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**Growth and  
Fluctuations  
1870-1913**

**W. Arthur Lewis**



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# **Growth and Fluctuations 1870–1913**

In this title, first published in 1978, Sir Arthur Lewis considers the development of the international economy in the forty years leading up to the First World War, with the adoption of the gold standard, a rapid growth in world trade, the opening up of the continents by the railways, vast emigration from Europe, India and China, and large-scale international investment.

The book contrasts the relationship between prices, industrial fluctuations, agricultural output, and the stock of monetary gold, considering both the varying patterns of leading economies and then their net combined effect on the rest of the world.

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W.Arthur Lewis



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# **Growth and Fluctuations**

## **1870–1913**

W.Arthur Lewis

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# Preface

I have come to this subject from an interest in the problems of our own time, some of which began in this period (such as the economic development of the tropical countries, or the economic difficulties of Britain) and others of which show marked correspondences (such as twenty years of worldwide inflation, international recessions, the struggle of even the richest countries to maintain fixed exchange rates for their currencies). This interest declares itself in brief comments scattered through the book comparing then and now. However, my main purpose has been to try to find out what actually happened—a difficult enough task—and I hope that the reader will not be distracted by the occasional reference to the preoccupations of our own times.

The chapters are of varying technical difficulty. Chapter 1 is intended as a simple introduction for people who are not familiar with the history of trade cycle analysis; others will find all they need in the synopsis which precedes the chapter. There are many places where the flow of the argument is interrupted for intensive discussion of some particular problem. The device of preceding each chapter with a synopsis is intended to help the reader to recognise the sequence of ideas in each section.

In writing this book the hardest and most time-consuming task has been to assemble the statistical appendices, without which it could not have been written. As the reader will see, I have remade the British index of industrial production, and made a new index of British real income. I have also had to make certain revisions of the available indexes for France, Germany and the United States. Since other writers will be continuing this process long after this book is finished, as well as producing similar series for other countries, I am only too well aware how tentative are the conclusions I offer here, and apologise in advance for the number of times that they are introduced by ‘conceivably’ or some similar evasion.

There is no separate bibliography. A bibliography of materials relevant to the expansion of the world economy would fill a book this size, and take years to prepare. Instead the Notes and Appendices contain extensive references to the materials used, which are further identified in an Index of Authors.

How does one record one’s intellectual debts after nearly forty years of reading, teaching and listening to other economists, and non-economists as well? All I know I have learnt from other people, and from reflecting on what they have said. This manuscript has been read by two of my colleagues at Princeton University, Professors W.J.Baumol and Wallace Oates whose penetrating advice I am glad to acknowledge, without committing them to what has emerged. I have had wonderful secretarial and technical assistance in the Princeton Research Program in Development Studies from Geraldine Kavanagh, Alice Anne Navin, Wanda Prorock and Dorothy Rieger. I have relied on Marion O’Connor for information on wheat production, and her paper on this subject appears as an appendix.

W.A.L.

*Princeton*

December 1976

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# Chapter 1

## Prospectus

SYNOPSIS: 1.00 The book is written around three interlocking themes: (a) the speed and regularity of growth of the four industrial core countries; (b) the Kondratiev swing in prices, downwards to 1895 and upwards thereafter; and (c) the differing degrees of response of countries at the periphery to the possible adoption of new technology and to opportunities to trade.

1.01 There are marked fluctuations in industrial production in the core countries. 1.02 The best known is the Juglar fluctuation, averaging about eight years. 1.03 The shorter Kitchin fluctuation is not relevant to our themes. 1.04 The Kuznets fluctuation turns on great depressions occurring about once every seventeen years. All four countries experienced such great depressions though not always simultaneously. The great depressions were associated with long swings in construction. We shall inquire whether there is a connection between great depressions and the Kondratiev swing in prices.

1.05 This long downswing followed by a long upswing is found in most price series or in their rates of change. 1.06 We shall inquire whether there was a corresponding change in the rate of growth of production. 1.07 In the downswing the terms of trade moved against farmers in both the core and the peripheral countries, stimulating political activism. The great outburst of urban radicalism at this time has also been attributed to falling prices, but the onset of the series of great depressions is a more probable cause.

1.08 The core contributed to the peripheral countries not only example but also technology, capital and migrant labour. Countries could adopt the new technology or could trade. 1.09 We shall consider why some peripheral countries responded with greater alacrity than others. 1.10 In doing so we will have to take political relationships (the colonial system) into account.

1.00 The idea of continuous economic growth from year to year is relatively new in human history; it belongs only to the period since the industrial revolution. Before that there had been long periods of economic fluctuation, including in Western Europe several low patches between 1600 and 1700. But after 1800 output per head had begun to rise steadily, and by 1900 the idea of an annual increment had joined the list of natural human rights.<sup>1</sup>

The process of continuous growth began in England, spread during the first half of the nineteenth century to the United States, France, Belgium and Germany, in that order, and thereafter set out to conquer the whole world. For the believer in cultural diffusion, a more appropriate metaphor is that of an escalator, taking countries to ever higher levels of output per head. Countries get on to the escalator at different dates—only half a dozen before 1870, perhaps another fifteen before the First World War, another fifteen between the two world wars, and somewhat more than twenty between 1950 and 1970. The list includes peoples of all creeds, races and continents, and continues to grow.<sup>2</sup>



## 2 *Growth and Fluctuations 1870–1913*

During the nineteenth century the escalator moved upwards at a speed of about one and a half per cent per annum (in terms of growth of output per head) but the countries on it—like the individuals on an escalator—can move faster or slower, by stepping up or down. It is also possible to fall off the escalator—to grow for a while and then to stagnate; to remain on the escalator is to have achieved the conditions for ‘sustained growth’.

Our study originates from interest in the proposition that the upward movement of those already on the escalator helps to pull more and more countries into the moving company. This proposition is not obvious, and its opposite—that it is the enrichment of the rich that impoverishes the poor—is perhaps even more widely held in one form or another. Our purpose is to study the extent and mechanisms of the spread of ‘sustained growth’ during one period of time, namely the forty years before the First World War.

The theory of international trade, as the classical economists developed it, did not provide for the transmission of sustained growth (or its opposite) from one country to another, since it simply did not deal with growth: technologies are given, and neither labour nor capital migrates. The ‘dependency’ relation was introduced into economics during the inter-war period by Canadians interested in the ‘staple’ (or as we would now say, ‘export-led growth’)<sup>3</sup> by Australians interested in the multiplier effects of an adverse balance of payments<sup>4</sup> and by Englishmen blaming the great depression of the 1930s on US failure to maintain its own prosperity.<sup>5</sup>

The words we now use we owe to Dennis Robertson and to Raoul Prebisch. Robertson, writing in 1938, referred to international trade as ‘the engine of growth’, and Prebisch writing twelve years later referred to the relations between the industrial world and the ‘periphery’.<sup>6</sup> These writers had their own definitions. In this study we shall divide the world into ‘core’ countries and the ‘periphery’.<sup>7</sup> The four core countries will be Great Britain, France, Germany and the United States. The ‘engine of growth’ is the industrial sector of the core countries taken together. Our prime concern is therefore the response of the periphery to the engine of growth in the core. This atrocious mixing of metaphors may perhaps symbolise the confusion of the subject matter itself.

Core and periphery together add up to the whole world, but we are not equipped to write about the whole world, so our picture of the periphery will be general and illustrative. Furthermore, we are not writing general economic history; our focus is on rates of growth and their interactions. Even this is further restricted, since what we are seeking is the causes of growth rather than its consequences. We are taking from history only that part which seems necessary to explain core-periphery economic relations from 1870 to 1913.

What follows is thus not a systematic exposition, but a series of discussions around these three questions:

- (1) How fast and regular was the engine of growth (industrial production in the four core countries)?
- (2) What accounts for the ‘Kondratiev’ price swing, down from 1873 to 1895, and up from 1895 to 1913?
- (3) How does one account for the differential response of the peripheral countries?

## THE ENGINE OF GROWTH AND ITS PULSATIONS

1.01 Our engine of growth is the combined industrial production of Britain, France, Germany and the United States. According to Hilgerdt<sup>8</sup> this sum, by value added, was 72 per cent of world industrial production in 1913. The next two countries in size were Russia (5.5 per cent) and Italy (2.7 per cent). Our coverage seems sufficient for our purpose.

The progress of industrial production in each of these four countries is shown on semi-logarithmic scale in Chart 1.1. These indexes combine manufacturing, mining and building. They are themselves controversial, and have had to be double checked before they could be used. The derivation of the British figures is explained in Appendix I, and the derivation of the others in Appendix II.

The curves are all drawn on the same scale, so their growth rates can be compared. But they are not additive, and their relative positions on the vertical scale is without significance.

Each series is shown with a line running along the top, connecting as many peaks as will fit on to a straight line. It is a peculiarity of volume series (i.e. series corrected for or not incorporating changes in price) belonging to the period 1870 to 1913 that their peaks tend to run in straight lines of this kind; this does not happen with earlier nineteenth-century series, or with series for the period between the two world wars. Even in Chart 1.1 nearly half the peaks are not strictly in line, but accuracy within one or two per cent is not to be expected of indexes of industrial production.

The line is not a trend in the statistician's sense. It does not measure the average rate of growth of actual output, but, if anything, indicates the long-run average growth of industrial capacity.<sup>9</sup> Since a straight line on a semi-logarithmic scale represents a constant annual rate of growth, the closeness of fit suggests that the fundamental determinants of industrial capacity were growing at constant rates in the four countries over these particular decades. However, we do not take this for granted; it is one of the things we want to find out.

Ultimately we shall be combining our four series to see the behaviour of the core as a whole; but since we shall not understand what happens to the whole unless we first understand what has happened to the parts, we shall first spend some time studying each of our countries individually.

First, it is obvious from the graph that the four countries grow at very different speeds. The slopes of the straight lines translate into: France 1.8 per cent per annum, UK 2.2 per cent per annum, Germany 3.9 per cent per annum, and USA 4.9 per cent per annum. Why these rates were so different is a puzzle we shall be probing.<sup>10</sup>

The graph also reveals pronounced wave-like movements in the rate of growth, which we used to call 'cycles'. Economists have devoted an enormous literature to the study of such movements, most of it designed to show how a market economy has a built-in tendency to generate production cycles (as in the rest of economics, empirical studies are only a small fraction of the trade cycle literature). This approach is now unpopular, not because the mathematical logic is suspect, but because the models, while they explain the past satisfactorily, always fail to predict the future with reasonable accuracy. If the term 'cycle' is to be confined to a movement whose future can be predicted from its own past, then the movements of industrial production, though wave-like, are not cycles; and the models which can explain them backwards but not predict them forwards have to be viewed with suspicion.

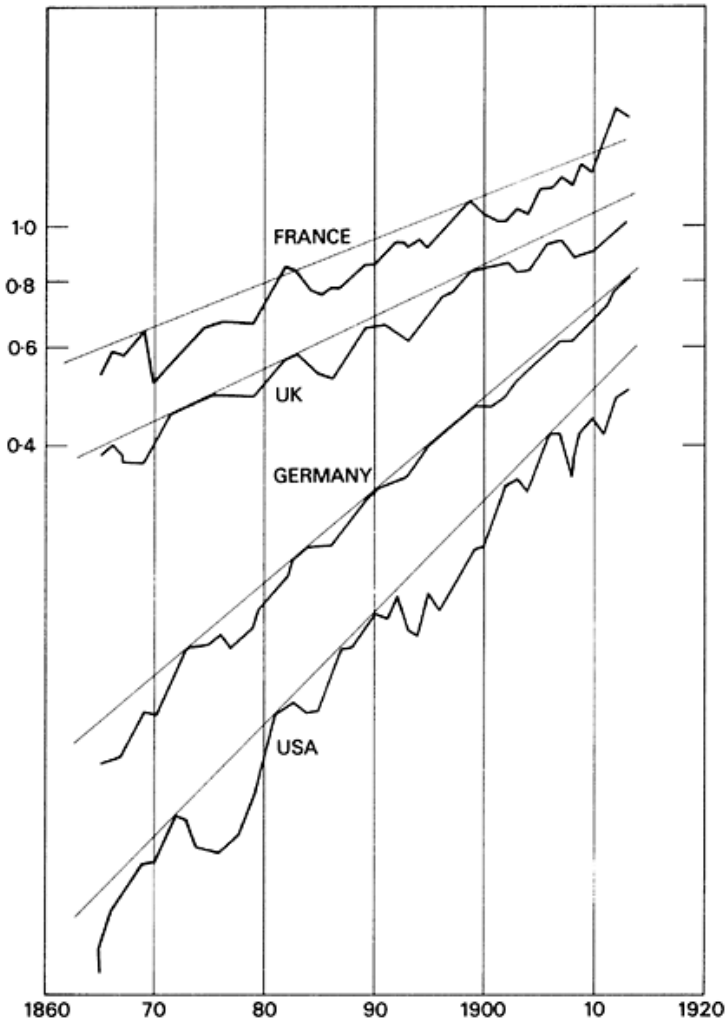


Chart 1.1 Industrial Production

It does not follow that we should abandon trade cycle theory. Meteorologists can explain the path which a hurricane has taken, but cannot predict its future direction without a wide margin of error. One day they may have mastered prediction. The same may happen to economists, or it may not. To predict the course of the trade cycle requires predicting not only human behaviour, but also the physical events (such as the weather) to which human beings will have to react. So economics may always be a trade which explains the past without predicting the future. Since it is both useful and entertaining to study the past, such an exercise is not entirely without merit.

In this book we shall not be attempting to give formal or complete explanations of why fluctuations occurred. In the periphery these fluctuations came as acts of God. We shall have to know when they occurred, how intense they were, and how they affected other mat-

ters which interest us, like the volume and terms of trade, or the willingness to migrate or to invest abroad. Like the captain of a ship navigating in stormy seas we shall need to identify the waves, without needing an exhaustive theory of what causes waves.

When analysing these fluctuations economists have identified four different cycles, distinguished by length of periodicity, each of which is named after the economist who first wrote about it: the Kitchin (about three years), the Juglar (about nine years), the Kuznets (about twenty years), and the Kondratiev (about fifty years).

Since cycles are identified by dating their peaks or troughs we must first say something about this process.

First, since our engine of growth is industrial production, in this work our peaks and troughs will be those of industrial production. This yields a set of dates differing by a year or more from those yielded by other series. The traditional dating of cycles in the history books derives from financial panics—either bank failures or stock exchange collapses. This is partly because monthly and even annual data of production were scarce when trade cycle studies began in the nineteenth century, whereas financial crises are exciting and spectacular events. But it also followed from the original investigators' belief that cycles were essentially financial phenomena, caused by fluctuations in the supply of money or credit. This approach was temporarily abandoned in the 1930s and 1940s, in favour of 'real' causes especially fluctuations in investment opportunities—although it is now again in favour in some circles. Some confusion results. Since some financial crises occur after the physical changes which have occasioned them, output and financial data do not always yield the same peaks, and it is somewhat jarring to be told, for example, that the crisis of 1873—one of the widest and best known—actually occurred in 1872! The idea that changes in stock exchange prices always precede real changes in the economy is a modern myth. It should be noted specifically that our peaks and troughs are not the same as those of the National Bureau of Economic Research, which constructs its reference cycles by averaging out many different financial and physical series (with the useful by-product that it can single out those which consistently lead, and use them as forecasters for the short term—say the next six months—though not for years ahead).

Secondly, a peak year has to stand out above its neighbours; but by how much? Most historians go by average levels; year 6 qualifies as a peak if it exceeds both years 5 and 7. This is not satisfactory in an economy where the labour force is growing all the time, and where investment plans presuppose built-in growth of demand. In such an economy a year which grows by less than the average will be a disappointing year; unemployment will mount, and profit expectations will be frustrated. For students of growth a peak year must exceed its predecessor by at least the normal rate of growth. As a corollary it follows that year 6 may be a peak year even if it lies below year 7. The definition of 'normal' will vary according to context; in the context of Chart 1.1 it is given by the slopes of the straight lines.

1.02 The standard cycle is the Juglar cycle, of about nine years' duration. This was the first to be identified,<sup>11</sup> and since it held the field alone for about sixty years it monopolised the title of 'the trade cycle', and is what most people mean when they speak of 'the cycle'. In the context of Chart 1.1 it is defined by two conditions to distinguish it from minor fluctuations:

- (1) Its peak is higher than all preceding points. For example, 1894 is not a Juglar peak for France. And,

- (2) Travelling forward from the peak, it takes more than two years to reach a year whose output exceeds that of the peak by more than two years of normal growth. (A line drawn from the peak parallel to the capacity straight line must take more than two years to touch the curve again.) Thus for France 1903 is not a Juglar peak.

On this definition the dates of the Juglar peaks are roughly: 1872/3, 1882/4, 1889/92, 1899, 1906/7 and 1912/13. It is also possible to treat 1875/6 as an extra Juglar peak for France and Germany, with some UK interest. We are not absolutely certain that 1913 would have proved to be a Juglar peak if the Great War had not erupted in 1914, but it is usually included in the list of Juglars.

One needs the double dates because the peaks do not coincide in these four countries. Naturally the countries react to each other's fluctuations, but each has its own momentum, which yields its own timing. One must be wary of taking these figures too seriously. We are talking about differences of one per cent above or below a line, and they are not sufficiently accurate for reliable deductions in this range. Nevertheless, for what they are worth, they indicate that no single country consistently leads the others into recession. This can be seen by examining our twin peak years to see which countries turn around in the first twin year. The list is:

1872	USA
1882	France (? USA)
1889	UK
1906	(? USA)
1912	France

Each country takes its turn except Germany.

An even more remarkable sign of independence is that France, Germany and the USA all escape one or more Juglar recessions; France those of 1872 and 1907, Germany that of 1907, and the USA that of 1899. Since each of those recessions was quite severe in the other countries, the autonomous elements in each country were obviously powerful.<sup>12</sup>

1.03 Kitchin peaks are the Juglar peaks, plus those that were eliminated by the definition of a Juglar peak. Kitchins do not show up well in data of industrial production. They are thought to originate primarily in fluctuations in inventories and bank credit, and can be traced back to the eighteenth century, when industrial production was still small. Using again the indexes of manufacturing and mining only, one can add for the USA 1895, 1899, 1903 and 1910. US Kitchin lists usually include 1887 and 1890, which were indeed years of financial excitement, but these flurries make small dents in the industrial index. For France one can add 1872, 1889, 1894, 1903, 1907 and 1909. Our two other countries seem to have been less nervous than France and the United States. The British add only 1902, and the Germans add only 1907.

Kitchins do not help to answer any of our three basic questions, so we shall pay no more attention to them.

1.04 Kuznets cycles were identified by observing that alternate Juglar depressions in the United States were particularly severe. This was true of the years following 1872, 1892 and 1907—intervals of twenty years and fifteen years respectively. Carried forward, the series

includes 1929, some twenty-two years later. Taken backwards, it is interrupted by the Civil War, which will have broken the sequence, if there was a regular sequence. Prior to that the next recession to qualify as a 'great depression' is that of 1837 and the early 1840s. Earlier than that it is hardly profitable to go, since industry and investment would be too small in relation to national income for their fluctuations to produce great depressions.

Here we must pause a moment to avoid semantic confusion. American writers give the title 'great depression' to any depression of great severity, and specifically to the five we have just enumerated: 1837, 1872, 1893, 1907 and 1929. British writers sometimes use the term for the whole of the long period of falling prices, 1873 to 1896. In this book the term is used in the American sense.

The severity of recessions is measured in various ways. A recession has two dimensions, its length and its depth. A simple way to measure its length is to count from the peak the number of years it takes to achieve two years normal growth of output, measuring normal growth as say the rate of growth between the two preceding peaks. Depth is concerned with the percentage fall from peak to trough. A recession may be shallow but long, like that starting in Britain in 1873; or deep but short, like that which succeeded it in 1883. A measure that combines length and depth is obtained by projecting a straight line forward from one Juglar peak to the next, and calculating the proportionate area between the straight line of potential capacity and the curve of actual output.

Great depressions were not confined to the United States. All our other core countries experienced them, but at their own dates. Germany underwent a great depression starting in 1876; this was mild by comparison with other countries' great depressions, but very severe by Germany's own average performance. France started great depressions in 1882 and 1899; Britain in 1883 and 1907.

What all these great depressions have in common is that they coincide with the ending of construction booms in their respective countries. This can be seen in Chart 1.2. Construction series are unreliable and hard to find; the struggle involved in preparing those which are used in this study can be seen in Appendixes I and II. What appears in Chart 1.2 are percentage deviations from semi-logarithmic straight line trends.<sup>13</sup>

Fluctuations in construction do not follow the pattern of Juglar cycles either in length or in depth. The stereotype is of a fluctuation which covers two Juglars, but this is a perfect fit only for France. US construction may also be said to have covered two Juglars, but the fit is not perfect; first because, as we have noted, the US skipped the Juglar recession of 1899, in favour of one long upswing from 1894 to 1907; and secondly because there were sizable flurries of construction activity between 1895 and 1897, past the onset of the great depression of 1893; and again between 1909 and 1912, past the great depression of 1907—these flurries being no doubt part of the reason why the great depressions of 1893 and 1907 were not as severe as those of 1873 and 1929. Britain is also hard to fit into an alternating pattern of mild and severe Juglars, since the recessions starting in 1883 and in 1889 were both bad, and the next two (1899 and 1907), though mild in themselves, were on a declining trend which produced heavy unemployment and emigration after 1907. Only France has the typical pattern of alternation, since its great depressions started in 1882 and 1899. If we date British great depressions as starting in 1883 and 1907, we find that in the four countries not only the dates but also the intervals were different (USA twenty years and fifteen years, France seventeen years, UK twentyfour years and Germany no repetition).

The fluctuations in construction which run with these great depressions are much wider than those in manufacturing. The strength of the long construction boom accounts for the mildness of those Juglar recessions which lie on their backs; while the depth of their valleys is what gives us the great depressions of the Kuznets cycle.

We can avoid a semantic debate. Some economists deny that there was a Juglar cycle in the United States; they see only Kitchin and Kuznets depressions—this is inherent in the National Bureau’s reference cycle pattern. One could also take the same line for France, by treating 1892 as a Kitchin and not a Juglar peak. This argument is not necessary for our present purpose, because we shall care only whether a recession was a great depression or not; so it is the underlying construction cycle which sets our pattern.

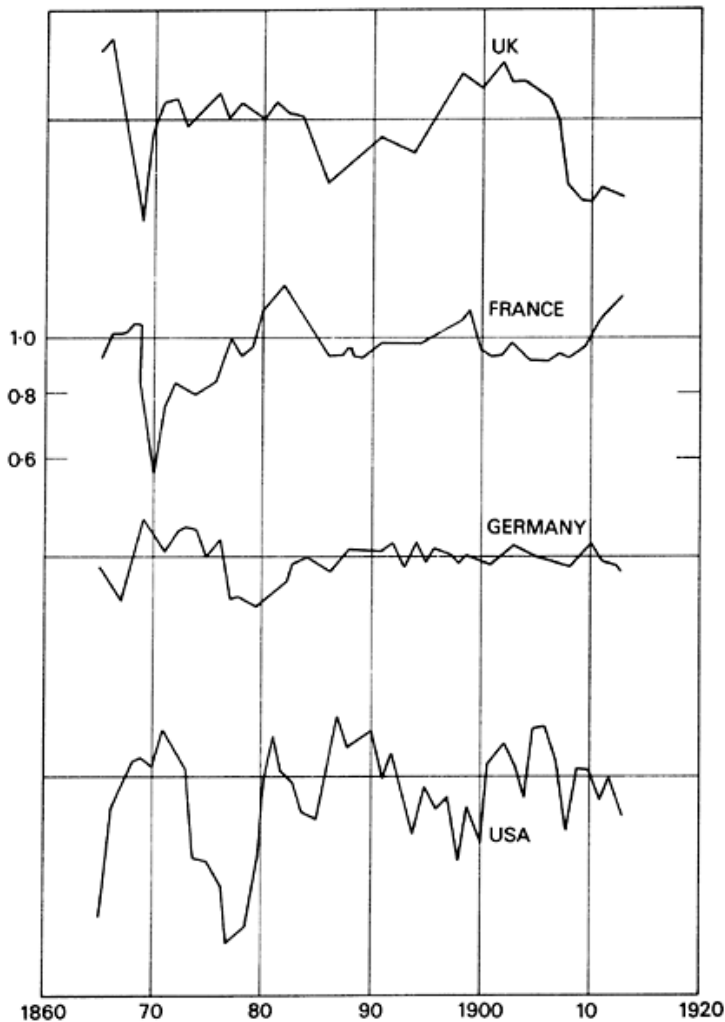


Chart 1.2 Construction



In identifying Juglar cycles we touched on the question of the mutual interdependence of the core countries. This question has been raised even more acutely for building cycles. Here the starting point is not the coincidence of peaks, as in manufacturing, but rather the fact that the American construction booms appear to alternate with those in Western Europe. Thus US construction edged out<sup>14</sup> in 1873, German in 1876, British in 1883, French in 1884. US construction edged out again in 1892, French in 1899, British in 1906 (Germany passes). US construction edged out again in 1910 when France was just launching what would have been a major new effort.

This spreading out of the times of construction booms could be purely accidental; Brinley Thomas argues the opposite case.<sup>15</sup> He sees the American building boom as needing and reflecting the immigration of persons and capital from Europe. This took place in long waves. On this view, during the American upswing domestic investment was reduced in Europe, whether for lack of capital, or for lack of demand (slower growth of numbers to be housed and employed in towns), or for lack of labour (slower growth of labour force). Hence European construction had to alternate with that of the United States. Whether the USA forced this pattern upon Europe, or whether the European pattern originated in demographic cycles in Europe and then forced itself upon the United States, contains elements of the chicken and egg problem. We do not for our purposes have to settle these disputes, since we are accepting fluctuations rather than explaining them, but our material will have bearing on them.

None of this involves the question whether building fluctuations are a cycle, in the sense that they are self-generating and predictable, or whether they are a random phenomenon. The question has been examined particularly with reference to the United States.<sup>16</sup> However, there were at most two such completed cycles in the USA between the Civil War and the First World War. What happened before the Civil War is obscure, and what happened after 1913 was presumably profoundly affected by the First World War. Statistical analysis of a species which contains only two individuals is not promising.

Our journey through this maze of different kinds of fluctuations in different countries at different times is meant to discover whether the core as a whole pulsated with a pattern of its own; and if so, what this pattern was, and whether it constituted an accidental sum of unrelated parts, or had a unity of its own. Specifically, as has been alleged, did the engine of growth slow down between 1873 and 1895, and then accelerate between 1895 and 1913; and was this why prices fell to 1895 and rose to 1913? This is the heart of the Kondratiev puzzle.

## THE KONDRATIEV PRICE SWING

1.05 The Kondratiev cycle began life as an observation about prices, not about production. A graph of wholesale prices shows long waves in prices of about fifty to seventy years' duration. For example, if one takes British wholesale prices, they rise from say 1770 to 1813, fall to 1849, rise to 1873, fall to 1896, rise to 1920 and fall to 1933.

Chart 1.3 graphs British wholesale prices for our period. These prices are representative of the principal commodities in world trade because the country was then committed to free trade. Wholesale prices of the other core countries all show the same general characteristics, falling from 1873 to 1895, then rising from 1895 to 1920. Since part of this trend



was due to the fall in shipping freights, also shown in this chart, a curve is also given which represents wholesale prices minus shipping freights.<sup>17</sup>

This price swing is all-pervasive. It does not apply to all commodities, but will be found in most. It is found in money income; 'gross domestic product deflators' have a turning point in the middle 1890s. Money wages fall in the 1870s, and start rising again in the 1880s; their turning point comes earlier than most. Interest rates and share prices fall, then rise again after 1895.

1.06 The Kondratiev price swing is central to our interests for several reasons. In the first place we want to know how it relates to the pace of growth of the core, whether as cause or as effect.

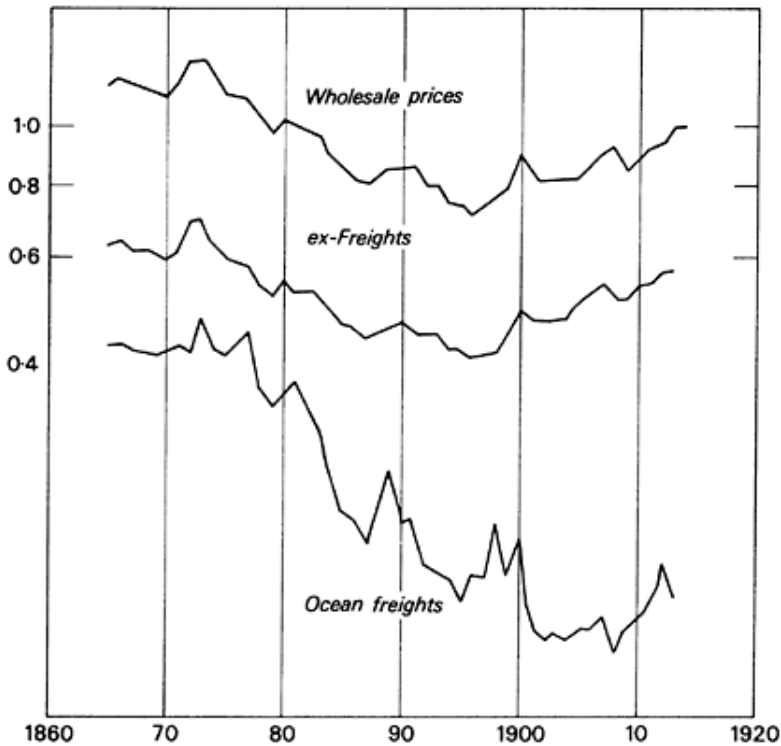


Chart 1.3 Wholesale Prices and Freights

The thesis that the fall in prices slowed down the growth rate originated in the 1880s, when it figured largely in the evidence tendered to the British Royal Commission on the Depression of Trade and Industry in 1884. Witnesses argued that the price decline was due to a decline of gold production; that profits were thereby squeezed, and investment was discouraged.

That falling prices depress profits in the short run is not in doubt; profits fall in the Juglar downswing and rise in the Juglar upswing. This is because money wages and other contractual payments adjust to changes in price only after a lapse of time. They do, however, adjust; and their adjustment is facilitated by the continued increase in productivity, which

makes it possible to raise (or lower) the absolute level of wages without changing its relative share. What we need to know is what happens to the long-run share of profits over two decades of rising or falling prices, and this we shall have to explore.

However, even if price changes did not affect the share of profits, a downturn of prices could depress investment psychology by turning the terms of trade against debtors in favour of creditors. Debtors' calculations are upset because the debt charges (interest plus repayment of the loan) now absorb a larger share of their real output than was expected. Bankruptcy rates therefore increase, and the investing community (as distinct from the financial and lending communities) retreats to lick its wounds. To be sure, interest rates then fall—the association between falling prices and low interest rates and between rising prices and high interest rates is well established—so that investment is resumed after a while. But if we are talking about price movements over two decades (up or down) this lag occupies a considerable proportion of the time, so it is quite conceivable that such a movement will see investment decelerate during the downswing and accelerate during the upswing.

The question whether 'the Great Depression of 1873 to 1896' was for Britain only a price phenomenon or also a period of decelerating growth has been debated for a long time in what is now an enormous literature.<sup>18</sup> That the economy decelerated is beyond question, and we shall later be examining why this happened. But since industrial production decelerated even more after 1900, when prices were rising, as a glance at Chart 1.1 will show, the fall in prices before 1895 can hardly bear the main responsibility, if any. We shall look as the question again for the core as a whole.

Schumpeter turned the proposition on its head.<sup>19</sup> He accepted the association between falling prices and output deceleration and between rising prices and acceleration of output, but he argued that it was the changes in the growth of production which caused the change in prices, and not the other way round. These changes in output he attributed to changes in investment opportunity due to changing technological advance. Thus the period 1850 to 1870 was one in which the core countries took to a state of near maturity the new opportunities in coal, iron, railways, steamships, textiles and clothing. The next set of big opportunities would be exploited after 1890: steel, electricity, organic chemicals, the internal combustion engine, automobiles; generating another upswing of prices. In between 1870 and 1890, according to this version, the core was simply coasting, and prices fell. The propensity for technological innovations to bunch in this way, with twenty-five years of voracious investment followed by twenty-five years of somnolent digestion, Schumpeter called the Kondratiev fifty-year cycle, with the emphasis on production rather than on prices.

Now Schumpeter was one of our greatest economists, with an extremely subtle mind, stored with historical data, so one cannot in half a paragraph do justice either to his argument or to the wealth of material with which it is illustrated over two large volumes. The reader must savour this pleasure on his own. We introduce this brief statement of the theme only in our process of laying out the ground which we shall be having to cover.

Our interest in Schumpeter's story is not in the logic of his model, but in how well it fits the facts. First, did the industrial growth of the core decelerate and accelerate as described? And secondly, if it did, was this due to some common element working its way through the whole system? For it is conceivable that with each country going its own way the sum of their activities could nevertheless add to a pattern of two decades of deceleration followed by two decades of acceleration, even though none of the four showed this pattern in itself.

The key to this is to study the set of Kuznets great depressions and their alleged inter-relationships. This is why we begin by examining in detail how the individual countries fared, before tackling the movement of the core as a whole.

1.07 The Kondratiev price swing is of interest, secondly, because it was accompanied by a change in the terms of trade between agriculture and industry. Agricultural prices fell more to 1895, and then rose, relative to industrial prices, to 1913.

The burden of the downswing fell upon the farmers both in the core countries and in the peripheral countries—this being one of the places where our three questions come together (about the pulse of the core, the Kondratiev price swing, and core-periphery relationships).

Farmers in the core countries suffered a double burden. The fall in prices would have hurt them as debtors even if industrial prices had fallen equally; the widened gap between industry and agriculture was an additional blow. In Western Europe the main result was to push agricultural tariffs upwards everywhere except in Britain, starting from the German tariff of 1879 and the French tariff of 1881. A tariff could not help the US farmers. They mounted a general attack on ‘monopolies’ which maintained prices against them, especially on the railways, on the industrial mergers and trusts, and on the banks; they became free traders, spearheading the attack on industrial tariffs, and their associations provided the solid foundation of the populist political movement which surged in the last quarter of the century. They also became involved in the demand for reflation, and therefore with the interests who sought to increase the coinage of silver. Whereas in Europe ‘radicalism’ was an urban, potentially working-class phenomenon, in the United States the large farm population, still 43 per cent of the labour force in 1890, was the foundation for mass democratic politics.

It is true that not all farmers were affected equally. For example British livestock farmers benefited from the fall in grain prices and the accompanying pressure on rents; some regions therefore prospered more because of falling prices. Similarly in the United States mid-western farmers may have gained as much from the fall in railway rates plus falling industrial prices as they lost from the lower price of wheat; not to mention the substantial increase in output per man deriving from mechanisation. But enough farmers were damaged to make a big protest movement, and well-organised protest movements attract large followings.

Then after 1895 agricultural prices turned around, and the burden fell on the urban working class. Real wages did not rise in Britain after 1899 until the 1920s, having risen around 40 per cent over the preceding two decades. Real wages continued to rise in Germany and the USA, but the rate of growth was sharply cut. So the first dozen years of the twentieth century saw great industrial turbulence, reaching its pitch in Britain, where the Edwardian era is one of great industrial turmoil, matched only by the years 1920 to 1926 and by current times (since the mid-1960s). The membership of trade unions rose between 1900 and 1913 from 2.0 to 4.1 million in Britain, from 0.1 to 1.0 million in France, from 0.9 to 3.0 million in Germany, and from 0.8 to 2.7 million in the USA. Perhaps if figures were available extending these numbers back to 1870 the growth rate might prove to have been fairly constant, but in union struggles it is numbers that count, and growth from one hundred to three hundred is not of the same order as growth from one million to three million.

In fact the years of the preceding Kondratiev price downswing were by no means quiescent industrially, despite improving terms of trade for the urban population. Industrial relations in the 1850s and 1860s had been quiescent, following the industrial and political turbulence of the 'hungry forties' that had culminated in the revolutions of 1848. However, from 1870 onwards organised hostility to 'pure' capitalism or to the unregulated market economy mounted steadily. This was not confined to the workers with their trade unions and burgeoning political institutions, nor to the farmers. All classes of society sniffed the wind. The industrialists abandoned free trade, which had been spreading widely in the middle of the century. The last triumph of free trade was the Anglo-French Treaty of 1860; after 1873 the tide turned, and tariffs began their steady upward march towards their peak in the 1950s. Industrialists also repudiated the gospel of free competition in the home market, and began a movement towards associations, cartels, mergers, combines and trusts, of which the celebrated 'multinational company' is only the latest phase. The middle classes also moved leftwards, tasting Fabianism, Populism and Social Democracy. The welfare state was spawned, fathered by of all people the German chancellor, Bismarck. The trend was compounded by the economists' abandonment of Malthusian political economy, whose more dismal adherents had taught that attempts to raise working-class living standards were doomed to frustration. By 1880 the economists' long march into algebra had already begun, and with it, until the temporary glamour of the Keynesian system, disappeared their intellectual prestige.

To disciples of Schumpeter, this transformation of economic and social ideas seems a natural accompaniment of the Kondratiev downswing.<sup>20</sup> This is not, however, obvious. The change of temper cannot have been due to falling prices, since prices turned the terms of trade in favour of urban communities. It was probably associated with the series of great depressions. It is hard to maintain faith in an unregulated market system which puts worthy artisans out of work for years and brings bankruptcy to thousands of respected business people, large and small. True, there had been a great depression in the forties, but that was thirty years before, and the industrial population had been quite small then in relation to total population, except in Britain. To enter after 1870 into a period (which would last to 1940) where no decade would pass without a great depression in one or other of the four leading industrial countries would prove to be a shock which the free market ideology could not possibly survive, except in isolated ideological enclaves. However, it is not clear that this owed anything to the long swing in prices. Great depressions occurred after 1900, when prices were rising, just as they had before. Probably the main explanation is that as the industrial system spread, drawing in more and more people, its recurring harshness came to be more widely felt and understood, and all classes of the community organised to protect themselves and to extend help to those with whom they sympathised.

The political effects of the Kondratiev swing are outside our field; we mention them only to indicate the social importance of this price phenomenon. Hereafter we shall keep to the economic story in so far as we can separate it out.

## CHALLENGE AND RESPONSE

1.08 The 1870s are a good starting point for our inquiry because most of the countries of the periphery outside Europe trace the quickening of their rates of growth to that decade or

after. Many had of course been in the world market long before 1870, but if we ask in how many real income per head grew by 10 per cent over two decades, our answer would yield only Ceylon, starting in the 1830s, Brazil and Australia in the 1850s and Argentina in the 1860s. The rest were yet to experience significant growth per head.

The reason for this is the rapid growth of their foreign trade after 1870. World trade was growing quite rapidly in the middle of the nineteenth century, but this growth was confined primarily to trade on the North-West Europe-United States axis. More distant trade depended on the great fall in transport costs which occurred after 1870. Shipping freights had been falling for a couple of decades, as iron and steam displaced wood and sail, but the downturn after 1873 was spectacular. According to Cairncross,<sup>21</sup> the index of inward freight rates to the United Kingdom fell 73 per cent from 1873 to its lowest point in 1908. With lower freights, distant countries could now compete in the markets of Europe and North America; and the heavier commodities—heavy in relation to value—now moved into international trade.

Also important in lowering transport costs inside the peripheral countries themselves was the building of railways inwards from their ports. Western Europe and North America in 1870 were already relatively well off for internal transportation. Not only had they been building railways for forty years, but they had already experienced their first transport revolution the building of canals and of metalled roads which began in the second half of the eighteenth century. This first transport revolution had largely by-passed the rest of the world, which moreover did not begin extensive railway building until well into the second half of the nineteenth century, when international lending for this purpose began to increase.

The core countries contributed to the development of the countries at the periphery in three separate ways.

First, they offered a new and highly productive technology. The essence of the industrial and agricultural revolutions in the first three-quarters of the nineteenth century was in new ways of doing old things—of making iron, textiles and clothes, of growing cereals, and of transporting goods and services. In the last quarter of the nineteenth century the revolution added a new twist—that of making new commodities: telephones, gramophones, typewriters, cameras, automobiles and so on, a seemingly endless process whose latest twentieth-century additions include aeroplanes, radios, refrigerators, washing machines, television sets and pleasure boats. Thus a rich man in 1870 did not possess anything that a rich man of 1770 had not possessed; he might have more or larger houses, more clothes, more pictures, more horses and carriages, or more furniture than say a school teacher possessed, but as likely as not, his riches were displayed in the number of servants whom he employed rather than in his personal use of commodities.

The point is relevant because we are sometimes told that the revolution was a revolution in mass consumption, and could take hold only in countries sufficiently egalitarian in their income structure for their masses to be in a position to buy all the new commodities which the revolution would produce. This is not so. The revolution consisted of cheaper ways of making already existing things, and was therefore immediately available to any country which was already producing iron, textiles or clothes, or growing cereals be it Sweden or Russia, Brazil, China, Japan or India. One should note, for example, that India opened its first modern textile mills in the 1850s, and its first modern ironworks in the 1870s. Why

some countries adopted the new technology quickly while others held back, is a fascinating question.

Secondly, the core countries contributed resources—specifically capital and people. Private international investment in the periphery (i.e. excluding the USA) was small in the middle of the century, moving upwards to a peak just before the First World War, at a level which it would not again attain (in real terms) until the 1960s. This was also the great age of international migration, not only from all over Europe into ‘the countries of new settlement’, the Americas and Australasia, but also from India and China into countries throughout the tropical world.

The reasons for this movement have been much explored. Why did people leave Europe or India? How large were the ‘pull’ and the ‘push’ factors respectively? Was the investment of capital abroad due to declining profits at home? Why was it so large in the 1880s when the prices of primary commodities were falling?

Thirdly, the core contributed its own markets; it was willing to buy some of the products of the periphery. This, however, was a limited opportunity. One of the myths of this subject is the belief that the industrial revolution of the core depended on importing raw materials from the periphery. The raw materials of the industrial revolution were coal, iron ore, cotton and wool; the foodstuff was wheat. All these the core produced for itself in abundance, with the United States and Europe complementing each other. Their chief deficiency was in wool, through which Argentina and Australia received their stimuli. Apart from this the core’s principal imports in 1850 were palm oil, furs, hides and skins, a little timber, tea, coffee and other commodities in small quantities. It is hardly an exaggeration to say that the industrial revolution in the core did not depend on the periphery.

The situation changed as the nineteenth century drew to a close. New technology demanded copper for electric wiring, rubber for bicycle and motor car wheels, oil for the internal combustion engine, and nitrates for the wheatfields; it also created new trades in refrigerated meat and bananas. The population explosion, coupled with rising incomes, increased the demand for tea, coffee, cocoa, vegetable oils, raw silk and jute. The closing of the American agricultural frontier gave new opportunities to the wheatfields of Argentina, Australia, Canada and Eastern Europe. In addition the periphery created one new international trade internal to itself—the big demand for rice in the new tropical market economies.

Many peripheral countries had very little industry of their own to start with. As they expanded their exports, their demand for manufactures grew. This presented an opportunity for what we now call import substitution. This feature is common to the history of every country since the industrial revolution. France, Germany and the USA felt the impact of the British industrial revolution early in the century through mounting imports; they were substituting for imports of textiles down to the 1850s and for imports of iron down to the 1880s. Since then, import substitution has been adopted by every developing country in the world. The first stage of industrialisation in any country is either to process raw materials for export or to substitute for imports.

1.09 To divide the world into a core and a periphery is helpful, because the technology, resources and markets of the core countries played essential roles in the development of the periphery. But it is also misleading if it suggests that the countries of the periphery were a single category. The main interest of the subject lies in assessing why the peripheral coun-

tries responded at different speeds. Their geographical resources—minerals, soils, climate were quite different. Some had already developed further than others by 1870, having more infrastructure and education, and higher levels of technology. Moreover there were great institutional differences as regards the status of labour, the extent of the market economy, financial institutions and government systems. The effect of these differences is not always obvious; even in our own time the fastest growing among the less developed countries are not always those with the best material resources, the highest levels of education, the highest per capita income or the strongest governments. We can learn something about such matters from studying development in our period.

1.10 Finally core-periphery relations were not only technological and economic but also political. The imperialists tell us that the finest contribution of the core to peripheral countries was good government. The anti-imperialists argue variously that empire was good, but in due course outlived its time; that it was irrelevant to development; that it actually held back development, by prohibiting certain activities or channelling them into spheres of limited potential; or that it de-developed, in the sense of actually reducing living standards or even killing people. Since colonies were governed very differently—‘the colonial system’ is another myth—one could nominate at least one colony to fit each of these categories, from best to worst. In addition anti-imperialists emphasise that the urge to acquire empire came from commercial imperatives—the search for markets, raw materials or investment opportunities, or the desire to avoid being excluded by others—and was part of the inner logic of capitalism rather than an adventure to bring civilisation and religion to backward peoples such as is portrayed in the children’s history books.

The colonial empires had for the most part been carved out long before 1870—the principal exceptions being parts of Africa, Indochina, the Pacific Islands, and the territories acquired by the USA from Spain in 1898. Indeed large parts of the imperial system had been acquired long before the industrial revolution began. So while the causes of empire building are a fascinating question, an explanation cannot lie within the confines of this study.

Our concern is rather with the influence of empires on growth or retardation. But here the answers are more numerous than the number of imperial powers, for not only did the imperial powers differ among themselves, but the same power pursued different policies in different colonies—the most spectacular example being the diametrically opposed policies of Britain in Kenya and in neighbouring Uganda. Hence, when seeking the causes of growth or retardation, one has to look at each colony separately, instead of trying to fit all colonies into a unique colonial pattern. No colonial power helped its colony to industrialise, but in everything else that might help or hinder development—education, alienation of land, encouragement of small farming, discrimination in employment, investment in infrastructure—their policies were very diverse, and ranged as widely as those of self-governing countries in the periphery.

So much by way of setting out the questions that we shall be investigating. Now we can begin to look for the answers.



# Chapter 2

## The Juglar Pattern

SYNOPSIS: 2.00 The main purpose of this chapter is to establish whether there was a Kondratiev swing in core industrial production corresponding to the Kondratiev swing in prices.

2.01 Our survey opens with the great boom of 1873. 2.02 The boom was followed by a great depression. 2.03 In Britain, France and Germany this depression was long rather than deep. 2.04 In the USA it was both deep and long. 2.05 The cumulative effect was that core production did not decline but stood still for six years, during which the gap between actual and potential production widened to an extent not again experienced until the 1930s.

2.06 Prices may have fallen in the 1870s and 1890s because of great depressions, but why did prices fall in the 1880s? 2.07 The USA experienced almost unbroken prosperity in the 1880s. 2.08 So also did Germany. 2.09 But France went into a great decline after 1882. This is usually attributed to agricultural depression, but the abrupt cut in government expenditures, following the abandonment of the Freycinet Plan, is a more likely cause. 2.10 Britain also went into a decline. The suggestion that this was due to the pull of US prosperity on British capital and labour is not tenable. It was due to the low profitability of manufacturing resulting from deceleration of exports and acceleration of imports.

2.11 All four countries went into Juglar recession early in the 1890s. But while Britain, France and Germany were very prosperous in the second half of the 1890s, the USA plunged into another deep and long depression. 2.12 Balance of payments problems and a drain of gold plagued the USA in the first half of the 1890s, but were overcome in the second half. Also railway investment, which had led earlier recoveries, was now more hesitant as the main railway network neared completion.

2.13 The upswing of prices from 1895 had no common effect on growth or fluctuations of the four core countries. Their diversity continued. After a slight setback in 1900, Germany resumed its almost unbroken prosperity. 2.14 The US recovery continued until 1906/7, whereupon a new great depression began. 2.15 France progressed to a superboom in 1899, followed by a great depression, and then to another superboom culminating in 1912. 2.16 The UK was very prosperous to 1899, then languished.

2.17 Each country has its own unique pattern of superbooms and great depressions. The pattern obtained from adding the four together has no independent explanation of its own.

2.00 In this chapter we shall study Juglar and Kuznets fluctuations, mainly with an eye to discovering whether they contribute to explaining the Kondratiev swing in prices.

This chapter has become somewhat long because, originally planned as a general review, it now has embedded within itself (in order to controvert some conventional wisdom) detailed essays on Britain and France in the 1880s, and the USA in the 1890s. The general reader is therefore invited to skip sections 2.09, 2.10 and 2.12, unless specially interested in their subject matter.



## THE SEVENTIES

2.01 Our period begins with the great boom that culminated in the great depression of 1873.

One distinguishing feature of the boom, which stands out in Chart 1.2, is that this would be the last time for eighty years that all four countries in the core would be having a construction boom simultaneously. The synchronisation was not perfect. France and the USA started first, and finished first; France because its economy was completely stunned by the Franco-Prussian War. Britain and Germany started a little later but went on much longer; Britain delayed by the slump in railway building following its minor recession of 1866, and Germany set back slightly by war in 1870.

In the United States the boom was clearly making up for time lost during the Civil War. Immigration was resumed, but this was not the main feature of the boom, since the average annual number of immigrants, over the most intense five-year period, 1869/73, although slightly larger than that of the preceding peak of 1850/4, namely 385,000 compared with 382,000, was considerably smaller in relation to population.<sup>1</sup> The housing boom also was not abnormal. Gottlieb's number of 'new housekeeping units' built<sup>2</sup> averages 171,000 over its biggest five-year cluster 1869/73, as compared with 137,000 over the period 1853/7; but this growth rate of 1–4 per cent per annum does not compare with the 4·8 per cent per annum growth of urban population between 1860 and 1870. More impressive is the leap of manufacturing production, which grew by 32 per cent in the six years 1860–6, rising to 48 per cent between 1866 and 1872. But most impressive of all is the contribution made by railway investment; railway mileage operated more than doubled between 1865 and 1873 (from 35,000 to 70,000 miles); this was the heart of the US boom.

The other spectacular boom was in Germany. Here also industrial production leapt spectacularly, led by pig iron, which doubled between 1860 and 1866, and doubled again between 1866 and 1873, and by the cotton industry which, somnolent during the US Civil War, also now doubled its output between 1866 and 1873: thus the cessation of the US Civil War promoted not only the US boom in manufacturing, but also similar booms elsewhere.<sup>3</sup> In Germany an enormous influx into the towns<sup>4</sup> set off a housing boom, which would last until 1876. Here too railway building was important, the mileage open doubling between 1867 and 1876. Helping to finance this boom, of course, was the reparations payment of five thousand million francs received from France in gold between 1871 and 1872.

2.02 Booms come to an end, but for the purpose of this book it is not necessary to investigate the mechanism, whether by means of econometric equations or by giving a blow by blow account.<sup>5</sup>

The United States exhibited all the usual phenomena. Railway building slowed, and many companies went bankrupt. Immigration declined, as did the building of houses. Three hundred banks collapsed. Industrial production fell sharply. Unemployment mounted. The depth of this depression displays itself in Chart 1.1, where at the trough of 1876 industrial production is 40 per cent below the potential capacity line. No other depression before that of 1929 shows such an enormous gap. According to rumour some three million persons were unemployed. This is highly implausible since, although it would only represent 23 per cent of the labour force compared with 25 per cent in 1932, it would also amount to