

# **The British Stock Market and British Economic Growth, 1870- 1914**

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## I. Introduction

In 1870 Great Britain was “the workshop of the world”; the leading edge of the industrial revolution; the only superpower. By 1914 it was one of a number of industrial powers—and not the dominant one. Germany had greater industrial production *per capita*. The United States had joined Australia (the sheep-raising OPEC of the late-nineteenth century) in having higher real GDP *per capita* and standards of living.

On the one hand, Great Britain’s relative economic decline was inevitable. As the economic historian J.H. Clapham (????) wrote, it is not surprising that in the long run the United States would surpass Britain in measures of aggregate industrial production: “...half a continent should raise more coal and make more steel than one small Island.” Britain could not long remain the only superpower and the only industrial nation in a world in which engineering knowledge and scientific literacy could diffuse swiftly across national borders.

On the other hand, as Alfred Marshall (????)—John Maynard Keynes’ teacher—wrote: “It was inevitable that [Britain] should cede much [of industrial leadership]...It was not inevitable that she should lose so much of it as she has done.” It is not the fact that Great Britain was not able to maintain its relative economic and industrial edge that is surprising. It is surprising that so much of that edge vanished so quickly in the generation before World War I. This is not to say that Britain’s pre-World War I

economy was a failure. Real GDP *per capita* in the two generations before World War I grew faster than it had grown in any previous era. Attempts to find a “climacteric” or a “productivity slowdown” in the pre-World War I British economy have failed to find anything save for a possible one-decade period of Edwardian stagnation in real wages.

But there remains a sense that the British economy *might* have done better. The performance of other economies in the generation before World War I serves as a yardstick against which to measure the performance of the British economy. And measured against the yardstick of the United States or of Germany, Britain’s pre-World War I economic growth appears anomalously low.

As W.A. Lewis (????) has noted, in the last years of the nineteenth and the first years of the twentieth century Britain lost its leading position in new, modern industry after new, modern industry. Organic chemicals became German (and American), British railroads became smaller and slower than those on the continent, the development of the automobile lagged behind France and the United States, the electric power grid was put into place slowly, the telephone network was rudimentary, and so on. Even in textiles, Britain began to be excluded from foreign markets on the basis of too high a price.

British levels of productivity remained high. They just failed to grow at the same rate as in the rest of the leading edge of the industrial world. And British companies lost, or failed to develop, market position in what were

going to become the leading industries of the first half of the twentieth century.

It is surprising that Britain should first lose market share in the highest of high technology industries. Even when Britain did move into the “new” industries of the late nineteenth century, it wound up drawing on foreign expertise to do so. The first public power station in England, in 1881, was built by Siemens. On the eve of World War I, the German electrical manufacturing industry was more than twice as big as Britain’s.

Britain’s loss of market position in the most technologically advanced industries is surprising, for in those industries lies the most natural comparative advantage of the leading industrial nation. The leading industrial nation is the richest, has the most experience with modern technology, and would seem to be the best set up to train and mobilize labor and capital to take advantage of new opportunities. Yet British firms and workers appear not to have done so.

In the thirty years before World War I factors of production behaved as if there was something pernicious about locating in Britain. On net both British capital and British labor left the island for better opportunities elsewhere. As U.C. David economist Gregory Clark (????) puts it, by 1910 you could combine British labor and British capital in the textile city of Fall River, Massachusetts, and obtain 50 percent more output per worker hour and 20 percent more output per machine hour than back in the textile city of Manchester, in England.

N.F.R. Crafts (????) has advanced the possibility that Britain's early nineteenth century advance contained the seeds of its early twentieth century inability to continue to lead productivity revolutions. Britain's relative prosperity had been based on a set of technologies that greatly multiplied the productivity of unskilled workers. The poor British educational system, its weak corps of technical engineers, and the easy availability of unskilled Irish and rural British workers were no great handicap as long as the most dynamic edge of the economy intensively used both machines and unskilled workers, but not skilled workers. But technologies that made heavy use of skilled workers would be the locus of industrial development in the twentieth century.

David S. Landes (????) has pointed out that those who governed Britain did not see an educated population as a high priority. In Britain:

For every idealist or visionary who saw in education ... an enlightened citizenry, there were several "practica" men who felt that instruction was a superfluous baggage for farm labourers and industrial workers. These people, after all, had been ploughing fields or weaving cloth for time out of mind without knowing how to read or write...all they would learn in school was discontent...Under the circumstances, Britain did well to have roughly half of her [elementary] school-age children receiving some kind of elementary education around 1860.

This was a far lower percentage than found in the United States or in Germany. What was true of elementary education was even more true of technical and engineering education. In Britain, technical education was the business of private firms. But why should they train workers who might well

go elsewhere for jobs? And why should they train workers if such training only upped the bargaining power of British unions? Meanwhile, in the United States and Germany institutes of technology were founded.

Belief that the British economy might have done better intriguing on theoretical grounds because pre-World War I Britain was the home of *laissez-faire*. The—civilian—government did little besides provide a night watchman to guard property against force and fraud and a judge to settle disputes, along with a few grants of monopoly and eminent domain rights to encourage the construction of infrastructure.

The British financial system—the City of London—has always been a prime suspect accused of the crime of having failed to fulfill its role of channeling capital from British savers to British firms. The accusation has been that the institutions and biases of the City of London channeled British capital overseas, into risky but relatively low-yielding colonial investments, bypassing higher yielding investments in domestic industry that would have produced higher expected returns and boosted British economic growth.

Yet the base of quantitative data to underpin this accusation, and to demonstrate either that it is true or false, has been remarkably thin.

We have spent the past two years collecting data on the British stock market. We have been looking for answers to the question: is there anything peculiar—anything that would bear on the truth of arguments that British finance was closely involved in Britain's economic decline—in the pattern of prices, dividends, and values of securities on Britain's stock exchange in the

years before World War I? Were domestic investments systematically underpriced—implying that entrepreneurs seeking capital for domestic industry found the stock market a poor source of funds, requiring transfer to title over a large share of the enterprise in exchange for a relatively small capital injection? How did the pre-World War I British stock market compare to the stock markets of other industrial economies?

This is still a preliminary data analysis. Our conclusions are fragmentary. Yet there is evidence that the British stock market did not behave as other industrial stock markets—those of Germany and the United States—in the years before World War I. The market as a whole appears to exhibit what one might call a *fear of equities*, as Peter Temin (????) has noted. Pre-World War I price and price-dividend ratios are such as to indicate that British investors had an absolute distaste for investments in domestic industry as opposed to colonial infrastructure.

Thus there is evidence that at the aggregate level the stock market was pricing domestic industry “too low” relative to colonial infrastructure—or at least lower than alternative stock markets would have priced such investments. At the more detailed level, there is some evidence that the stock market was not recognizing the growth prospects of “high tech” investments: equity of firms in industries at the cutting edge of late nineteenth century technological progress sold for no higher price-dividend ratios than equity of firms in slower-growing, established industries. To the extent that the stock market exists to provide capital for risky yet promising enterprises and

industries, and to take account of high prospects for economic growth as it prices claims to speculative high tech companies, the pre-World War I British stock market was not fulfilling its typical role.

Thus the pre-World War I British stock market was potentially misallocating capital—although as McCloskey (????) has emphasized, any conclusion that capital market failures slowed British growth appreciably requires powerful externalities feeding back from poorly-capitalized domestic industrial firms to slower economy-wide total factor productivity growth.

## **II. Raising Capital on the British Stock Market**

Although the Stock Exchange in London only obtained a constitution and a building of its own at the beginning of the nineteenth century, organized dealing in stocks and shares had by that time already been underway for more than a century (Morgan and Thomas, p. 11).

The securities traded in the British stock market's earliest earliest days consisted primarily of the shares of joint-stock companies chartered by the government to engage in international trade and provided by the government with substantial grants of monopoly power. The East India Company is the canonical example. It was accompanied by a variety of similar companies founded to exploit other colonial opportunities.

The Bank of England was the first actively traded company to have a domestic purview. It was—briefly—joined by other domestic joint-stock



companies that took advantage of the Exchange during the short-lived South Sea Bubble.

[Section on the South Sea Bubble, and its consequences]

Starting in the late seventeenth century, these securities were joined by the growing public debt. Between the late seventeenth and the early nineteenth century the British public debt ballooned to somewhere between two and three times a year's national product, under the pressure of fighting the Second Hundred Years' War with the French (and with many others).

Adam Smith (1776) was but one of many who feared that the British economy would be crushed under the weight of the public debt. He attacked the:

The practice of funding has gradually enfeebled every state which has adopted it. The Italian republics seem to have begun it.... Spain seems to have learned the practice from the Italian republics, and (its taxes being probably less judicious than theirs) it has, in proportion to its natural strength, been still more enfeebled.... France... languishes under an oppressive load.... The republic of the United Provinces is as much enfeebled by its debts as either Genoa or Venice. Is it likely that in Great Britain alone a practice, which has brought either weakness or desolation into every other country, should prove altogether innocent?

The system of taxation established in those different countries, it may be said, is inferior to that of England. I believe it is so. But it ought to be remembered, that when the wisest government has exhausted all the proper subjects of taxation, it must, in cases of urgent necessity, have recourse to improper ones. The wise republic of Holland has upon some occasions been obliged to have recourse to taxes as inconvenient as the greater part of those of Spain. Another war begun before any considerable liberation of the public revenue had been brought about... may... render the British system of taxation as oppressive as that of Holland, or even as that of Spain.... Let us not... rashly conclude that [the British economy] is

capable of supporting any burden; nor even be too confident that she could support without great distress a burden a little greater..."

Even in the mid-nineteenth century, the public debt accounted for the majority of funds raised and traded on the London Exchange. In 1853, British Government debt accounted for more than 70 percent of the nominal value of securities quoted on the Exchange (853 million pounds out of a total of 1215 million pounds).

The first *domestic* industries to raise money on a large scale on the London Exchange were the railroads. In 1853, fifteen percent of the nominal value of securities quoted on the Exchange (194 million pounds) was accounted for by the debt and equity of British and Irish railways. A further eight percent of nominal market capitalization (101 million pounds) was accounted for by foreign and colonial stocks and bonds. And nearly one-third of foreign and colonial stocks and bonds were issued by overseas railways.

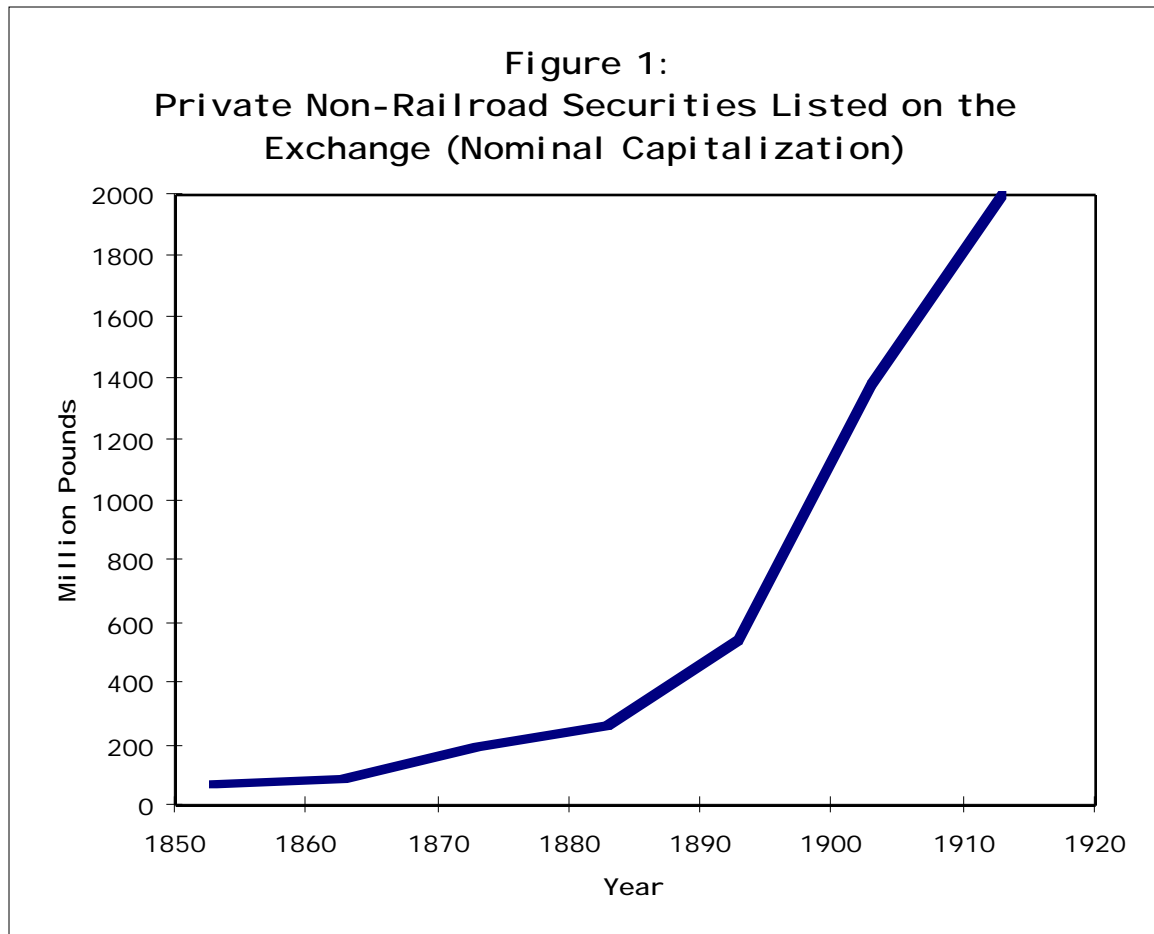
Less than two percent of nominal market capitalization were made up of commercial and industrial companies (some 22 million pounds) and by canals and docks (17 million pounds). Less than one percent were made up of each of the following categories: mines, insurance companies, banks & discount companies, gas companies, and waterworks (Morgan and Thomas, 280-281); domestic, non-governmental, non-railway enterprises accounted for less than six percent of the total nominal capitalization of securities issued and trading on the London Exchange.

Late nineteenth century Exchange functioned remarkably well as (a) device for raising money for governments on attractive terms (very low consol rates); (b) device for where people could invest in *safe* securities like consols. Low consol rates. Low consol rates (lows of 2-2.5 percent in the 1890s) increased appetite among investors for securities with a high return. Just look at the dividend yields—all the preference shares which have yields of 6, 7, or 8 percent. This encouraged more buying (which encouraged more issuing).

By 1913, the Exchange had grown substantially, both absolutely and relative to the growth of the economy as a whole. The nominal value of securities listed had grown by nearly ten times (to more than 11.2 billion pounds). Its total capitalization thus exhibited an 1853-1913 rate of growth more than twice that of nominal GNP. The number of different securities—equities, preferred stocks, bonds, and other financial instruments—had grown from about 1000 in the early 1870s to nearly 30,000 by the outbreak of World War I.

Not only did the exchange grow substantially during the 60 years prior to World War I, the character of the typical security changed. By 1913 the sum of domestic and foreign government finance accounted for less than 45 percent of total London Exchange capitalization. By 1913 British railways accounted for eleven percent of total London Exchange capitalization, down from fifteen percent in 1853. Foreign railways accounted for another 26 percent, up sharply since 1853.

Domestic, non-government, non-railway enterprises accounted for eighteen percent of total nominal market capitalization, three times their 1853 share of the market.



Of this 18 percent, slightly over one fifth was accounted for by commercial and industrial companies: 16 percent by iron and steel companies, 14.5 percent by banks, 12 percent by financial trust, land, and investment companies, 7 percent telegraphs and telephones, and between 5 and six percent in tramways and omnibuses, and in breweries and distilleries.

Of this sector, banks grew by 6 times in 1863-73 and 3+ times in 1893-03, Commercial and Industrial, 5 times in 83-93 and 2.5 times in 93-03

Financial 4x in 83-93

Insurance 5x in 83-93

Breweries 2x in 93-03

[Removal of legal disabilities restricting the creation of joint stock companies].

[Limited liability. Limited liability law is somewhat tricky in this period.

Companies could get limited liability only by private bills in Parliament or by a royal charter prior to 1857 (Bubble Act and all that making limited liability scarce). Limited liability law in 1857 makes getting LL much easier—basically after the passage of the 1857 law companies only have to assert that they have limited liability in their letters of organization. This probably helps to explain the rapid growth in the 1860s.]

After the Parliament passed the Companies Acts of 1862 and 1867, the way a company became a joint-stock enterprise and issued securities was as follows:

1. Seven people needed form a company. They fix the amount of the capital, write a prospectus and invite applications for shares. After applications come in, they allot shares. They have leeway to issue shares to whomever they like and to keep shares in reserve for themselves, depending upon how the offering is selling....
2. To get a listing on the Exchange (this is as of 1878), under rule 129: “The Committee (ie the Stock Exchange) will order the

quotation of a new company in the official list, provided that the company is of a bona fide character, and of sufficient magnitude and importance; that the requirements of Rule 128 (about the setting of a settlement day for a new company, about providing the stock exchange with the subscription book, articles of association, and bank book showing how much has been received on allotment) have been complied with, and that the prospectus has been publicly advertised..." That it provides for the issue of not less than half of the nominal capital, and for the payment of 10 percent on the amount subscribed.... Two-thirds of the whole nominal capital be proposed to be issued have been applied for and unconditionally allotted to the public... That the articles of association restrain the directors from employing the funds of the company for the purchase of its own shares. A member of the stock exchange is authorized to give the exchange any information it needs....

The Exchange was composed of brokers (who buy and sell on behalf of clients) and jobbers (who sound like specialists or market makers). All were all equally members, although typically members performed one function or the other.

There were also *shareholders of the Exchange* (many of whom, I think, are also members of the exchange). About 2000 members of the Exchange in 1880.

### III. Aggregate Patterns in Dividend Yields and Market Valuations

Domestic enterprises—railways and others—did raise significant amounts of capital on the London Exchange before World War I. On what terms did they raise this capital? How did the ways in which shares of British enterprises were valued back before World War I compare with how British enterprises were valued after World War I—or with how American and German enterprises were valued before World War I?

The London and Cambridge Economic Service (1973) spliced together four overlapping but non-identical indices to construct a continuous series of annual average prices of industrial ordinary shares in the United Kingdom. Since 1962 the series is the *Financial Times*-Actuaries 500-stock industrial share series; from 1949 to 1962, the series is the Moody's Services Ltd. sixty-stock index; from 1924 to 1949 the series is the London and Cambridge Economic Service series constructed by Bowley *et al.* (1931); and before 1924 the series is the backward extension of the LCES series constructed by Smith and Horne (1934).

Smith and Horne (1934) reports values for estimated stock *price* (although not dividend yield) series back to 1867.

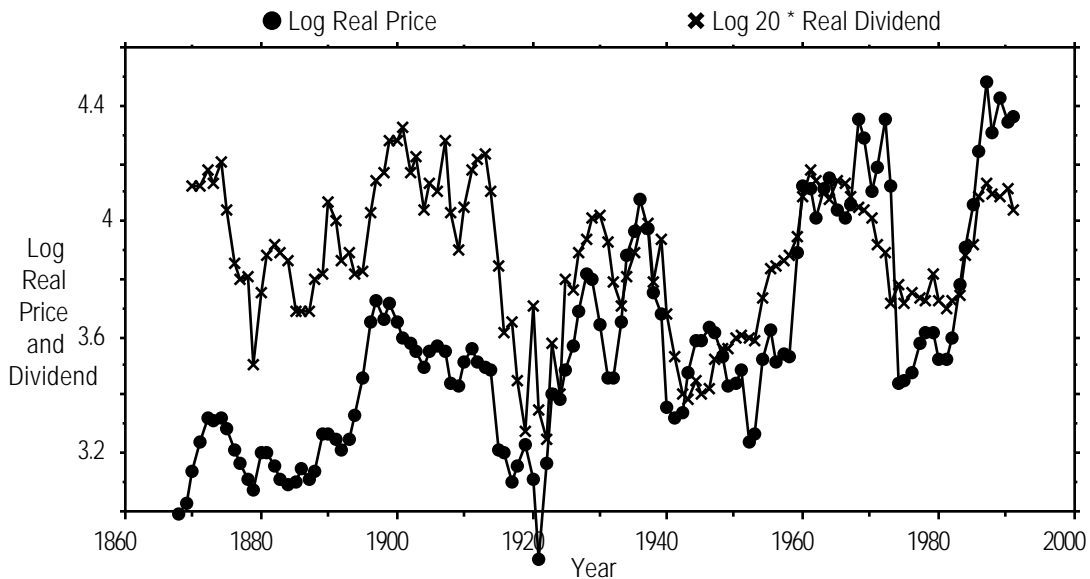
Drawing on the price and dividend data reported in December issues of the *Investors Monthly Manual*, we have constructed a dividend series for the Smith and Horne index extending back to 1870 (see Grossman and De Long, 1993). In the process of data construction we have found no anomalies or shifts in composition in the pre-WWI era that would make us conclude that the behavior of the index, or of its associated dividend yield, was very

different from the behavior of the whole market.

*The Course of the British Stock Market*

Figure 1 plots, on a logarithmic scale, the British stock price index and dividend series, both deflated by the consumer price index to translate their nominal into real values. The dividend series has been multiplied by twenty to give it approximately the same range of variation as the stock price series.

**Figure 1**  
**British Stock Prices and Dividends, 1870–1990**



The overall pattern of stock market movements across the past century is familiar. The British stock market does exhibit roughly the same major bull and bear markets as does the American (Barsky and De Long, 1990): the market triples in the 1980s, in the 1950s-1960s, and in the 1920s; it falls substantially in real terms during the World War I inflation and the post-World War I recession; and it falls by two-thirds in the early 1970s.

British real dividend levels undergo several substantial declines. The



most recent is associated with the macroeconomic stagflation during 1965-1975. Earlier large declines include one associated with the outbreak of World War II, one decline associated with World War I, a major and extended Edwardian-era decline, and a short-lived decline in the late 1870s which we attribute to credit market stringency.<sup>1</sup>

The most notable fact about the pre-World War I period evident from figure 1 is that British price/dividend ratios appear very low relative to their post-World War I levels. While their average level is not far from twenty after World War I, the average price/dividend ratio before the Great War is closer to twelve. In 1870, a share of the index could be purchased for 10.2 times its annual dividend. Today, a share of the index costs 23.3 times the annual dividend it pays.

Might this shift from the pre- to the post-World War I period in the price/dividend ratio reflect a change in the definition of the index, and not a change in the behavior of the market? While the principles underlying the construction of the Smith and Horne (1934) series are certainly not immune from criticism,<sup>2</sup> the fall in the dividend yield occurs in the period covered by the Smith and Horne (1934) series: the dividend yield has already fallen into the 5-6 percent range by the early 1920s, as figure 2 shows. The decline in dividend yields is not due to some flaw in the earlier Smith and Horne index, but is in fact exhibited during the period covered by that particular index.

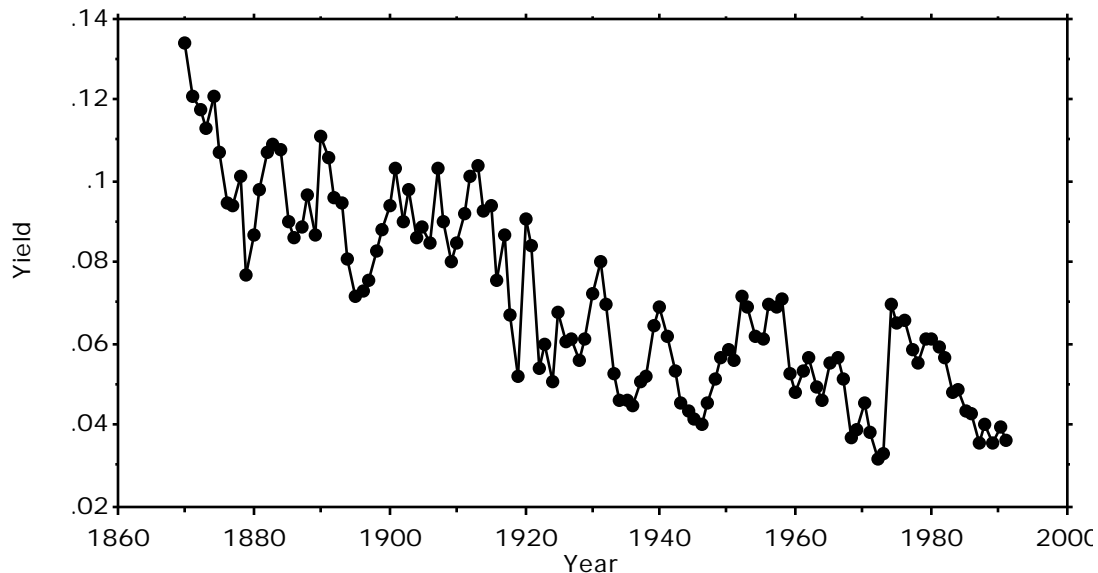
## Figure 2

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<sup>1</sup>Associated with the crisis surrounding the collapse of the City of Glasgow Bank. See Capie (1988, 1991).

<sup>2</sup>Before the 1890s some sectors are represented by one or zero firms. As Capie writes: "A number of sectors were [completely] ignored...e.g. railways, banks, mining. Also, it is a price index and not a value index since the prices were not weighted...[it was] simply the arithmetic mean of the monthly percentage changes in prices." It thus corresponds to a portfolio with equal amounts invested in each security, rebalanced every year.

### British Dividend Yields, 1870–1990



The fall in the dividend yield cannot be ascribed to a shift in the composition of the Smith and Horne index. In fact the fall in dividend yields for those stocks that are common to the index in both 1871 and in the 1920s is larger than the fall for all stocks in the index. Thus none of the reduction in dividend yields recorded for the index between its beginnings and the eve of World War I is due to a shift in the composition of the index.

After World War I, a regression of the log stock price on the log dividend level for the post-World War I period accounts for sixty-one percent of the variation in stock prices, and associates each one percent increase in dividends with a 1.22 percent increase in stock prices. The bulk of post-World War I stock price movements can be understood in terms of a very simple rule of thumb: overall stock prices do not remain far from twenty times dividends. This same rule of thumb accounts remarkably well for stock price levels and movements in the U.S. and in Germany, both after and *before* World War I (see Barsky and De Long, 1990; De Long and Becht, 1993).

By contrast, in pre-World War I Britain, stock prices appear to be characterized by a great “fear of equities” on the part of investors: the average enterprise is valued by the market at little more than ten years’ purchase of its *current* dividend. Thus for British domestic companies, raising money on the stock market is expensive—much more expensive than in the other leading industrial economies of the turn of the century like Germany and the United States, where the rule is much more that equities sell for not ten to fifteen but fifteen to twenty-five times the current level of dividends.

#### **IV. Sectoral Patterns in Dividend Yields and Market Valuations**

Our more detailed data are as yet incomplete. Moreover, we have to date analyzed only a small portion of the securities traded on the late nineteenth-century British stock market: ordinary equity shares. The problems of valuing and assessing the valuations of the host of preferred and convertible shares that were also traded on the London Exchange are surprisingly complicated.

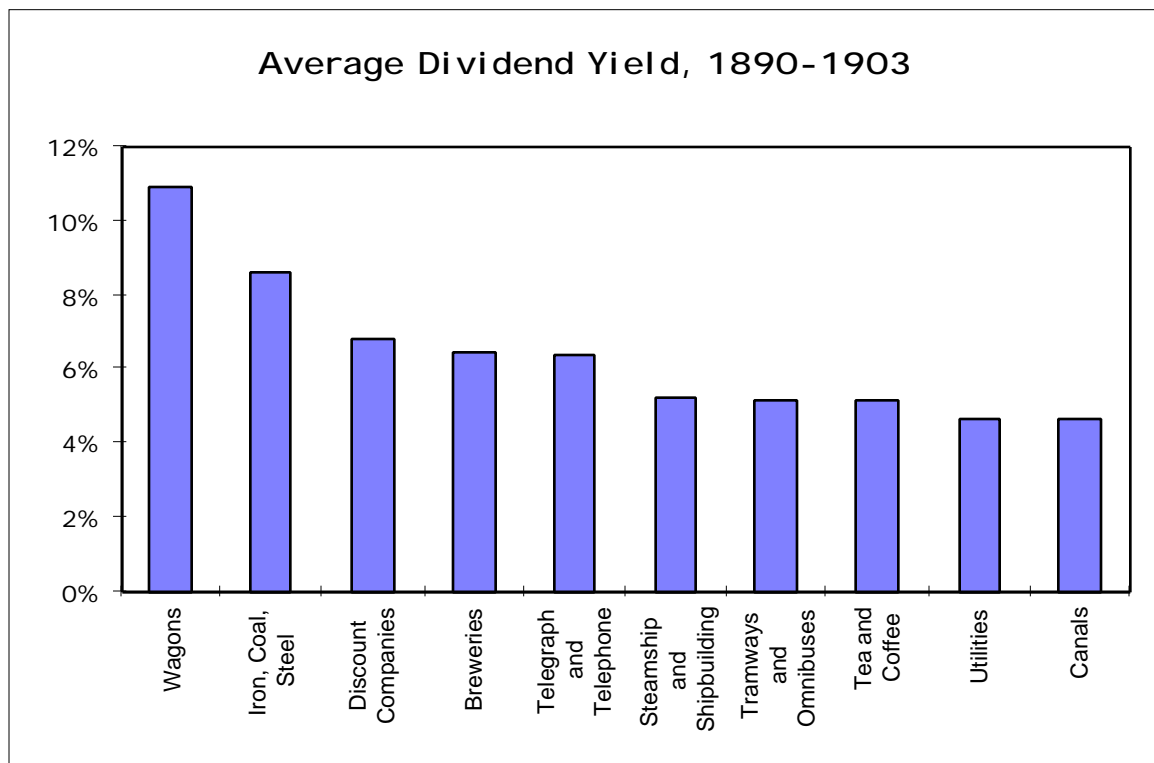
For example, an investor who bought for 20 pounds an ordinary share with a par value of 50 pounds was (a) buying an equity stake in the company, (b) selling an open-ended “put” option to the company—that is, obligating himself to buy an additional equity stake for 30 pounds at some time in the future at the company’s option—(c) subject to the proviso that the company exercise similar puts purchased from other shareholders at the same time,

and (d) complicated by the fact that the stock purchaser was the ultimate beneficiary when the put option was exercised.

The modern mathematical tools of options pricing *can* calculate the “rational” and “warranted” prices of such securities—under the assumption that everyone else in the marketplace knows and uses the modern mathematical tools of options pricing. But how is one to assess whether or not market prices reflected fundamental valuations a century before such tools of analysis were developed? Thus to date we have confined our analysis to ordinary equity shares, and put to one side the preference and convertible securities.

The figure below shows average dividend yields over the decade and a half from 1890 to 1903 on the London Exchange for a number of different industries. A similar figure for America today would show a standard and widely expected pattern. On the left hand side of the figure, with high dividend yields, would be the relatively slow-growing “mature” infrastructure industries: industries that had passed through their most rapid phases of growth, that had few capital gains anticipated, and that as a result paid relatively high dividends to support their market valuations. On the right would be the “high technology” industries: the rapidly-expanding technologically dynamic sectors of the economy, where dividends were low because of a scarcity of capital yet stock prices were high because of the expectation of rapid future growth and high capital gains.

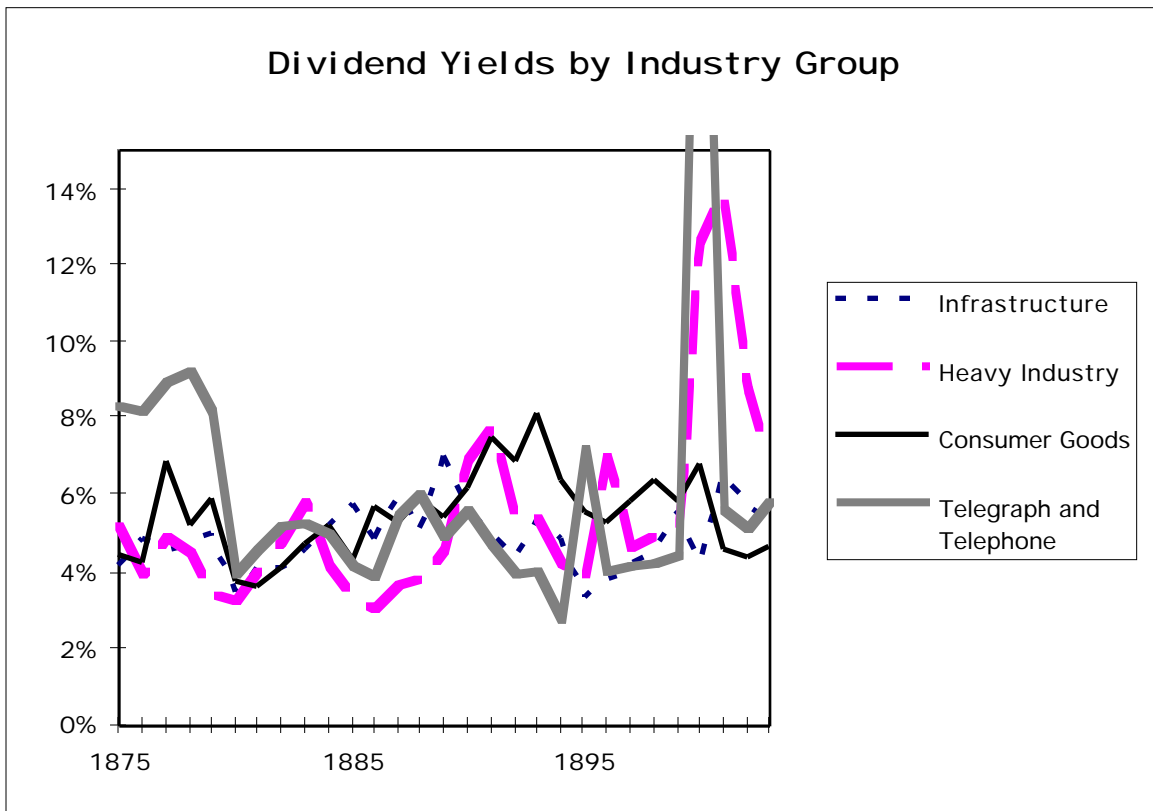
In the middle would be industries that expected moderate growth, like consumer goods industries, and industries that were especially vulnerable to the business cycle and thus carried relatively high degrees of systematic risk: such industries might have bright growth prospects, but their risk characteristics imply that investors demand high rates of return on them as well.



This is not the pattern we see in the late-nineteenth century British stock market. The “mature” infrastructure industries (and by 1900 they were mature: the population of Britain was no longer growing as rapidly as in the nineteenth century) are concentrated on the right rather than the left of the

figure, with low not high dividend yields. The high-tech companies with rapid growth prospects and heavy capital requirements—telegraph and telephone on the one hand, iron and steel and shipbuilding on the other—are not on the right but in the middle and on the left of the figure.

There is no sign that industries with bright growth prospects were able to raise more money on the Exchange for a given commitment to pay immediate dividends: no sign that anticipated market expansion played any role at all in determining the relative prices that British investors were willing to pay.



The figure above plots our estimates of dividend yields over time for four industry groups: infrastructure, heavy industry, consumer goods, and telephone and telegraph. The fact that relatively “high tech” industries reaped no advantage in terms of lower immediate dividend yields from their bright growth prospects holds in the earlier, 1875-1890 period as well.

Perhaps the most interesting episode is the sharp spike in dividend yields on high tech and heavy industrial stocks in the crisis surrounding the collapse of the City of Glasgow Bank. The panic was not general: dividend yields on infrastructure and consumer good firms barely moved. Yet the more dynamic sections of industry saw their relative values greatly—albeit temporarily—reduced: the multi-year “flight to quality” induced by the financial panic was a flight away from the most dynamic sectors of British industry.

## **V. Conclusion**

Great Britain had been the first industrial nation. Its commercial dominance of the seventeenth and eighteenth centuries, coupled with its established shepherding industry, its plentiful supplies of water power, coal, and iron, and a relatively large pool of wage-workers without traditional rights to occupy the land gave it crucial economic advantages at the start of the industrial revolution. In textiles, steam power, iron production, and canal building Great Britain led the way throughout the 18<sup>th</sup> and nineteenth

centuries. The last years of the nineteenth century saw Great Britain the richest country in the world (save for Australia, the late nineteenth century sheep-raising equivalent of OPEC), with the heaviest industrial base, the most comprehensive railroad network, and ruling over the largest Empire the world had ever seen.

Clearly many factors contributed to Britain's relative decline. One perennial suspect has been what has been seen as Britain's anemic rate of investment in domestic industry which occurred in spite of a very healthy rate of national savings. In the years immediately before World War I almost as large a share of British savings was invested abroad as was invested at home.

Without ample investment in high-tech industries and in upgrading the technologies of established industries, how were British workers to acquire skills necessary to continue to utilize and British firms to acquire the skills necessary to continue to create the world's most advanced industrial technologies?

The year 1914 saw close to 40 percent of Britain's national capital stock—of its produced means of production—located overseas. No other country has matched Britain's high proportion of savings channeled to other countries. Britain's overseas investments were concentrated in government debt, in infrastructure projects like railroads, streetcars, and utilities, and in securities guaranteed by the local government.



Britain did not do well out of its overseas investments. In the forty years before World War I, British investors in overseas assets earned low returns, ranging as low to perhaps 2% per year in inflation-adjusted pounds on loans to dominion governments (reference?? Edelstein).

Such returns were far below what presumably could have earned by devoting the same resources to the expansion of domestic industry. McCloskey (????) has wondered if such a difference in rates of return between home and foreign investments should not be attributed to greater risk in domestic industry. But this seems unlikely, for overseas investments were at least as, if not more exposed to risk than were domestic investments. In the final analysis British investments in Argentina or Australia yield profits to British investors only by the export of Argentinian or Australian goods to Britain. In a depression in Britain—the major risk facing investors in domestic industry—exports to Britain from the periphery of the world economy drop far in both quantity and price.

An Argentinian government guarantee to pay British holders of Argentinian securities is worthless unless Argentina exports to Britain on a large scale. Given that a depression in Britain would severely reduce Argentina's exports to Britain, it is difficult to believe that overseas investments—even if guaranteed by a government—were in any sense less risky than investments in domestic industry.

British industry in 1914, and British infrastructure, were not as capital intensive as American industry and infrastructure were to become by 1929. It

is difficult to argue that Britain's savings could not have found productive uses at home if only they could be challenged appropriately and managed productively. Chandler's (????) accounts of the slow growth of managerial capitalism in Great Britain stresses how long firms remained held together by webs of personal ties of clientage and patronage, and how loath were top executives—even the top executives of would-be conglomerates—to take seriously the problem of choosing appropriate managers. Landes (????) notes that the scarcity of British engineering talent was matched by a scarcity of venture capital—there was plenty of capital for infrastructure or for government debts, but little for the progressive entrepreneur.

Why, then, did British investors commit their wealth overseas? One possibility is that the high rates of return presumably available at home were not really there: the absence of British engineering skill, and the aggressive wage demands of British unionized workers would have prevented home investments from earning even the small profits earned abroad.

This paper has presented some evidence for a second possibility: that there was something systematically awry in British investors' demands for different types of assets, and thus that the prices at which capital could be raised for domestic industrial investments were much less favorable than the benchmark of a "rational" financial market would predict—and much less favorable than found in, say, post-World War I Britain, or indeed in pre-World War I Germany or the United States.

At the level of the aggregate stock market, price/dividend ratios in Britain were markedly lower before World War I than they have been since.

Yet there appears to be no sufficient fundamental reason—neither greater risk, nor higher real interest rates, nor sufficiently lower rates of dividend growth—for this reduced price/dividend ratio.

British investors before World War I appear to have been excessively fearful of holding equities that were quoted on the stock market. In this “fear of equities” pre-World War I British investors were different from investors elsewhere. Investors in the German and American stock markets were more willing to pay high prices for equities, and prices were significantly higher multiples of dividends (Shiller, 1989; De Long and Becht, 1991).

The anomalous pattern found in the aggregate market index is reinforced by anomalies in the relative valuation of different sectors. In general, cyclical industries tend to have relatively high dividend yields, “mature” infrastructure industries tend to have very high dividend yields to offset low anticipated future growth, and high-tech and expanding industries tend to have low dividend yields both because capital scarcity makes paying dividends expensive to the firm and because the market discounts expected future growth.

In pre-World War I Britain the pattern is different. “Mature” industries have not high but low dividend yields—as if investors value their apparent safety very highly. “High tech” and expanding industries have not low but relatively high dividend yields—as if investors do not value the prospects of future growth. Investors appear to fear equities, and not to accept that the risks associated with investments in high technology and capital intensive industries are well worth running.

Pre-World War I British investors’ fear of equities may have helped keep British companies from transforming themselves into the publicly-owned, professionally-managed enterprises that were to dominate the

twentieth century. It may have played a role in Britain's failure to develop the high-tech industries of the turn of the century, and consequently its relative industrial decline.

German and American investors do not appear to have shared the British "fear of equities." Their greater willingness to invest pushed price/dividend ratios in Germany and the U.S. before World War I up to levels near twenty. Thus they eliminated the opportunity of making wealth without significant risk that the British stock market apparently left open. Nevertheless, investors in Germany and the U.S.—like investors in Britain—failed to push up the demand for *British* equities.

The higher price/dividend ratios outside of Britain may have given entrepreneurs and investment bankers in other nations a leg up on those in Britain. An entrepreneur seeking to raise money to establish or expand a firm in America or Germany could raise \$20 or 20 RM for each \$1 or 1 RM he could promise in annual dividends. His counterpart in Britain could raise only little more than £10 for each £1 he could promise in annual dividends.<sup>3</sup>

"Fear of equities" on the part of British investors meant that British industrialists faced a higher cost of equity capital than did their competitors in other countries. This higher cost may have reduced their ability to compete and expand—especially in the large-scale capital-intensive leading-edge high technology industries of the 1890s and 1900s, like electricity, chemicals, automobiles, and machinery, where the ability to raise and deploy large

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<sup>3</sup>Industry can also obtain finance from the bond market or from bank loans. To the extent that a company fails to raise a substantial pool of equity capital to provide a buffer between the asset value of a firm and its debt, it is unlikely to be able to borrow significantly even on the bond market or from banks. It is not clear whether firms were unable to establish close links with finance, or whether—once founding families had decided to retain both substantial ownership and control rather than sell their stake into the depressed stock market—they did not wish to. See Capie (1988, 1991), Cottrell (1980).

amounts of capital was a key to success and which were the locus of much technological progress.

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