SUMMARIES OF LECTURES in ECO 303Y1:

the Economic History of Modern Europe, to 1914

for the Academic Year: 2012 - 2013

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Updated: Thursday, 28 February 2013

XIX. Week no. 19: Lecture no. 24: for 27 February 2013 (following Reading Week)

Section V: the Rapid Industrialization of Germany, 1815 - 1914 . A common theme of all these lectures is the increased role of the state in German economic development and industrialization.

The Rapid Industrialization of Germany in the 19th and early 20th centuries

1. **An overview of 19th century German industrialization:**

a) **Relatively slow economic growth of the various German states (not yet united) in the 18th and early 19th century:** up to about the 1850s: well behind France and the Netherlands, as well as Great Britain.

b) **The initial 'take-off' period, from the 1850s to the 1870s:** key features
(1) The German Zollverein, of 1834: political forces for market unification.
(2) German Railroads: for the physical integration of the Germany economy
(3) the Prussian Emancipation Law of 1851, and agricultural modernization thereafter;
(4) the role of the Investment Banks or Universal Banks.

c) **From the 1870s to World War I:**

i) the period of most rapid and complete industrialization was from the 1870s to World War I: in steel, chemicals, and the electrical industries, all 'new' industries from the 1860s.

ii) In steel, Germany gained European mastery by the 1890s;

iii) and in the other two -- chemicals and the electrical industries -- Germany gained world mastery (i.e., ahead of both Britain and the US) also by the 1890s.

iv) Was Germany a victim of the so-called 'Great Depression' of 1873-1896, a deflationary era:
(1) no evidence of any such depression, though the trade statistics indicate a slower rate of export growth
(2) but the evidence also indicates faster growth rates and the final achievements of industrial supremacy in the following inflationary era: 1896 - 1914.

2. **The German Steel Industry, from the 1870s:**

a) **We used the Webb thesis (1980):** to explain how Germany gained European mastery in steel production (or in many aspect of steel production).
i) Contrary to expectations of traditional economic theory, the explanation lies basically in the combination of protective tariffs, industrial cartels, investment banks, and state support for those cartels.

ii) Tariffs and cauterization soon led to almost complete vertical and horizontal integrations, with large increases in scale economies, involving extensive mechanization.

iii) Vertical integration and extensive mechanization led to significant productivity gains, especially in fuel economies, by producing steel 'in one heat' -- converting pig iron into steel while still semi-molten, by savings on transportation and transaction costs, and by economies of scale.

iv) Steel cartels, owning iron and coal mines, and railroads, subsidized inputs, especially coking coal, while charging much prices to those outside the cartel, especially to foreign buyers (chiefly France); and offered discounts to ensure compliance with cartel pricing and market sharing.

b) **The ongoing debates about supremacy in the post-1870 steel industry:**

i) David Landes had made many of Webb's points earlier, in 1979, stating that 'The Germans put big and bit together, while the British kept small and small apart.'

ii) Those views were challenged by Donald McClosky, whose reply in turn provoked further responses.

iii) Thus we discussed the Landes-McCloskey-Allen debates, in which McCloskey (1981) had contended that the British steel industry was at least on a par with the American and German steel industries, if not superior in some aspects.

iv) The statistical evidence presented led us (or me) to conclude that the British steel industry, by the 1890s, was inferior in productivity and pricing to both the American and German steel industries.

v) Indeed 70% of German rolled steel went to British and Imperial markets.

vi) Price evidence shows that while German cartels exported steel at somewhat lower prices than those charge in the domestic markets, nevertheless, German steel export prices were still lower than British domestic prices, for comparable steel products.

c) **How did the British respond and survive in the international steel markets?**

i) With Britain's steady resolve to maintain complete free trade and the Gold Standard, how did the British steel industry survive?

ii) The answer lies in Comparative Advantage:

- the Germans had a distinct absolute and comparative advantage in Bessemer steel,
- while the British conversely had a comparative advantage in Siemens-Martin Open Hearth Production: producing higher cost but far higher quality steel, with smaller scale economies.

ii) Both industries in fact shifted over the long run to Siemens-Martin, but the British maintained a lead until World War II.

3. **The New Chemical and Electrical Industries, both of which were coal-based.**

a) **Germany's natural resource endowment,** with ample supplies of coal (and also potassium and sulphur) provides one explanation, but hardly a compelling one since Britain had even more ample supplies of coal.

b) **The difference,** we argued, lies in Germany superiority in science: with scientific, engineering, and technical education, with far stronger links to the new industries than found anywhere else; and the evidence was presented in much detail, summarized in one table.

c) **The new chemicals industry had two key branches, both linked to coal, from which all these chemicals were extracted or synthesized:**

i) **aniline dyestuffs and alkali or soda based chemicals**, exemplified in the name of a leading German chemicals firm, then and now: BASF, located in Baden Baden, Wurtemberg: Badische Anilin und Soda Fabrik.

ii) for both, the world's textiles industries – by far the largest global industry – provided the major consumers

iii) but from coal tars, these new chemical industries produced many thousands of different products: dyestuffs, medicinal products (e.g., Bayer aspirin), pharmaceuticals, perfumes, soaps and bleaching products, explosive, etc: see the lecture notes

d) **German world mastery in the international chemicals markets:**

i) By 1900, Germany was producing 90% of the world's dyestuffs, so vital for all textile industries

ii) and 50% of all the world's chemicals, in all forms.

iii) In the early 20th century, to World War II, the leading German chemicals cartel was I.G. Farbenindustrie (guilty of war crimes in WW II -- in supply the chemicals for the mass murder of Jews, Slavs, Roma (gypsies), and others: composed of BASF, Hoechst and Casella, Bayer, and several other smaller firms

d) **The new electrical industries were also coal-based:**

i) since coal-fired steam turbine (invented by the British scientist Charles Parsons in 1884) generated almost all the electrical power.

ii) Germany, unlike France, Switzerland, and Italy, did not use much if any hydro-electric power.

iii) For this industry the German investment banks played a far greater role than in chemicals, since the industry involved very large-scale, heavily capital-intensive units, based on mass markets, with mass consumption in terms of:
(1) electric urban transport (trams, streetcars, underground trains),
(2) mass urban electrical lighting (while the British still used coal gas);
(3) telephones, and finally, by the 1890s
(4) industrial machinery, including electric furnaces for steel-making.

e) **German world mastery in the new electric industry, producing both capital goods (producers' goods) an and consumer goods:**

i) By 1910, Germany was the leading exporter of electrical goods, from small appliances to giant dynamos and generators,

ii) accounting for 50% of world exports,
(1) 2.5 times greater than those of the US or Great Britain.
(2) Siemens-Schukert became the major German cartel in this industry.

4. **Cartels: provided the final topic on German industrialization**

a) **important because so much of Germany industry** was engaged in cartel or syndicate organizations (lists given in the online lecture notes).

b) **the key features are:**

(1) the role of protective tariffs,
(2) the strong legal support from the German government and Supreme Court (in contrast to Britain and the US, where cartels were illegal -- but not in France and Russia),
(3) both support and direction from the investment banks.

c) **Cartels achieved their greatest importance in industries subject to unstable oligopolistic competition:**

i) competition between a vew very large scale firms, with major impediments to entry (high capital costs), producing homogenous or undifferentiated products (though in a wide variety of such products:

ii) each required its own separate cartel structure).

iii) Such competition was often cutthroat and highly unstable: so that investments banks, anxious to preserve their investments and equity stakes, promoted cartels to ensure stability.

d) **Certainly cartels, usually condemned in traditional microeconomic theory courses, provided Germany with enormous benefits:**

i) the usual charges against cartels -- that they misallocated resources, became inefficient, robbing domestic consumers of the 'consumer surplus', etc -- are in no way vindicated by the history of, say, the German steel industry; nor of the chemicals industries.

ii) instead, they provided relative industrial and employment security.

iii) investment in research and marketing was undoubtedly the chief benefit, especially from those cartels backed by the great investment banks:
(1) the large-scale investments in industrial and market research, responsible for thousands of innovations directly benefitting world consumers.
(2) consider that far-smaller scale business units engaged in more direct competition lacked both the will and the resources to engage in such research: so costly, risky, with no guarantees of payoff
(3) But cartels, in promising stability and more guaranteed profits and market shares, could thus better undertake such risky investments in research

iv) why would cartels, as monopolistic organizations designed to control or set prices and market shares, be interested in industrial product innovations?
(1) because such controls affected only their domestic German markets, while they still had to compete, often fiercely for international market shares with other national competitors

(2) because, for both domestic and foreign markets, often the greatest profits lay in being the first to produce totally new products, for which – though only in the short run – there were no competitors, and for which their investments in marketing research and expertise could create consumer demands, and thus high profits. (3) Think of the case of modern computer and related electronic products, and observe their price histories: from very high prices with the original product and thereafter steeply falling prices with international competition (attracted by monopoly rents).