one hand and revolutionary France on the other disrupted the bill market. A similar collapse in 1799-1800, centered on the free city of Hamburg, resulted from the ebb and flow of the British blockade of the continent. The next major crisis in Britain resulted from the aforementioned combination of agricultural and trade problems in 1810-1813, and the end of the Napoleonic Wars brought ‘[r]apid deflation’ while the Bank of England kept nominal rates high. The resulting increase in real rates led to a decline in trade in 1816 (Kindleberger 1989: Appendix B; Quinn 2004: 162). In Britain, a major panic ensued in 1825, when, after a rapid expansion of credit to the recently independent Latin American countries, the market collapsed following the onset of war between Argentina and Brazil over Uruguay. Banks holding Latin debt failed, taking the deposits of their correspondent banks with them. At the same time, across the Channel, Kindleberger (1989) argues that in Restoration France there was considerable speculation in lands, the titles to which had been placed in dispute as a result of the Revolution and Napoleonic Era. This market crashed in 1828, causing considerable distress to lenders.

The most widespread international crisis of the era spanned from 1836 through 1839 and reached across the Atlantic to the United States (Temin 1969; Wallis 2001). Since Britain returned to the gold standard in 1819, the Bank of England was charged with maintaining convertibility. As

a result it closely monitored the nation's monetary gold reserves. With London serving as the financial center of an expanding world trade network, other financial markets became sensitive to the Bank of England's discount policies. An increase in rates, to protect reserves, accompanied by a collapse in the market for U.S. canal debt, reverberated throughout the banking systems of the Great Powers. The crisis of 1836-1839 was rivaled by that of 1847-1848, which in terms of breadth, depth, and political ramifications was the worst of the era. There was also an international downturn in 1857, which stretched across the Atlantic as well as the continent.

Today, the speed at which shocks are transmitted from the financial sector to real economic activity can be quite rapid (see, for example, Hansen 2003), but central banks stand ready to pump liquidity into the banking system. The crises of 1836-1839, 1847-1848, and 1857 spread at various speeds, but each demonstrated the potential role of a lender of last resort with public responsibilities above and beyond its own balance sheet. Table 1 shows that by mid-century there were at least ten institutions that could or would subsequently fulfill the obligations of a modern central bank. However, even as late as the crisis of 1866, these institutions were still struggling with how and when to exert their control over the money supply and serve as a lender of last resort. Their struggles with these functions were related to the fact that most were private institutions, charged with maintaining the convertibility of their currencies. Since the directors had private stockholders to whom they answered during a panic, these institutions would protect their own portfolios and deposits rather than run the risks associated with pumping liquidity into the banking system more generally. As a result, their discount policies became very conservative at exactly the time when the economy called for liquidity. Similarly, their goal of maintaining

convertibility often meant raising discount rates during a crisis, exactly the opposite of what subsequent monetary theory would suggest was efficacious. A move to takeover the charters of most of the institutions followed as the century progressed (Muhleman 1896).

Table 1
Summary of European central banks before 1914

Country	Bank	First founded or taken over by the state	Note issue monopoly	First decade as lender of last resort	First year on gold standard
UK	Bank of England	1694	1844	1850s	1819
France	Bank of France	1800	1848	1880s	1878
Germany	Reichsbank	1875	1875	1870s	1871
Belgium	National Bank	1850	1850	1850s	1878
Netherlands	Bank of the Netherlands	1814	No	Unknown	1877
Denmark	National Bank of Denmark	1818	1818	1900s	1873
Finland	Bank of Finland	1811	1886	1890s	1878-79
Norway	Bank of Norway	1816	1816	1900s	1875
Sweden	Riksbank	1668	1897	1900s	1873
Italy	Bank of Italy	1893	No	1900s	1884-93, 1902
Austria-Hungary	Austro-Hungarian Bank	1816	1816	No	1900
Portugal	Bank of Portugal	1822	No	No	1854-90
Spain	Bank of Spain	1829	1874	No	No
USA	None	–	–	–	1879

Note: For the details of the dating of the various actions, see Craig and Fisher (1997: 117), Muhleman (1896) and Tarkka (1993).

Finally, then, we turn to the most common and persistent source of modern business cycles, fluctuations in the non-agricultural, non-banking industrial sector. The relative decline of agriculture and the maturation of banking systems across the continent was accompanied by the spread of industrialization, and just as the spread of banking made bank panics more common and their consequences for the economy more dire, increasingly what happened in the industrial sector influenced overall economic activity. As the research on modern real business cycle theory suggests (see above), exactly why modern economies remain subject to downturns in real economic activity, even after all of the above-mentioned causes have been ameliorated, remains

something of a mystery. Modern business cycle theorists have focused on ‘technology,’ which in this context is a rather amorphous term that might stand in for something as specific as an energy price shock, related to, say, political unrest in a major petroleum producing area, or it might simply stand in for ‘all else.’ Of course, these downturns in aggregate activity are just the net impact of firm-level decisions, and here, late twentieth-century downturns looked a lot like their nineteenth-century counterparts in that they often coincided with layoffs, which in turn tended to follow the accumulation of inventories.

Because this accumulation of inventories was often financed by credit, the manufacturing sector was tied to the financial sector, just as trade had been for centuries. Until the late-nineteenth century, these loans tended to be short-term and used to finance operations rather than long-term investments in physical plant. Although they could be rolled over and thus could be used to finance some plant and equipment, they were more often used for working capital and wages, covering short-term deficits, as ‘when the inflow of credits (accounts receivable) proved too slow to cover payments due (accounts payable) a demand for external borrowing was created’ (Quinn 2004: 158). When the short-run cash flow was negative, manufacturers had to go into the bill market to cover expenses, and they became subject to the vagaries of interest rates. As the bill market matured, manufacturers could go into the market and raise funds for expansion, even when accounts payable and receivable were roughly in balance. Conversely, when discount rates soared, or when war disrupted the flow of goods to customers, manufactures would have to borrow at unfavorable terms or face layoffs and a reduction in output.

This story is not so far from current real business cycle theory. Assuming the initial prosperity was at least partly associated with an increase in productivity, which itself might be related to technological change in key, that is large and growing, sectors, then the borrowing that led to the expansion of inventories was nothing more than a reflection of an upturn in the (real) business cycle. The downturn came when some exogenous factor--an agricultural crises, for example, or war, which disrupted the trade with suppliers or customers--caused actual conditions to diverge from forecasted conditions. There was nothing irrational about the behavior of either borrowers or lenders. However, on occasion they made forecast errors. There was no easy, i.e. low cost, way to hedge against that possibility. Although the result was swings in aggregate real output, that from the back of the classroom, look systematic, there was in practice nothing systematic about them. The forecast errors of 1810 were made by different men, in different industries than those of 1848.

As for specific episodes, in Great Britain, there were major declines, as measured by the Crafts-Harley (1992) index, in 1800-01, 1808, 1812, 1816, 1819, 1826, 1829, 1837, 1840, 1842, and 1847, and using GNP figures from Mitchell (1978, 1992) we would add 1866. For France, Toutain's (1987) index of industrial production shows downturns in 1819, 1828, 1830-31, 1839, 1847-48, and using GDP figures from Mitchell (1978, 1992) we would add 1851, 1853, 1855, 1859, 1861, 1865, 1867, 1870-71. For Belgium, Craig and Fisher (2000) create what is essentially a consumption index and infer downturns in 1818, 1822, 1828, 1831, and 1837-38. Also, more generally, the years 1842-1850 appear to be bad ones. Similarly, using production and interest rate data for 'Germany,' they identify downturns in 1816-17, 1836, 1838, 1845, and

1848-1850, and using industrial production figures from Mitchell (1978, 1992) we would add 1853.

Combining the narrative accounts of harvest failures, financial panics and industrial downturns with the empirical evidence constructed by economic historians, and offered in the secondary literature, yields Table 2, which shows the years in which six European countries experienced declines what might arguably considered a recession in the current meaning of the term. These include Great Britain and France; after 1815, Belgium and Germany; and after 1850 Italy and Sweden. Once we have observations for all four countries after the Napoleonic Wars, the table shows that there were downturns roughly every four to five years. Like the eighteenth-century data for Great Britain, these figures show more frequent recessions than one finds in post-World War II Europe. Of course, as Basu and Taylor (1999) and Romer (1999) note, one should be suspect of comparisons such as this over long periods of time, because of the changes in the underlying structure of the economy. On the one hand, just as we noted for the eighteenth century, given the still relatively small size of the industrial sector, it is possible that the dating of these cycles focuses too much on industrial fluctuations. On the other hand, the fact that the volatile agricultural sector composed such a large part of these economies, particularly early on, suggests that the aggregate figures reflect agriculture's role at the time. The French economy, in particular, was driven overall by agriculture, with the downturns in aggregate activity mirroring those in the agricultural sector.

Table 2

Economic Downturns in Six European Countries, 1750-1870

United Kingdom	France	Belgium	Germany	Italy	Sweden
----------------	--------	---------	---------	-------	--------

1754				
1756				
1762	1763			
1765				
1768				
1773-74	1772-74			
1778-79				
1785				
	1789-90			
1793-1794	1793			
1797				
1801				
1808	1806-07			
1812				
1816	1815			
1819	1820	1818	1818	
	1822	1822	1821	
1826	1825	1828	1826	
1832	1832	1831	1831-32	
1837		1837-38		
	1839			
1840-42	1842	1842		
	1845-46	1845	1845	
1848	1848	1848-49	1848-49	
	1851			
	1853		1853	1853-54
	1855			
1857	1859			1857-59
	1861			
	1865			
1866	1867		1867-68	1867-68
	1870-71			

Finally, the table shows that even by 1815, there was an identifiable European business cycle.

The following years would appear to be good candidates for continent-wide recessions:

1762-63	1772-74	1793-94
1806-08		
1815-16	1818-19	
1821-22	1825-26	
1831-32	1837-38	
1840-42	1845	1848-49
1853-54	1857-59	
1866-68		

Although we certainly welcome other interpretations of the data and narrative accounts for these countries during this period, we think the observation that there was something like a European

recession roughly twice every decade, with most spanning more than a year, after the Napoleonic Wars, is sound. This accounting yields more frequent downturns than Europe subsequently experienced. We conclude by noting that, while the frequency might be a function of how the data and events were recorded, the role of agriculture, metallic standards, and the absence of a consistently credible lender of last resort all probably played a role, and thus an important part of the “lessons of history for pan-European development” is the amelioration of these factors, through modernization, learning and institutional change.

Empirical Analysis

It is clear from the narrative accounts of early business cycles that the causes of cyclical activity changed over time, with industrial and financial shocks becoming increasingly important and replacing agricultural and demographic shocks as the key causal factors by the early nineteenth century. It is possible that, as a result of this change, the underlying characteristics of the cycles themselves changed and that these changes can be established by statistical analysis. Therefore, in the remaining section, we analyze fluctuations in real wage and prices for two countries, England and Spain for which we have reasonably comparable and consistent data back to 1568.⁷

A typical approach in econometric research on business cycles is to decompose time series into trend and cyclical components through a filtering process. The most commonly used filter proposed by Hodrick and Prescott (henceforth HP) decomposes the series into a stochastic growth component (the trend) and a cyclical component. By dividing the data into two periods--a pre-1800 and a post-1800 period--we can test whether these countries share similar features of

⁷ The primary sources of the data employed here can be found in Roses, O’Rourke and Williamson (2007) for Spain, and Allen (1992) for England. The secondary sources are in Craig and Fisher (1997, 2000).

business cycles as well as the hypothesis that shocks differed in their impact over time (Artis and Zhang 1995; Backus and Kehoe 1992).

Table 3 contains the standard deviations and the autocorrelation coefficients of real wage growth rates (first differences of logarithms of real wages) for England and Spain (agriculture and manufacturing) before and after 1800. (The data are displayed in Figure 1, below.) For England and Spanish manufacturing, the standard deviation of wage growth in the post-1800 period exceeded the pre-1800 figures. As for the autocorrelations, except for post-1800 England, all of the figures are negative. Although neither clear cut nor overwhelming, taken together, the figures in Table 3 might suggest a change in the nature of economic fluctuations after 1800.

TABLE 3
Properties of Real Wage Growth Rates

Country	Standard deviations (%)		Autocorrelations	
	Pre-1800	Post-1800	Pre-1800	Post-1800
England	8.74	10.2	-0.40	0.24
Spain-agric.	24.1	19.8	-0.09	-0.09
Spain-man.	7.13	11.1	-0.19	-0.49

Turning to the decomposed series, Table 4 illustrates the magnitudes of the real wage fluctuations (the HP-filtered logarithm of real wages).⁸ The pattern of the standard deviations of real wage fluctuations is similar to the un-filtered figures in Table 3.⁹ As for the autocorrelation of the cyclical component, the figures illustrate how fast the series return to equilibrium following a shock. For the first period, 1568-1800, we find that for England and

⁸ For yearly data, the parameter λ of the HP filter is set equal to 100. Higher values λ do not alter qualitatively our main results.

⁹ Graphs of both the HP filtered trend and HP filtered cycle are in an appendix, which is available from the authors on request.

Spanish agriculture the autocorrelation coefficients are smaller than for the second period. In short, shocks driving real wage fluctuations had less lasting effects during the first period when compared to the later period.

TABLE 4
Properties of Real Wage Fluctuations

Country	<u>Standard deviations (%)</u>		<u>Autocorrelations</u>	
	Pre-1800	Post-1800	Pre-1800	Post-1800
England	7.42	10.2	0.29	0.54
Spain-agric.	20.8	17.6	0.36	0.39
Spain-man.	5.85	8.01	0.32	0.07

In addition, we report the correlation coefficients of the HP cyclical components between countries. Such contemporaneous correlation measures provide information about the degree of synchronization of the cycles. Given the reduction in shipping costs and information flows, one might reasonably expect higher correlations after 1800. Table 5 shows the contemporaneous correlations of HP-filtered logarithms of real wage between England and Spain. The figures show that the, with respect to the comparisons of England and Spain, the correlations were higher in the post-1800 period. However, the correlation results are not statistically significant. Curiously, within Spain, the correlation fell after 1800.

TABLE 5
International Real Wage Correlations

Pre-1800 and post-1800

	England	Spain-agriculture	Spain-manufacture
England (pre-1800)		-0.01	0.11
(post-1800)		0.07	0.18
Spain-agriculture			0.28

Spain-manufacture

We repeat this analysis for price level fluctuations. Table 6 presents the results for inflation rates (first differences in the logarithms of price levels), and Table 7 contains the HP-filtered figures. Qualitatively, the results are quite similar to those we obtained for wages. (The data are displayed in Figure 2, below.)

TABLE 6**Properties of Inflation Rates**

Country	<u>Standard deviations (%)</u>		<u>Autocorrelations</u>	
	Pre-1800	Post-1800	Pre-1800	Post-1800
England	8.77	9.19	-0.02	0.16
Spain-agric.	23.7	19.6	-0.08	-0.09
Spain-man.	5.47	10.8	-0.09	-0.45

TABLE 7**Properties of Price Level Fluctuations**

Country	<u>Standard deviations (%)</u>		<u>Autocorrelations</u>	
	Pre-1800	Post-1800	Pre-1800	Post-1800
England	7.33	8.86	0.29	0.50
Spain-agric.	20.6	17.1	0.36	0.36
Spain-man.	4.82	8.23	0.44	0.16

Although Spain's extensive trading empire makes it a good candidate for investigating early modern cycles, England's rise came later, and in terms of their importance in the broader European economy, the two countries had arguably traded places by the nineteenth century.

Thus, we expanded the above analysis to include data from Austria and the German states. Because of missing observations, the time period was divided into two sub-periods: 1568 to 1750 and 1800 to 1870. The variables analyzed are inflation and real wage growth.¹⁰ Qualitatively, the results of the Austrian series differ little from those using the English and Spanish series. The Austrian series shows low persistence and the autocorrelation coefficients are small and even slightly negative for all the variables in both sub-periods. However, the German series behave differently showing high persistence in both periods.¹¹

Overall then, the results of these time series tests suggest that, although the causes of business cycles may have changed over time, in an econometric sense, it is difficult to make general statements about the underlying nature of the cycles before and after 1800. No clear pan-European, pre and post-1800 pattern emerges. However, broadly speaking, relative to more modern cycles, it is safe to say that the persistence, transmission, and trans-national impact of a shock after 1800 differed little from earlier shocks. To put it pedantically, one cannot reject the hypothesis that, in an econometric sense, there was no clear change in the cyclical behavior of the series before and after 1800. This is not to suggest that there was no pan-European cycle; rather these results highlight the importance of the caveats issued in the Introduction above, which is to say that business cycles are best understood in the historical context in which they occurred.

¹⁰ For the second sub-period, we used industrial production as a proxy for Austria.

¹¹ An appendix containing a larger set of results is available from the authors.

Figure 1: Real Wages: England and Spain, 1568-1870

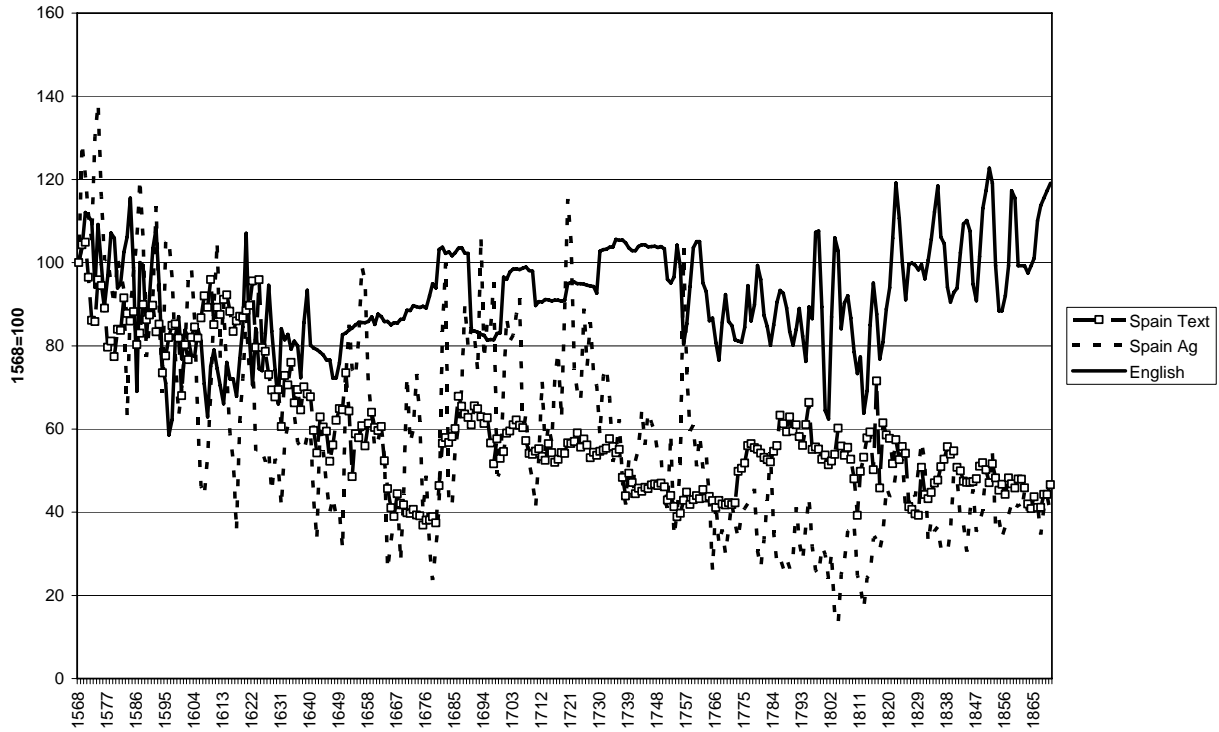
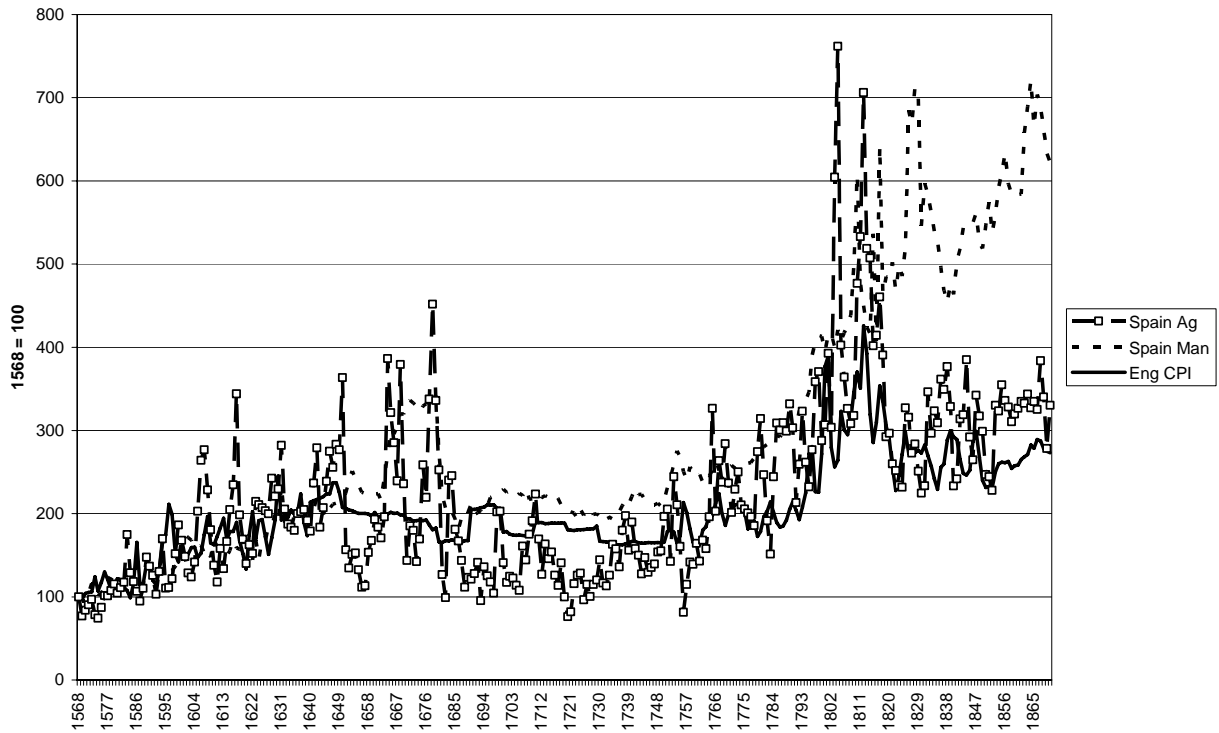


Figure 2: Price Indices: England and Spain, 1568-1870



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