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Did the US Lag Europe before 1914?**

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Rethinking Corporate Finance Fables: did the US lag Europe before 1914?*

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ABSTRACT

In 1914 the New York Stock Exchange (NYSE) was only a modestly-sized equity market (considering it served what had for decades been the world's largest economy), but those deducing that overseas securities markets led the US miss the (non-NYSE) majority of US-quoted equity and the unusually high leverage of US corporations. As contemporaries understood, US corporate securities (especially bonds) had substantially increased in the decades before 1914 and those quoted nationwide naturally exceeded those of the smaller economies of France, Britain or Germany in absolute terms. A comparison of corporate finance in the four leading industrial economies - across the full spectrum of corporations and their securities - suggests conditional convergence on high ratios of stock exchange financing to GDP, led by the Anglosphere, but differently articulated in ways a) not captured by standard revealed preference modelling and b) with uncertain qualitative effects.

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Aldo Musacchio and John Turner (2013) reinforce the growing consensus among economic historians that Rafael La Porta et al's (1998, 2008) "legal origins" hypothesis exaggerated the contrast between common and civil law and lacked plausible pre-1980 underpinning. However, the least satisfactory aspect of the emerging consensus is its picture of historically backward US capital markets and corporate laws.¹ A careful quantification of the full range of US corporate securities and markets eliminates many elements of the claimed pre-1914 European leadership. One can pinpoint weaknesses of US corporate law, but the American century was not built - as sometimes alleged - on a foundation of stunted securities markets for large corporates (Calomiris 1995, Rajan and Zingales 2003, Roe 2006: 512-3, Fohlin 2006: 261) combined with contractually-challenged SMEs (Guinnane et al 2007, 2008).

This article broadly supports skeptics who have questioned one or other of these views (Sylla 2006, La Porta et al 2008, Ferderer 2008, Musacchio 2010, Hannah and Kasuya 2015, Hilt forthcoming).² The next section describes a US domestic corporate *bond* market dominated by NYSE listings and larger than those in the UK, Germany or France. Recovery of contemporary estimates for dozens of secondary US *equity* markets (less dominated by NYSE listings than bond markets) follows, showing that the US ratio of *national* quoted equity capitalization to GDP was higher than Germany and equalled France (though lagged the UK) before 1914. The next section assesses qualitative differences between the tight German regulatory regime and other less formal capital markets, reviewing possible implications for competition and technical innovation. The conclusion highlights areas for further investigation.

¹ A close second would be more general commercial advantages of common law. The high proportion of *international* contracts today freely choosing resolution by English common law courts implies competitive advantages of fairness, flexibility or judicial competence (and/or the ability of London professionals to speak the global language).

² Unfortunately some prescribed a snake-oil "cure" - Goldsmith's (1985) pioneering statistics - meeting their stated objective of measuring the market value of quoted companies only for France: his US/German statistics on corporate securities anomalously included unquoted companies and he reported UK/German par (not market) values.

In 1914 the value of all listings on the London Stock Exchange (LSE) equalled any two combined of Berlin, Paris and New York, the metropolitan exchanges of the other three major industrial economies. Their investors collectively owned a substantial majority of global securities (Neymarck 1915). Next-ranking national exchanges - St Petersburg, Vienna, Amsterdam, Brussels - were only around a quarter their size and duplicated many of their listings.³ However, these eight national exchanges are misleading indicators of *domestic* corporate finance because those of the two most populous countries among them were not internationally-orientated: St Petersburg was entirely domestic (by law), while the New York Stock Exchange (NYSE) was also - of its own volition - less globalized. In 1914 only 16% of NYSE listings at par were foreign or colonial (compared with around 60% on the main European exchanges); moreover, only 12% of NYSE securities were government bonds (compared with around half in Europe). Measuring *domestic corporate* finance - subtracting all foreign and government securities and adding all domestic corporate securities traded off the main metropolitan markets - is a more demanding task. It is also one in which modern scholars have surprisingly ignored abundant contemporary evidence.

LEVERAGING THE AMERICAN CORPORATION

Today stock exchanges are dominated by equities - bonds having largely migrated to other trading platforms (Biais and Green 2007) - but in 1900 government and corporate bonds dominated markets. Early NBER research (Hickman 1953, 1958, 1960) usefully surveyed all US corporate bonds in the hands of the public, showing that the NYSE listed 60% - by par (face) value - in 1900. Its share briefly fell below 50% but by 1914 had recovered to 56% and peaked in 1928 at 74%. The NYSE particularly dominated railroad bonds, but most industrial and utility bonds were listed regionally and/or traded over the counter. Table 1 includes domestic bonds on all exchanges:

³ In the UK's industrial heartland, the Manchester Stock Exchange - probably ranking fifth in the world - was larger (Powell 1915: 538) than exchanges in most national capitals; its listings, mirroring many of the LSE's, included global and national as well as its own regional securities.

Table 1. Tradable Domestic Corporate Bonds (all Markets) 1913/14.

	UK	France	US		Germany
	1914	1913	1914		1913
			NYSE	Other	
Railways	£365.1m	F142m	\$7,895m	\$2,363m	\$134m
Other	<u>£699.3m</u>	<u>F2,435m</u>	<u>\$2,417m</u>	<u>\$5,689m</u>	<u>M3,353m</u>
Total	<u>£1,064.4m⁴</u>	<u>F2,567m</u>	<u>\$10,312m</u>	<u>\$8,052m</u>	<u>M3487m</u>
Total in US \$	\$5,180m	\$495m	\$18,364m		\$830m
Total % of GDP: (par)	44%	5%	50%		6%
(market)	38%	5%	41%		6%
Non-rail % of GDP (par)	29%	5%	22%		6%

Sources: col.1 Essex-Crosby (1937) for bonds of British-registered companies in the *Stock Exchange Official Intelligence (SEOI) 1915* (showing the situation at the close of the market on 30 July 1914), including those on the LSE official list, the LSE junior market and many (but not all) corporate bonds traded provincially or otherwise negotiable, while excluding privately-held debentures (unless issued by an included publicly-quoted company). I estimate £30.9m (from sampling the *SEOI*) for bonds of non-railway statutory, chartered and Dublin-registered companies explicitly excluded by Essex-Crosby. Board (1915) for UK railway bonds at the end of December 1914 (the *SEOI* shows 93% of these were listed on the LSE and the residue are presumed to be listed provincially, though some may have been private or inter-corporate). Railway bond market/par ratios (85%) from the *Banker's Magazine* December 1914 index and other bonds presumed to be at 90%.

Col.2. Hautcoeur (1994: 43). Railway bonds at par from *Annuaire Statistique*, excluding the state-guaranteed bonds of the six major railways. Hautcoeur (1994: 34, 40) notes that some bonds are missed and other

⁴ Coyle and Turner (2013: 840) reported a lower 1914 figure of £463.6m at par for British corporate bonds listed in the *Investor's Monthly Manual*: 396 bonds (fewer listings than the NYSE), mainly in the LSE official list and averaging more than £1m (\$5m) each. They excluded the *IMM*-listed bonds of UK companies operating overseas or in finance, as well as some officially-listed bonds and thousands of other domestic bonds (mainly of amounts well under £1m) traded by "special settlement," on other exchanges, or informally. A figure for all those formally listed on exchanges would lie (at an unknown point) between £463.6m and the £1,064.4m shown in the table. Essex-Crosby and stockbrokers considered other bonds to be tradable, though they were presumably less liquid. Are the unlisted bonds of J. S. Fry & Sons properly excluded (Coyle and Turner) or included (Essex-Crosby)? Fry's was a private and secretive Quaker chocolate manufacturer (all board members were related), but outside holders of its £0.5m debentures had since 1896 reliably received 2% semi-annual interest, the low (4% annual) rate indicating confidence in its locally-revered owners (who were not only directors, but, with their lawyer, trustees for the debenture holders!), backed for the skeptical by its collateral, including its impressive seven-storey factories in Bristol city centre. The *SEOI* reported Fry's debentures, though not recent prices, and the company's debenture registers (Bristol Record Office 38538/S/1/3) suggest a market in which retail investors or brokers readily matched small or large bargains. From 1907 (newly-legally-defined) private companies were barred from making a public prospectus issue of debentures, but "private" debentures (some sufficiently freely negotiable to feature in directories of tradable securities) continued because (like pre-1907 UK - and continuing US - *shares*) debentures could be sold privately (or via a broker) to any number of investors (Jefferys 1938: 288).

unquoted bonds of companies with quoted securities are included. On the basis of a 1900/01 study (*idem*: 53) the total has been increased by 15% to allow for provincial markets and the Paris *coulisse*. The 1913 market/par ratio (94%) is based on 22 industrial bonds (Raffalovich 1915: 415).

Col. 3. Hickman (1953, 1960), with NYSE share for straight bonds (the great majority) assumed to apply to all bonds. *New York Times* December 1 1914 bond prices of 82.73% of par.

Col. 4. Anon (1914), with an allowance for issues since the end of December 1912. This is confined to bonds listed on a stock exchange (71% of them on Berlin) and excludes M1,289m that were unquoted. AGs were analysed in the *Statistisches Jahrbuch*, but this excludes listed bonds of *bergrechtliche Gewerkschaften*, while including unlisted AG bonds (giving the higher figure of M3,737m sometimes cited, Burhop et al 1915: 16, n. 16). I have used this source only as a guide to estimating the annual increase and share of (non-tramway) rail bonds. Only ordinary bonds (*Obligationen/Schulden*) are included, not *Hypothekenschulden/Pfandbriefe* (which parallel the Anglosphere's bank mortgages, but were securitized); *Hypothekenschulden* would add about 45% to the figure shown. The market/par ratio for German bonds (based on sampling *Saling's Börsenjahrbuch*) was 94%.

Row 4. Exchange rates: \$4.867 UK, \$0.193 France, \$0.238 Germany.

Rows 5-7. GDPs in the relevant year were £2,441m for the UK, \$36,831m for the US (both from www.measuringworth.com), F49,517m for France (www.rug.nl/gddc/data), and M53,700m for Germany (see n. 34 below). Note that alternative GDP estimates exist: for example, the US range of 1914 GDP estimates (Carter et al 2006: 25, 65) could produce ratios of 49-54%, not the 50% shown in the table. See also Bozio (2002: 82-3) for alternative French GDP figures.

the US had an unmistakable lead over Germany and France, with the UK near US levels (except in railway bonds). The conventional scalar for potential market size - the ratio of corporate bond values to GDP - is shown in the lower columns of the table. The American lead is not significantly reduced at quoted prices: after more than a decade of mild inflation, bonds had performed less well than in the previous quarter-century of mild deflation and tended to be quoted below par everywhere.

Fixed interest securities are understated here because the distinction now made between corporate stocks and bonds was then blurred. Preferred stocks (preference shares) - which largely disappeared during the century - might be considered a hybrid of bonds and stocks. Some preferred were close to bonds (in an economic, not legal, sense): they specified a rate of interest and were cumulative (that is, if the dividend were not paid one year, no dividend on the common could be paid until the backlog had been made up), though (unlike bonds) they did not allow holders to foreclose when payments were missed. Others - notably participating preferred (which shared residual profits after a basic dividend on common stock had been paid) - resembled equities. The sources do not all distinguish common from preferred (and none distinguish among them, preventing their accurate reclassification as quasi-equities or quasi-bonds), so references to equity

should be construed as conforming to the legal definition: that is equity includes *all* preferred. A higher portion of American and British than German and French quoted equity was preferred stock.⁵

Even excluding such hybrids, in absolute terms the US had nearly fourteen times as much quoted corporate debt outstanding at par in 1914 as Germany and France combined. This was not primarily determined by legal factors: at least before the temporary strengthening of creditors' rights in 1938-78, the US was less protective of them than Europeans (Skeel 2001, Giesecke et al 2011: 238). Nor were the tax advantages of bonds emphasized by modern analysts relevant: before 1914 corporate taxes were non-existent, low, or neutral between bonds and equity.⁶ Companies within more bank-orientated financial systems may have preferred loans from banks for their fixed-interest borrowing, though the recent tendency is to emphasize that banks in the Anglosphere differed from continental European banks less than once thought (Fohlin 2006: 222,254; Burhop et al 2015). Nonetheless US banks were unusually small and unbranched (for political reasons) and possibly inclined to steer large corporate customers whose demands strained their own lending capacity to issuing bonds, which (before Glass-Steagall) commercial banks underwrote and sold (Goldsmith 1958:217-18).

However, the primary explanation of Germany's lag is that most German railroads were nationalized, so issued *government* bonds (and no equity), disqualifying them from this tabulation of *corporate* securities.⁷ With similar effects, the French government had for decades guaranteed the bonds issued by the six main private railways, making them effectively equivalent to *rentes*: they, too, are conventionally excluded from the French *corporate* bond data (Hautcoeur 1994). Eliminating railroad bonds from all countries' totals (the bottom line in Table 1) suggests this factor accounts for

⁵ 4% of German shares were preferred (Kaiserlichen S A 1915: 398) and perhaps less in France, where they had only been definitively legalized in 1902. The preferred of the largest 100 US industrials equalled their bonds and accounted for 30% of their stock (Bunting 1986: 18-19), more at market. 36% of all UK quoted shares at par and 23% at market were preferences (Table 4 below). On the later substitution of bonds for preferred stock in the US see Graham et al (2014).

⁶ Even when taxes rose in World War One, there was arguably little effect (Bargeron et al 2014).

⁷ Prussian State Railways alone had issued M7,438m (\$1,770m) of state bonds (Raffalovich 1915: 89), twice all the German corporate bonds in Table 1.

about half the French and German shortfalls, but Germany's and France's corporate bonds still register a ratio to GDP less than a quarter of the USA's. Another factor was the share of financial corporations, which then hardly ever issued bonds⁸ (presumably because leveraging by taking deposits was cheaper). Financial corporations accounted for around a quarter of domestic equities on major European markets, but only a few percentage points on the NYSE: most US banks were family-owned and/or traded locally and/or by auction (their size and hence marketability was limited by anti-branching laws). These large industry-specific factors were familiar determinants of market size to contemporaries but have been ignored by econometricians modelling aggregate market developments. Such studies do not lack imagination - their independent variables "explaining" levels of securities development are remarkably eclectic, including legal origin, real incomes, past profits and dividends, proportional representation, trade openness, taxes, listing rules, bank turnover or concentration, firm sizes, religion, freemasonry, elite directors, wars, trust, language and democracy - but they mainly omit these important determinants and (unsurprisingly) report low r-squares.

Charles Calomiris (1995) has suggested that US reliance on bonds derived from its failure to develop universal banks, whose delegated monitoring and information dissemination functions were conducive to *equity* issuance in Germany. His case for German equity leadership is over-stated⁹ and Belgium - which pioneered universal banks - had a corporate bond market fostered by its banks and matching the Anglosphere's (Overfelt et al 2009, Annaert et al 2012: 192). The view that information flowed more effectively within continental European universal banks is modified by evidence of information sharing and monitoring in the Anglosphere's financial networks (Cochrane 2009, Lamoreaux et al 2007), which also avoided some direct conflicts of interest involved in

⁸ Table 1 excludes German *Pfandbriefe*, French *Crédit Foncier*, municipal utilities and similar securities benefitting from state support; the first two (though securitized) fulfilled roles similar to deposits in Anglosphere mortgage institutions.

⁹ Tracing Calomiris' sources, he includes financial firm equity and unquoted equity for Germany which are excluded from his US data; see also Table 5 below

universal banking.¹⁰ Hilt and Frydman (2014) have also suggested that US investment banker-directors encouraged bond issuance by monitoring boards; they possibly also promoted equities.¹¹ Calomiris's characterisation of bonds as less sophisticated securities for nations with deficient intermediaries (derived from the "pecking order" theory of finance based on later stylised facts) fits uncomfortably with long-run historical trends. Pioneering nineteenth century corporations were mainly equity-financed: bonds were a last resort, not first in their "pecking order" (Evans 1936, Hilt 2008, Freeman et al 2012).¹² Great strides had been made in promoting corporate bonds by 1900 but they did not match the quantity of equity worldwide until the twenty-first century (Roxburgh et al 2011).

Recent research on innovation underlines the disadvantages of equity and importance of fixed-interest finance in funding the development of patents (Hall and Lerner 2010, Kerr and Nanda 2014). An earlier Anglo-American example is the 1904 London IPO of the silk manufacturer, Samuel Courtauld & Co, a relatively successful performer in an industry fighting a losing battle against tariff-free imports of Japanese, Italian and French silks. The public were offered only fixed- (and quasi-fixed) interest securities: £0.2m 4½% debentures and £0.1m 5½% cumulative preference shares, insiders maintaining voting control with the ordinaries.¹³ Henry Tetley and Thomas Latham (professional managers who had taken the helm from the family owners) and their works chemist were monitoring new inventions in artificial silk (rayon); they wanted to develop key chemical

¹⁰ See Bonnet (1914) for a French view that English bankers gave clients more impartial investment advice. Today similarly conflicted US investment bankers like Goldman Sachs disadvantage clients (Kay 2015: 114-8).

¹¹ De Long (1991) purported to show that Morgan's information signalling promoted equities, but his yardstick was all NYSE securities, so implied that the majority of NYSE equities were poorly monitored. Hannah (2011) alleged his sample was corrupted by survivor bias, remaining neutral on whether banker monitoring was effective, but instancing other information signals used to promote market development. For outcomes it only matters that US investment bankers had positive effects, outweighing what Hannah, Calomiris and De Long all agree were their unusually high fees.

¹² However, UK turnpike trusts were entirely bond-financed, for legislative reasons rooted in seventeenth century practice.

¹³ This account is based on the LSE archives (London Guildhall Library), files MS 18001 93B 108 and 171B 280. The broker was Laurie Milbank and banker the Union of London and Smith's, which was in 1913 the sixth largest holder owning 5.4% of Courtauld shares, though the bank's board minutes and investment books throw no light on why (email to the author from RBS archivist 24 September 2015).

patents for converting wood pulp to viscose yarn. The IPO was slightly undersubscribed, but enabled the firm to take this critical transformative step: half of the £229,125 new funds raised went to nervous insiders who wanted to cash out, the other half to buy the patents (£25,000), build and equip the first experimental factory in Coventry, and send directors to investigate prospects in America for replacing imported Japanese silks with chemically-processed yarns. Ten years later Courtaulds was the monopoly manufacturer of viscose rayon in the US (via its wholly-owned American Viscose subsidiary) and the largest rayon manufacturer in Europe, with a profit rate in excess of 100% annually: the £0.2m ordinary shares of 1904 were already worth £5m, making it one of the world's hundred largest manufacturers. The initial outside investors' returns were modest (as promised in the prospectus), but some insider owners, managers and business acquaintances - who traded the ordinaries privately among themselves until they were officially listed in 1913 - became very wealthy. Even new outside investors who bought the ordinaries in 1913 multiplied their capital 11.6 times by the 1920 peak.

Courtaulds remained highly secretive and used every accounting trick available to understate its published profits, not only to deter rival entry, but on antitrust concerns. In business situations where revealing information on development plans reduces their value, "betting the firm" through bond leverage is sometimes the most practical way of resolving the asymmetries of information between innovators and investors. The rayon development strategy was not mentioned - beyond a coy reference to "extending" the business - in the 1904 prospectus, which simply demonstrated that the previous seven years' (externally audited) business profits would cover interest payments and that the balance sheet undervalued the existing assets on which the debt was secured. Yet, without this outside capital, the critical step that propelled the company to become the dominant global rayon giant would not have been taken (Coleman 1969). In this case the insider managers and owners found that their investment paid off so quickly that they could expand internationally, economising on working capital by managing their rapid throughput and reinvesting profits, without needing to return to the market for funds.

Few firms move from SME to global giant in one decade and, at first sight, it is not obvious why this one was London-financed. The key patents were French, the Silesian millionaire Prince Henckel von Donnersmarck and German banks generously funded rivals and the major target market was America, where Du Pont delayed copycat investments until the 1920s. Yet an IPO in this form would have been difficult on the Paris *parquet*, which resisted listing bonds unless common stocks were also listed (Hautcoeur 1994: 30)¹⁴ or in Germany (which relied on wealthy individuals or banks to fund such untried technologies);¹⁵ and would have been unusual on the NYSE (where the amount raised was too small).¹⁶ There were no doubt other reasons for success - including the shrewd technical and global marketing vision of its entrepreneurial managers - but it seems obtuse to argue that the Courtauld bonds funding its UK and US investments - or industrial bonds that Table 1 suggests were promiscuously issued by US companies regionally - were symptoms of financial backwardness.

Calomiris addresses supply factors on the corporate “sell” side, but buoyant investor demand on the “buy” side also drove bond markets.¹⁷ Most corporations issuing bonds on major markets also issued equity, deciding the ratio between them partly in response to investor demand. As already noted, the major European stock exchanges offered a vastly larger quantity of (national and foreign) government bonds than the NYSE.¹⁸ Americans - whose demand for securities with the

¹⁴ If motivated by wishing to maximise equity listings, this was short-sighted: nine years after its bond IPO, Courtauld's ordinaries became one of the largest LSE listings.

¹⁵ The Bergisch-Märkischen Bank founded Vereinigte Glanzstoff AG in 1899 to develop Swiss-German cellulose patents. Listing on Berlin in 1906, it raised M12m (£0.6m) equity capital (more than Courtauld's in 1904). Insiders retained control and the company was profitable, but made slower progress, acquiesced in a limited market share within the European cartel and did not open an American branch until 1927.

¹⁶ The Courtauld issue (\$1.5m) would probably have taken the form of a private banker buy-in followed by a market introduction on the curb. The NYSE's bias toward large issues encouraged (possibly otherwise uneconomic) mergers, not SMEs. Morgan's issue of \$2m bonds for Studebaker in 1896 was exceptional (Navin and Sears: 121) and Hickman (1953: 47) contends that even on regional markets small firms rarely issued bonds. By contrast, in the UK many SMEs that would have remained entirely private elsewhere issued only bonds, enlarging the public market, while retaining owner control.

¹⁷ The large quantities of German government bonds and *Pfandbriefe* (securitized mortgages) traded in Berlin dispel any suspicion that German investors' demand for fixed interest securities was low.

¹⁸ A similar negative relation between government and corporate leverage is observed longitudinally in the US (Graham et al 2014).

simply understood characteristics of bonds cannot be presumed to be lower¹⁹ - effectively had no federal bonds in which to invest: the few that existed were, for regulatory reasons, mainly owned by national banks (Comptroller 1915: 46). The recent introduction of new government securities (Cuban, Japanese and US-backed Panama bonds) on the NYSE had not created enough frequently-traded government bonds to fill the gap left by federal balanced budgets, while the bonds of (more profligate) American states, counties and municipalities were generally too small for the NYSE. Corporate bonds were simply the only ones issued and listed in sufficient quantities to fill this void, tempting American corporations - particularly on the NYSE - into extraordinarily high leverage.²⁰

Table 1 may therefore confuse apples with persimmons in equating bonds in Europe and the US. At market prices, NYSE corporate bonds exceeded equities, implying typical leverage (defined as the bond/equity ratio x 100) above 100%. No other country even approached such levels so one might expect higher defaults if underlying business risks were comparable.²¹ That was indeed the outcome: the NYSE had a high churn rate of listed firms (Goetzmann et al 2001: 17), while there was greater stability of Berlin's more modestly-leveraged corporations (Burhop et al 2015). Pre-1914

¹⁹ The conventional contemporary view (based on revealed preferences in national portfolios including *government* bonds and securitized mortgages) was that Americans, British and Germans favored shares and the French fixed interest securities (Neymarck 1908: 11-12). This possibly reflects long-term supply-side biases (favoring government-guaranteed railway and mortgage bonds plus loans funding reparations for its aggression against Germany), not necessarily distinctive French investor tastes.

²⁰ While nineteenth-century foreign investors in US rails favored bonds more than Americans, some recent issues showed Americans favoring bonds: for example by 1914 they held only 75% of the common stock of US Steel, but almost all its bonds. In 1914 NYSE market leverage at market prices was 115% and for other US markets 58%, compared with only 23% in UK markets (n. 65 below) and less in France and Germany (in all cases excluding government and government-guaranteed bonds). A stock market might appear highly leveraged, while its component corporations were not, if firms listing bonds and stocks were different, but this was not generally the case on major markets. These figures are compatible with Conant's 1905 estimate of 64% national leverage at par (Huebner 1910: 483, and the figure at market would have been higher), while Goldsmith's (1985) figures - implying US leverage well below 40% at market in 1912 - are irrelevant for the quoted sector, since he added *unquoted* stocks at "market" prices (not disclosing how he estimated those) to his stocks total. Unquoted corporations usually leveraged by bank loans and trade credit: in 1914 the US corporate sector overall had a ratio of *all* debt (including bank loans, trade credit and other debt as well as bonds, none separately reported) to share capital at par of 58%, with public utilities (including rail) being the most leveraged by this alternative definition, at 91%, and industrials the least, at 33% (Commissioner 1915). Banks were then everywhere more leveraged by deposits (excluded from these statistics), but were then more prudently run than many (such as Deutsche Bank or Citibank) that were so disastrously leveraged in the recent global financial crisis that they required publicly-supported rescue.

²¹ Coyle and Turner (2013:818) identify Spain and France as countries sharing America's high corporate bond/GDP ratios, but their "corporate" bonds were substantially government-guaranteed (if they over-leveraged, as some did, and could not maintain payments from revenue, they were bailed out).

investors in German bonds rarely lost their principal, but on the NYSE corporate default was routine: in 1914 more than 6% of currently listed bonds by par value - mainly railroads - were in default (Comptroller 1915: 105).²² This default rate marked progress: an amazing 36% of bond values nationwide had defaulted in 1873/5 and 19% in 1892/4 (Giesecke et al 2011) but European investors still viewed America's uniquely untamed financial crises (Calomiris and Haber 2014: 183) as the Wild West (Neymarck 1905, Kobrak 2007).²³ Mainstream European railways rarely went bust: even in the UK, where railways were entirely private, legislation limited leverage ratios to 50% and railways had not defaulted since the 1860s.²⁴ Leading UK firms - generally free to choose their leverage and generally choosing levels below 50% - of course sometimes defaulted, but at only one-thirtieth the NYSE rate.²⁵ So European bonds were considered safe investments, but the pre-1914 NYSE was stuffed with what were later to be called "junk" bonds, requiring investors to be as wary (or diversified) as they were with equities. Contemporary international investors clearly recognised this enhanced risk, obtaining bond interest from US corporate borrowers near to the yield of "blue chip"

²² The position of US stockholders was, of course, even more precarious: in 1914 26% of NYSE equity capital at par paid no dividend (Comptroller 1915: 106), compared with only 11% of German AG capital at par in 1913 (Kaiserlichen S A 1915: 402-3). This compares 200 or so US companies on the NYSE with most (3,979) German AGs (less than a quarter listed on Berlin) and so understates the US/German gap (smaller, unquoted companies were more prone to miss dividends, Fohlin 2006).

²³ An arguably beneficent by-product of the US's distinctive corporate instability was the development of equity receivership (designed to avoid the economic disruption of unacceptably routine bankruptcies of vital public services), eventually leading to more corporation-friendly post-bankruptcy procedures (Tufano 1997, Wardrop 2011).

²⁴ Railways evaded the 50% limit by issuing "guaranteed" preference shares and promissory notes to contractors ("Lloyd's bonds"), which are excluded from Table 1, but did not generally attain US leverage ratios.

²⁵ Among the 339 British-owned quoted corporations with more than £1m share capital in 1911 (more than were listed on the NYSE) only two (Dunderland, a Norwegian iron ore mine with 37% leverage at par, and Waring & Gillow, a furniture multinational with 56% leverage) - accounting for only 0.2% of their capital - were in the process of liquidation by bondholders. Smaller quoted companies in the UK were also less leveraged than US counterparts (Table 4) and default was rare (Coyle and Turner 2013: 823).

equities in Europe (Edelstein 1982: 123-5).²⁶ There is a case - when evaluating the supply of risk capital - for considering stocks and bonds together, as did many contemporaries (Neymarck 1915).²⁷

The US corporate bond market is shown in Table 1 at its peak (1914) ratio of 50% of GDP, most in railways and other regulated public utilities (Hickman 1953, Graham et al 2014). From 1917 the government competed as a bond issuer, as had long been the case in Europe, though outstanding corporate bonds continued to rise modestly through 1931, when they had fallen to 41% of GDP, then rapidly declined to only 10% of GDP over the next two decades.²⁸ Earlier in Europe, Germany's 1923 hyperinflation ruined all mark-denominated bondholders and inflation expropriated other countries' bondholders in real terms, if less harshly. Neither development was anticipated by the markets before 1914, but in the 1920s European investors faced bond losses that made even American bonds look safe. In France and Germany losses were concentrated on government, government-guaranteed²⁹ and mortgage bonds, which formed the bulk of their bond market, though a small corporate market remained there and in the UK (Hautcoeur 1994, Perotti and von Thadden 2006, Coyle and Turner 2013). Equity funding - or self-finance - thus came to dominate for corporations on both sides of the Atlantic before mid-century. There was a renewed explosion of the bond market in later decades and by 2010 corporate bonds reached levels of 147% of US GDP and 87% globally as finance and nonregulated sectors developed leverage as high as the public utility sectors earlier (Roxburgh et al 2011, Graham et al 2014). This was driven partly by the "Great Moderation" (that is by a return to the pre-1914 conditions of stable inflation and - in Europe - low

²⁶ Moreover, while some UK corporate bonds paid less than bank interest (reflecting their liquidity advantages over term loans), the reverse applied for many US companies issuing bonds. Giesecke et al (2011) suggest that US credit spreads overpriced the default risk. Hickman (1958: 10) showed that 44% of bonds rated as junk by rating agencies defaulted, but that the realized returns on them were higher than on investment-grade bonds, a finding consistent with inefficient intermediation in this market.

²⁷ Is leverage generally a relatively uninteresting, second-order, issue? There is, of course, some later theoretical (Modigliani and Miller 1958) and empirical (DeAngelo and Roll 2015) support for that view, as well as from pre-1914 opinion, though investors in bankrupt, over-leveraged firms recognised the difference.

²⁸ when Hickman's data end. An overlapping series for long-term corporate debt is available from 1916 (Carter et al 2006: 3-774) and shows similar trends at a higher level (it includes some non-bonded debt and treats intercorporate holdings differently).

²⁹ there was, of course, no guarantee against inflation.

volatility) and partly by tax increases and (not entirely benign) financial innovations. The US re-established its lead over Europe in corporate leverage (Economist 2015a) and driving serious financial crises.³⁰

STOCK EXCHANGES: METROPOLITAN AND NATIONWIDE

On some dimensions, by contrast, US *equities* lagged (mainly civil law) Europe before 1914. For decades the number of corporations with common stock listed on the NYSE hovered around two hundred (Cowles 1938; Hilt and Frydman 2014: 58), only a fraction of the many hundreds of *domestic* corporations officially listed on Paris, Berlin or London.³¹ Ranging slightly beyond the NYSE, Rajan and Zingales (2003, hereafter “RZ”) reported that the equity valuation of five major US exchanges in 1913 was only 39% of GDP, while that of German exchanges was 44%, of French exchanges 78% and of the LSE 109%. These ratios have been extensively criticized - sometimes unjustifiably - but RZ’s French figure - an indirect estimate from Saint-Marc’s data on taxed dividend income - is clearly too high. Bozio’s (2002) correction for French equities quoted on all eight exchanges in 1913, more reliably based on direct counts of listings, reduces it to 54% of GDP.

RZ’s German ratio of 44% (based on extrapolating a precise count for the Berlin exchange to all 23 German exchanges by contemporary estimates of relative sizes) was - unbeknown to them - anticipated by pre-1914 Prussian bureaucrats (Königlich PSL 1915), who regularly made such counts for Berlin, with the professional advantages of frequent repetition for checking anomalies (compared with the one-off exercise by RZ assistants). Burhop and Lehmann (2014) have undertaken an independent recount, though they too were unaware of the earlier efforts of

³⁰ However, the European Central Bank’s underwriting of German banks’ unwise lending to the European periphery now arguably offers more serious competition.

³¹ The LSE official list already exceeded the two hundred figure by the 1840s (Burdett 1882: xvi) and by 1914 approached a thousand domestic companies; Berlin listed about the same number (see next note); Paris about half that level, at 490 (Bozio 2002: 106). Numbers were restricted by legal (Berlin) or *de facto* (NYSE, LSE, Paris) minimum size limits, especially high on the NYSE: the numbers officially-listed and their mean sizes were inversely related. In 1913/14 the equity market capitalization of the average NYSE corporation was around \$90m, compared with \$8.7m for Paris, \$5.5m for London and \$4.5m for Berlin; while the sizes of the top 200 on the four exchanges were, of course, closer together.

Prussian statisticians. All three counts purport to measure Berlin domestic equities on the last day of 1913, but they differ from each other by more than Germany differs from RZ's figure for the US.³²

The median estimate for Berlin is adopted here, with the related (and only) direct estimate for 22 regional exchanges. Quoted *bergrechtliche Gewerkschaften* (mining companies)³³ also need to be added, producing a revised 1913 ratio for all German exchanges around 42% of GDP.³⁴ This must be considered provisional: the differing reported totals for Berlin compel skepticism about counts for any country, unless they have been double-entered independently by "blinded" researchers and discrepancies reconciled. Lower totals may be more accurate, but my later conclusions will survive the choice of *any* of the three rival estimates.

Of more concern is that the boundary between stock-exchange-listed securities and unquoted (close) corporations was then less clear than in today's regulated markets. In common law countries (and some civil law countries) informal, off-exchange, trading was normal (even for listed shares and bonds) and there were more small markets than in countries like Germany, which explicitly banned IPOs or public trading of shares off official exchanges. France also regulated its exchanges and imposed some limitations for tax compliance reasons. By contrast, in the UK and US all stock exchanges were private voluntary associations with no trading monopoly over the securities they listed and were subject to none of today's central government securities regulators that have reduced definitional variations. Many informal markets prospered unmolested; some consisted of holders and/or brokers meeting in a bar to match bargains, with prices reported in the local press, while some companies made issues and subsequently facilitated trades in their own shares at their

³² For Berlin only, Prussian bureaucrats counted 907 companies with M9,158m share capital at par (M15,198m at market), Burhop and Lehmann 932 companies with M17,548m capital (at market only) and RZ 1,054 companies with M12,065m at par (M18,957m at market). The highest estimate exceeds the lowest by 32% (par) or 25% (market). Discrepancies perhaps arose from varying definitions of "domestic" companies, two different sources and the omission of companies formally listed but rarely traded (as well as *Gewerkschaften*), not necessarily or solely from errors of transcription/calculation.

³³ Professor Burhop tells me that (like the *Landesamt*) he excluded *Gewerkschaften*, so I inflate his ratio from 38% to 42% (Anon 1916 and Kocka and Siegrist 1979 for justification).

³⁴ RZ's GDP figure was M49.6b, which recent revisions suggest was too low. I follow Burhop in using the NNP of M53.7b. Net property income from abroad should be added and depreciation deducted to convert this to GDP, but there is no consensus on the appropriate adjustments.

head offices or even their retail shops. RZ's coverage - all eight official exchanges in France, all twenty-three official exchanges in Germany, but only five US exchanges (New York, Baltimore, Philadelphia, Boston and Chicago) and one (London) in the UK - was plainly uneven, since there were dozens more exchanges in the US and UK, including small exchanges like Honolulu, Toledo, Cork or Dundee (White 2013, Thomas 1973, 1986). Contemporaries were aware of this, but mainly published information on their central metropolitan markets.

The six surviving enumerations of all NYSE securities between 1902 and 1921 in Table 2 reflect stock values (at par) averaging less than 2% compound annual growth in real terms over that period.³⁵ Contemporaries reported par values as appropriately measuring the *quantity* of stocks,³⁶ undistorted by short-term market price fluctuations and par values are here converted to the conventional ratios to GDP, also correcting for the rapidly-growing economy. Off the table to the left, the rapid expansion of industrial listings in the merger wave of 1897-1902³⁷ had decisively changed a NYSE landscape until then overwhelmingly dominated by railroads (before that London and Boston had listed more US industrials than the NYSE).³⁸ Yet many citing Navin and Sears (1955) on this expansion forget that the glass they showed nearly half full was also more than half empty. That persisted: for these two decades NYSE stocks were growing more slowly than the US economy. The lower lines in Table 2 (re-estimated at market prices) show US securities (particularly common) generally trading below par. Specifying how J P Morgan should pay him for Carnegie Steel (making him America's richest man), Andrew Carnegie was not alone in 1901 in insisting on bonds and disdaining equities. Corporate bonds on the NYSE were consistently worth more than stocks before

³⁵ from \$7,498m in 1902 to \$23,796m in 1921 (or to \$10,866m adjusted by the GDP deflator).

³⁶ For similar reasons, Rousseau and Wachtel (2000) suggest rescaling market value measures of financial development by stock price indexes: effectively a return to this forgotten early practice.

³⁷ In that period 56 large industrial mergers listed on the NYSE had \$3,671m authorized share capital (Nelson 1959: 92), which is actually higher than Pratt's (1912) figure for all NYSE-listed industrial stocks in January 1902, though the latter is issued capital, which would be below that authorized.

³⁸ In 1890 there were perhaps 100 US "industrial and miscellaneous" securities listed on the Boston exchange, 71 on the LSE and only 28 on the NYSE (Hannah 2007)

1914 and the *quantity* of corporate bonds was increasing faster than GDP or equities, even as bond prices wilted.

The stocks/GDP ratio declined faster at market than at par (though there were temporary respites in booms like 1906 and 1919 not captured in Table 2): the Cowles index fell 15% over these two decades (more in real terms).³⁹ Exceptional post-war volatility, severing stable relationships between investor cash flows and market prices and elevating capital gains and losses to larger shares in annual returns, together with increasing numbers of no-par stocks, eroded any meaning par values had once had. From 1924 the NYSE began publishing figures for all listed stocks at *market* prices annually, revealing a more intense - but equally brief - spurt off the table to the right, a generation after the first. The NYSE stock/GDP ratio increased from 31% in 1924 (a little higher than the 1921 estimate in Table 2 at market) to 69% at the interwar peak (for this ratio) in 1928, before falling back (to the lower fifties) in the 1930s.⁴⁰

Aware of the NYSE's low penetration, foreign analysts urged the compilation of more comprehensive statistics to facilitate meaningful international comparisons (Neymarck 1905: 346-7) and *Moody's Manual* rose to that challenge (Table 3), though its statistics have since been neglected. In his swansong preface of that year, the *Manual's* founder, John Moody (1907), reported the aggregate par values of securities traded anywhere in the US: including 1,512 railroads, 1,655 utilities and 2,390 industrial, mining and miscellaneous corporations. He merely counted the further 13,500 listed financials (their values in Table 3 are my estimate) and the directory also omitted some other small issues. Moody's data (mainly relating to late 1906)⁴¹ did not separate NYSE listings from others, but Table 3 interpolates an end-1906 figure for NYSE stocks from Table 2 data.

Outnumbering NYSE corporations by nearly a hundred times, Moody's additions included some

³⁹ Preferred stocks are excluded by the Cowles index but included in this table with common stocks and until the war they held their value better.

⁴⁰ RZs' (2003) interwar NYSE figures do not correspond to the Exchange's own data, compare <http://www.nyxdata.com/Data-Products/Facts-and-Figures> (accessed 23 August 2015).

⁴¹ December (and June) 1906 balance sheets dominate entries, though some relate to March 1907.

Table 3. Quoted Stocks in *Moody's Manual 1907* and NYSE stocks end-1906.

Sector	<i>Moody's Manual</i>		NYSE	NYSE
	US stocks	All stocks	All stocks	share
	\$m	\$m	\$m	%
Steam Railroads	5,280	5,978	4,825	83
Industrials*	9,553	10,286	3,325	32
Utilities†	4,344	4,455	921	21
Finance	<u>1,500</u>	<u>1,500</u>	<u>326</u>	22
Total at par	<u>20,677</u>	<u>22,219</u>	<u>9,397</u>	42
Total at market	17,782	19,108	7,800	41
Ratio to GDP (par)	66%	71%	30%	42
Ratio to GDP (market)	57%	61%	25%	41

* Including mining and miscellaneous

† tramways and the NY subway are grouped with other local utilities, not railroads.

Cols 1 and 2: Moody 1907: 26-9. Moody only counted financial companies' numbers not values. In 1907 there were 6,429 national banks with \$834m capital and (omitting private commercial banks and other non-corporates) 9,967 state banks, 794 trust and loan companies and 1,415 savings banks with capital of \$792m (Comptroller 1907: 35-6, 40, 50-1). This excludes insurance and other financial companies and the IRS counted 29,822 financial corporations with \$2,724m share capital at par in its first survey of 1909/10. Many banks were family-owned and traded only locally if at all, which may partly explain why Moody only listed 13,500 financial corporations. I have conservatively estimated the par value for all quoted finance stocks as \$1,500m.

Col. 3. I have interpolated a 1906 figure from Pratt's (1912: 81-2, 1920: 53, 132) figures for NYSE stocks in 1902 (including the unlisted department which closed in 1910) and 1911, using his data on new listings in the interim. In the absence of disaggregated listing flow data, I derive sectoral shares from the means of 1902 and 1911.

Col. 4. Col 3/col.2 x 100

Line 6. Adjusted by average market/par ratios estimated by sampling the *Commercial and Financial Chronicle* and the *Manual of Statistics*.

Lines 7-8. For all columns the GDP - \$31,336m - is for the US only.

giants: notably Standard Oil and Singer Manufacturing (traded on the NY curb), Du Pont (listed on the lax San Francisco Exchange which tolerated small free floats), Eastman Kodak (listed on the LSE since its 1898 IPO there and also traded on the NY curb) and Procter & Gamble (listed on Cincinnati, since delisting from the NYSE in 1902 after persistently refusing to publish accounts and not relisting until 1926).⁴² Those Moody measured were, of course, not all so large: they had about one-twelfth the mean equity capitalization of the NYSE-listed and the added financials were much smaller (even after allowing for their higher market/par ratios). Moody also provided bond data, not reported here because consistent with the earlier discussion around the NBER data in Table 1, and showing a higher NYSE market share⁴³ for bonds than stocks.⁴⁴

Moody distinguished domestic from foreign stocks (cols 1 and 2) but the NYSE (col 3) did not, so the 42% coverage indicated in col 4 includes listed foreign corporations (mainly Canadian and Latin American railways and mines), which (as the NYSE had more international cross-listings than regional exchanges) overstates the NYSE's *domestic* coverage. This would fall below 40%, if corrections were made for this and for omissions and intercorporate holdings. Thus the NYSE appears less dominant than a generation later (n. 50, below), though - if stocks mirrored bonds - this was near its lowest point (Hickman 1960). The NYSE was indisputably the national stock market for railroads - even as late as 1914 rails still accounted for 55% of its stock values at market and included

⁴² Standard Oil listed - with sufficient transactions to appear in the Cowles NYSE index - in 1918, Eastman Kodak in 1920, Singer in 1926 and Du Pont in 1935.

⁴³ All references to market share are to listings not trading. The early data on trading (or trading relative to listings) are patchy, inconsistently measured and difficult to interpret even on a national basis. The NYSE apparently had a higher share of trading than listings relative to other exchanges, but that conclusion might not survive the inclusion of OTC markets (on which there are no data, Ferderer 2008). The regional German exchanges had a higher share of trading than exclusive listings, relative to Berlin (excluding intra-bank matched bargains, Burhop and Lehmann 2015).

⁴⁴ A calculation for bonds using the Table 3 methodology shows higher totals (and a higher share for the NYSE) than Table 1. Moody and Hickman netted out intercorporate bond-holdings, while the NYSE did not, thus exaggerating the NYSE share. Hickman also omitted bonds of foreign companies or mainly held by foreigners, reporting NYSE (straight) bonds only at four-year intervals. His observation coinciding with an NYSE enumeration reports \$10,209m in January 1920 against the NYSE's own \$14,308m in May 1920, a 29% shortfall; interpolation suggests a smaller shortfall in 1902. Hickson's definitions are more appropriate for analyzing the national market for bonds in the hands of the public.

a comfortable majority of rails quoted anywhere⁴⁵ - but the metropolitan exchange was markedly less dominant in other sectors generating 90% of GDP. Its share of industrial and miscellaneous stocks was below one-third and in finance and utilities (the classic local securities) below a quarter. Banks - which once dominated New York (Hilt 2008) - were delisting and migrating to auction and informal markets.⁴⁶ Railroads apart, around three-quarters of US quoted stocks (by par value) were *not* traded on the NYSE.

The ratio of all Moody's domestic corporate stocks to GDP at the end of 1906 was 66% at par and 57% at market: US financial stocks were normally well above par and others usually below, though 1906 was the (then all-time) peak of stock prices. Moody's detailed enumeration was not repeated by his successors, though the eponymous *Manual* (Moody 1923: xliv-xlv) retrospectively assessed the total for "securities in the hands of the American public," at market values for 1916, 1920 and 1922, without as clearly specifying definitions or methodology.⁴⁷ These figures for quoted corporate stocks amounted to 48% of GDP in 1916, 34% in 1920 and 42% in 1922⁴⁸ and appear compatible with the wartime slump in the stock values/GDP ratio on the NYSE in Table 2. In this period liberty bonds crowded out corporate securities,⁴⁹ regulation depressed rail stocks and wartime excess profits facilitated industrials' self-financing. The 1920s Wall Street (and nationwide) boom decisively reversed this long period of marking time, with a massive increase in quoted stocks, especially industrials (railroads ceased to dominate NYSE listed par values around 1922) and in stock prices (the monthly Cowles index rose from a post-war low of 51.9 in August 1921 to a peak of 225.2 in September 1929). In the later 1920s the ratio of all US stocks to GDP at market for the first time

⁴⁵ On a comparable (gross of intercorporate) basis, there were \$6,804m US railroad stocks at the end of 1906, suggesting the NYSE share was 71%, though that needs to be reduced to allow for foreign railways.

⁴⁶ Bank and trust company stocks fell from 4% of the NYSE market at par in 1902 to below 1% by 1914.

⁴⁷ Were US corporate securities owned by foreigners (still non-negligible, despite the wartime sell-off) deducted, as the description implies? Moody did not deduct them in 1907 and I suspect they were included later, too.

⁴⁸ \$23,950m in 1916, \$29,973m in 1920 and \$30,717m in 1922.

⁴⁹ By 1921, government (mainly liberty) bonds accounted for 63% of all NYSE bond listings at par and corporate bonds only 37%, compared with only 12% government and 88% corporate in 1914.

exceeded 100%.⁵⁰ Even after the 1929 crash (with both stock prices and GDP collapsing), US stocks on 23 major exchanges in 1930 totalled \$81,970m at market (Moody 1933: a106-7), or 89% of GDP, a little higher if smaller and informal markets were included.

US data on this nationwide basis facilitate meaningful international comparisons of equity/GDP ratios. The suggested ratio of around 42% for all German exchanges' equities at market in 1913 (nearly seven-eighths by value quoted on Berlin) is below the national totals for the US in 1906 (57%) or 1916 (48%) and Germany's ratio then diverged further (Burhop et al 2015). French pre-1914 ratios - a high of 59% (1902) and a low of 51% (1912) - are indistinguishable⁵¹ from the US, with the Paris *parquet* share of its national market rising from 70% to 80% (Bozio 2002). French ratios declined sharply in the war and then expanded more slowly (they were 18% in 1920 and 36% in 1930, both well below the US), reflecting the financial devastation wrought by the costs of France's wartime victory and post-war European disorder. Even before 1914, *national* equity ratios were thus closer together than RZ suggested, with the US about the same as France and ahead of Germany. The US also had a much larger corporate bond market (Table 1), so ratios of all quoted corporate securities to GDP put the US unambiguously ahead of France and Germany even before 1914.⁵² As Table 5 shows it is the failure to allow for bonds (which dominated the NYSE) and regional markets (Berlin and Paris were more dominant nationally than the NYSE) which has led to misconceptions that the US lagged.

Discussion of these matters in the "legal origins" literature is underpinned by traditional faith in revealed preference evidence: where laws protect investors, it is presumed that they will finance larger corporate securities markets. This not only fails to explain the sharp (1897-

⁵⁰ The ratio for the NYSE alone was 69% in 1928, 62% in 1929 and 53% in 1930 (the latter implying a 60% NYSE share). Assuming the same NYSE share in 1928, the national ratio would have peaked at 116% in 1928.

⁵¹ Using alternative GDP estimates (Table 1, note on rows 5-7), the US ratio exceeds the French, while using the lower French GDP figure of Table 1 rather than Bozio's would restore the slight French lead. Given margins of error also in both countries' securities data, no gap is distinguishable.

⁵² However, the US was behind civil law Belgium, which from 1867 to 1933 had unregulated private stock exchanges on the Anglosphere model: domestic equities on Brussels alone were 80% of 1913 GDP and corporate bonds another c.40% (Annaert et al 2012: 192-4)

1902 and 1924-29) US bursts of securitization we have noted (which do not correlate with improvements in investor protection) but abstracts from the “sell” side, implicitly assuming corporations had to meet investor preferences on the “buy” side. Yet some entrepreneurs and managers - primary decision-makers on listing - preferred *less* shareholder protection and more board discretion. Superior European regulation and corporate governance may have revealed itself in investment *quality* rather than greater *quantity* of quoted equity: European entrepreneurs unwilling to submit to corporate governance disciplines simply remained private firms or partnerships. On the other hand, charter-mongering competition between New Jersey and Delaware notably reduced pressures on US corporations to adopt even the modest corporate governance standards required by Massachusetts, Pennsylvania or New York (Grandy 1989). State and federal regulators enforced some publicity and governance standards on banks, insurers, utilities and railroads, but the NYSE struggled to persuade other listed company boards even to publish accounts, a legal requirement in most of Europe.⁵³ The competition of regional markets and the curb weakened the NYSE’s capacity to enforce listing rules on industrials until SEC backing in 1934, though in 1910 some progress was made in closing down the unlisted section under pressure from Governor Hughes’ Inquiry. The needs of corporations for finance, in a US economy whose rate of structural change required more external finance than Europe’s (Davis 1966), still impelled many US corporations to go to the markets. Moreover, then as now, much IPO activity was not directly concerned with financing new investment, but with extracting money from maturing businesses for early angel investors or retiring family owners. Many businessmen - appealing to patriotic distaste for the more despotic European regimes - eccentrically urged stockholders that their republic’s

⁵³ Snowden (1987: 350) plausibly argues that federal ICC regulation differentially improved informational efficiency in the railroad equity market. In France all SAs had to provide their shareholders with accounts, though (unlike for railways and some utilities and banks in the US) the content was not prescribed, on the grounds that business good faith would achieve as much or more than detailed prescription (Neymarck 1911: 14), a view which in the age of Enron and Lehman - of detailed specified data disclosure conveying pitifully less useful information - compels some sympathy. Similar provisions applied to German AGs and UK public companies (though not to GmbHs or private companies). Of course firms everywhere had a variety of incentives to reduce the “lemon” discount by improving transparency voluntarily, see Barton and Waymire 2004, Overfelt et al 2010.

preciously-won liberties included continuing freedom from the European tyranny of requiring quoted companies to disclose their accounts publicly (Vanderlip 1935, Hannah 2007).⁵⁴ This favored bondholders, who at least had the option of taking over the firm if rewards for investing their funds fell short by one easily observable indicator, while many industrial stockholders had weak anti-director rights and poor information.

There is a distinguished renegade strand in American business history maintaining that US industrialists' freedom creatively to plan investments - treating shareholders not as owners but as mere capital for hire - underpinned a form of corporate development with long-term advantages (Chandler 1990, Lazonick 2007, O'Sullivan 2009).⁵⁵ By contrast - and more firmly in the financial economics mainstream - Burhop et al (2015) have argued that German statutory reforms of 1884 and 1896 imposed obligations on firms going public and their intermediaries, creating a strongly-entrenched, bank-promoted shareholder value culture, later destroyed by Nazi legislation inimical to the publicly-quoted firm.⁵⁶ Corporate governance standards promoting shareholder value in the two countries before 1914 were thus the reverse of those ascribed to each country later in the century by the "varieties of capitalism" school. Yet other factors - excluded by conventional modelling - evidently determined the somewhat larger US stock of corporate securities.⁵⁷

This did not mean that continental European business derived fewer financial resources from securities markets, because railways and other businesses issued government bonds (Germany) or government-guaranteed bonds (France) which are excluded from the corporate totals here. Equity risks transferred to governments had no corresponding securities and not all government (or municipal) bond issues were earmarked, so the sources do not readily yield exact

⁵⁴ Wright (2014) argues for *deteriorating* US corporate governance around 1900 (when the market was rapidly growing); on the other hand Cheffins et al (2016) suggest declining protection in state law from 1900 was mild and from the 1930s offset by increasing federal protection.

⁵⁵ For modern parallels, see Kay (2015: 163)

⁵⁶ Germany had been more diverse earlier with free cities like Frankfurt and the Hanse towns hosting exchanges nearer to the Anglosphere model; change was driven by legal innovations owing more to Prussian bureaucracy.

⁵⁷ In another context, Hamao et al (2009) argue that increased liquidity with relaxation of listing requirements, not investor-friendly rules, drove Japan's exchange growth.

proportions for comparison, but such bonds more than made up the continental European shortfall in corporate securities.⁵⁸ Any American advantage in funding business enterprise by quoted securities thus lay in the merits of ownership by capitalists rather than the state. The expansion of telephone service was much slower in the state-owned systems of France, Germany and Britain than in the US (Foreman-Peck and Millward 1994), but the pre-1914 evidence on railroads is less clear-cut: nationalization generally reduced efficiency, though both French and German railways were at times more efficient than those in the US (Bogart 2010). Many decades of experimentation with socialism - communist, national and many varieties in between – were needed to convince most politicians in advanced countries that mixed economies with a high share of private enterprise and more discriminating government infrastructure supports were probably a better route to prosperity than the regimes favored by many before 1914.

In 1914 the UK had little state-owned enterprise and lagged the US in domestic corporate bonds only because of (compulsorily less-leveraged) railways (Table 1). What of UK equities? Richard Grossman (2015) has calculated the values of the ordinary shares of around 950 domestic companies listed in the *Investor's Monthly Manual (IMM)* - most of the LSE official list - in 1913.⁵⁹ His total for that year - approaching 73% of GDP at market - exceeds any figure proposed for other major countries, though it omits more UK equities than it includes: the ordinaries of the many thousands of smaller UK quoted companies in contemporary directories, plus all preferences.⁶⁰ The LSE's numerous brokers competed to increase their business by trading provincially-listed or

⁵⁸ Not all were devoted to productive activities, but on the Berlin Börse at the end of 1910 the bonds of the German Reich, states and municipalities at par exceeded all German corporate stock and bonds listed there (Neymarck 1913: 237-41), while on the NYSE only 12% of securities were government bonds.

⁵⁹ His longitudinal *IMM* data for 1869-1929 need to be interpreted with care: the implied secular decline in equity/GDP ratios merely reflects declining *IMM* coverage. The securities totals (including equities) measured in overlapping periods between 1853 and 1934 by *Burdett's Official Intelligence*, the *Stock Exchange Official Intelligence*, *Annual Abstract of Statistics* and Essex-Crosby (1937) indicate faster growth of listed/traded securities than in Grossman's graphs, which show stability of extant paid-up capital at par over decades of substantial new equity issuance.

⁶⁰ Nearly 90% of the several hundred large, independent, British-owned companies with more than £1m share capital had LSE-listed securities, while less than 10% of smaller quoted companies were officially-listed. The additions depend on comparing Grossman's *IMM* and Essex-Crosby's (1937) *SEOI* par values for 1913/14, though allowances for some omitted companies and market/par ratios are less securely based.

otherwise negotiable securities, blurring the distinction between metropolitan and regional exchanges that was clearer in other countries.⁶¹ The LSE's annual *Stock Exchange Official Intelligence (SEOI)*, belying its title, thus included not only its *official* list, but also what might be called its junior market: its own less regulated "special settlement" securities plus many provincially-listed or otherwise negotiable securities which LSE brokers traded. Paris and the NYSE had modest cross-listings with regional markets and the NY curb provided a venue for trading some larger regional securities, but more extensive cross-listing on multiple exchanges and trading by LSE brokers of unlisted securities helped forge a more integrated and competitive UK national market.⁶² Table 4 (adding these extra LSE-traded shares and bonds to Grossman's *IMM* securities) portrays something approaching the whole national market, comparably to Table 3 for the US (though with many similar small omissions).

The LSE *official* list (approximated by line 1 for ordinaries only) covered about two-thirds⁶³ of quoted domestic equities: a lower portion of the national market than Berlin or Paris but more than the NYSE. The LSE remained larger for domestic corporates than the NYSE in 1913,⁶⁴ but all quoted UK corporate securities in Table 4 were in absolute dollar terms (at market exchange rates) only about two-thirds of the US *nationwide* total.⁶⁵ All US exchanges thus *collectively* constituted the world's largest *domestic* corporate securities market - unsurprisingly since the US had for two generations been the largest economy in the world and by 1913 produced more than

⁶¹ In 1914 there were 4,855 brokers on the LSE, more than on Paris, Berlin and New York combined.

⁶² Compare the cross-listings shown in Burhop and Lehmann (2014) for Germany (where Berlin, with 40%+ of its listings being cross-listings with regional exchanges, has more cross-listings than Paris or the NYSE) with UK cross-listings shown in the *Investor's Monthly Manual* for 1913. For the association between multiple market listing and wide shareholding, see Acheson et al (2015) and Rutterford et al (2015)

⁶³ The share for ordinaries is increased by the higher portion of officially-listed preferences (Table 6).

⁶⁴ Including domestic corporates on its junior market as well as the official list.

⁶⁵ Interpolating the 1906 and 1916 US figures for the ratio of equities at market to GDP, a 1914 figure of 50% of GDP would give \$18,412m for equity capitalization, which together with \$15,193 for corporate bonds at market (data underlying Table 1), makes a total of \$33,605m. Of this \$17,039m (\$7,920m equities and \$9,119m bonds) or 51% was on the NYSE (data underlying Table 2) and about \$6,750m (mainly NYSE securities) or 20% of the total was held abroad, most in the UK (Lewis 1938: 546, 558). The UK *SEOI domestic* corporate securities total in 1913 (all, whether officially-listed or not, in principle tradable on the LSE) at market was £4,560m (Table 4) or \$22,193m (\$17,662m equities, \$4,531mm bonds). The UK thus almost equalled the US market for *equity*: it was corporate bonds that made the US the distinctly larger corporate securities market overall.

Table 4. Quoted UK Corporate Securities in the LSE's *Stock Exchange Official Intelligence*,⁶⁶ December 1913.

	At par (£m)	At market (£m)
1. IMM-listed ⁶⁷ ordinaries (Grossman)	1,065	1,750
2. Other quoted ordinary shares	636	1,045
3. All quoted preference shares	<u>957</u>	<u>834</u>
4. Total equities (1 + 2 + 3)	<u>2,658</u>	<u>3,629</u>
5. All quoted corporate bonds	<u>1,034</u>	<u>931</u>
6. Total UK quoted corporate securities (4 + 5)	<u>3,692</u>	<u>4,560</u>
7. GDP	2,411	2,411
8. Corporate equities/GDP (4/7 x 100)	110%	151%
9. Corporate securities/GDP (6/7 x 100)	153%	189%

Sources: Line 1. Grossman 2015: 475-6. His graphs indicate a figure approaching £1.8b for domestic UK ordinary shares in 1913 at market and above £1b at par.

Line 2. Essex-Crosby (1937) tabulates the ordinaries of all British-registered companies in *SEOI 1915* and, omitting foreign railways, gives a total of £1,219m at par, which I reduce by 1% to allow for additions between 1 January 1914 and the closure of the stock exchange in July 1914 and by 5% to allow for unquoted ordinary shares (Essex-Crosby's totals are for all the capital of any company with one quoted security: he included a company's ordinary shares even if only its bonds or preferences were quoted), leaving £1,146m. Essex-Crosby omitted all statutory, chartered and Irish companies (statutory and chartered companies were those with individual private acts of parliament or royal charters, rather than those registered with the Board of Trade; Ireland, part of the UK in 1913, was semi-detached when Essex-Crosby was writing). For UK railways (all of them statutory corporations) Board (1917) gives £493m ordinary shares in December 1913. The *SEOI* says £432m were officially-listed and I allow £14m for provincially-listed issues, conservatively deducting £47m for those that may have been inter-corporately or privately held. A further £107m for remaining Essex-Crosby omissions is estimated from sampling the *SEOI*. The figure shown at par for additional ordinaries is this total minus line 1. Grossman's market/par ratio (164% from line 1) is very similar to the *Bankers Magazine* monthly

⁶⁶ Houston and Dunning (1976: 37-8, 40) report 13,500 companies (but not their values) listed in the 1914 *Stock Exchange Year Book* – published by Skinner (the British Moody) – and they separate those that mainly operated overseas (3,373, of which 730 were registered abroad and 2,640 in the UK), leaving 10,127 mainly operating in the UK. Of the latter around 9,000 were not officially-listed on the LSE and one can debate whether the 2,640 British companies operating mainly abroad should also be included (as some US-registered ones, like United Fruit or Mexican Petroleum, are for the US). Table 4 estimates are based on the less comprehensive *SEOI* (excluding securities unlikely to be tradable by LSE brokers) and account for just over half Skinner's total numbers, but the omissions were mainly small, thinly-traded issues.

⁶⁷ The 30 July 1914 *Stock Exchange Daily Official List* included 1,852 companies, compared with around 1,400 (68% domestic) reported by Grossman (whose *IMM* source includes some large provincially-listed companies). Some of these 452+ omissions are firms only listing bonds or preferences or foreign listings, but others are smaller officially-listed domestic ordinary shares. He refers to his 1,400 total (and 950 domestic shown here) as "equities listed on the London Stock Exchange." As the large (included) provincial issues and small, numerous (omitted) LSE listings to some extent balance, this is reasonable, if not strictly accurate.

ordinary index calculated for 18 December 1913 (159%). Grossman's data indicate that small *IMM* firms had higher market/par ratios than large ones (email to the author, 9 October 2009) but I conservatively assume these extra (mainly small) companies had Grossman's (2015) overall market/par ratio.

Line 3. The procedures in line 2 are repeated, substituting an estimate of 3% for unquoted preferences and omitting the deduction of line 1. Market/par ratios are estimated by sampling prices for the relevant securities.

Line 5. The procedure of line 3 is repeated for bonds, substituting an estimate of 1% for unquoted bonds.

Line 7. www.measuringworth.com

three times the UK's GDP⁶⁸ - but, by the conventional ratio, the UK was in a class of its own. For domestic equities alone, its ratio of 151% of GDP in 1913 at market was not matched by the US until near the *end* of the twentieth century and - as Table 5 shows - was *three times* the mean pre-war ratio for the other three large industrial countries. One can quibble about finer details in these statistics (for example, is the fuzzy border between quoted and unquoted securities equivalently drawn for the US and UK?), but leadership is clear. The UK ratio was ahead of the US whether measured at par or market, in share capital only or adding bonds, with or without preferences, deducting foreign holdings or including them, and confined to the metropolitan market's official list or including most securities traded nationally. Considering only their metropolitan markets for domestic securities, the LSE (official list plus junior market) was not only larger but also more orientated toward industrials and financials. The rail sector had ceased to be the majority by value of the *domestic* quoted securities tradable on London around 1890, three decades before that happened on the NYSE.⁶⁹

The exceptionally early, deep and wide penetration of traded equities into British business financing compared with the US was not a consequence of common law.⁷⁰ Other claimed causes - such as strong anti-director rights and corporate governance practices promoting the divorce of ownership from control (Rutterford 2012, Foreman-Peck and Hannah, 2012, 2013, 2015)

⁶⁸ At current prices and exchange rates (www.measuringworth.com). Maddison (2006: 427, 462) put the US real GDP at only 2.3 times the UK's.

⁶⁹ Table 3 shows railroad *stock* as a minority at par by 1917/21, but adding railroad bonds (as with the LSE) delays the transition a few years; in both countries the transition was earlier at market prices.

⁷⁰ On the contrary, legal family predicts an American lead: civil law Louisiana was a smaller portion of the US than civil law Scotland of the UK.

and better corporate accounting (Watts and Zimmerman 1983, Edwards 1992) - may explain some of the lead, but similar factors were not enough to elevate Germany above the US, so they would need stronger or less selectively negative⁷¹ effects in the UK to do the required heavy lifting alone.

Supplementary factors (some less intense or absent in Germany or the US) may include: being an early mover in stock exchange development,⁷² knowledge-sharing and trust in the networks of a confident, conservative, culturally-homogeneous and settled society,⁷³ statutory controls on railway leverage, a more competitive metropolitan stock exchange, more integrated with regional markets (Michie 1987, Kynaston 1996: 525-9),⁷⁴ cheaper IPOs (Hannah 2011), effective criminal prosecution of securities fraudsters (Taylor 2013), investment trusts permitting small investor diversification (Rutterford 2009), an exceptionally low share of agriculture in GDP (farms rarely listed),⁷⁵ tolerance of multi-branch banking (large banks were more likely to be listed), and high wealth/GDP ratios and economic inequality that the US did not match until later in the century (Piketty 2014). Today the US ratio of equities to GDP is exaggerated by the preponderance of American-headquartered multinationals with most of their operations abroad (activities that anomalously do not appear in the GDP denominator) and there was a similar UK distortion before 1914. Many large UK companies (Coats, Nobel, Shell, Standard Bank, BAT, Hudson's Bay etc) had more overseas than domestic assets

⁷¹ As we have noted, the existence of a relatively unregulated LSE junior market allowed more trading, despite private order LSE official listing requirements possibly as restrictive as Germany's legal requirements.

⁷² The LSE claims foundation in 1773 and the NYSE in 1792, both somewhat arbitrarily. London had a longer tradition of share trading in Change Alley coffee houses (though was far from being the European first mover: the Antwerp exchange dates back to 1531 and Belgium's equity/GDP ratio - despite extensive railway nationalisation in 1898 - was perhaps nearest to the UK's in 1913).

⁷³ Trust in a gentlemanly finance sector with behaviour disciplined by socio-cultural norms was higher and lasted longer (not only in the UK but in Europe generally) than in the US (achieving some, albeit limited, control of malpractice which J P Morgan - who understood it - famously failed to persuade the Pujo Committee he was replicating in the US). Lacking much of the trust that lubricates financial intermediation, the heterogeneous, competitive, thrusting US led the world into box-ticking rather than ethics-based financial regulation, which arguably worsened rather than cured the disease. Tragically, this was later enthusiastically embraced by a corporatist Japan and Europe to conceal the scale of their banks' financial skulduggery.

⁷⁴ Fixed commissions on the more monopolistic NYSE model were introduced from 1912 and lasted on the LSE until 1986, ten years longer than on the NYSE.

⁷⁵ Even today corporations only account for 5% of US farm receipts (Allen and Lueck 2004), though much British-owned farm acreage before 1914 was overseas and much of that (in plantations and stock-raising) was corporate.

- like GE, Microsoft, HSBC or BP today - and perhaps one quarter of the capital in “British” companies financed their operations overseas.⁷⁶

Financial development is associated with growth (and in the real - non-Arrow-Debreu – world, with transaction and information costs, obviously can assist development), but - if consensus among ideological incompatibles is a reliable guide - then the view that enterprise led and finance merely followed must be taken seriously, with Joan Robinson, Ronald Coase, Alfred Chandler and Robert Lucas sharing such a perspective. Skeptics about whether finance is the major driver of growth might relish the lag of NYSE equities behind GDP growth in 1902-24 (Table 2)⁷⁷ and its (most rapid ever) spurt just preceding America’s deep depression; while Germany’s regulation-driven 1896-1914 corporate finance lag (Table 5) did not prevent an impressive economic growth performance. Since the global financial crisis, economists have also more commonly explored why high levels of financialization may cause harm (Zingales 2015, Kay 2015).⁷⁸ There is a more long-standing literature condemning the UK’s precocious pre-1914 financialization, with its allegedly weak monitoring of investment bubbles and irrational overseas bias (Hobson 1905, Kennedy 1987, Pollard 1989), pre-figuring some modern literature on financialization and off-shoring (Krippner 2005). Such critics have in turn attracted refutation: pre-1914 British investors are defended as sensibly pioneering rationally diversified return maximisation strategies (Lenin 1928, Edelstein 1982, Goetzmann and Ukhov 2006, Chabot and Kurz 2010). This is not the place to enter these (sharply

⁷⁶ Firms mainly investing overseas were more likely than domestic firms to be incorporated (Worswick and Tipping 1967: 116, 121) but domestic corporate borders are ambiguously defined in different studies (Hannah 2007). Geoffrey Jones (1996:30) warns that foreign direct investment data for 1914 are crude and variously defined (and a small amount was non-corporate), but his estimates suggest the UK stock was \$8,192m (equivalent to 23% of all UK quoted corporate capital at market plus unquoted share capital at par from Tables 1, 4 and 6) and the USA’s \$2,549m (only 4% of US corporate capital on the same basis). By contrast, Germany’s higher ratio than the US reflects its exceptionally low denominator (corporate capital) and equal numerator (multinational investment).

⁷⁷ However, NYSE securities (all bonds plus corporate equity at par) had grown faster than GDP in 1868-1902 (Pratt 1912): the GDP ratio rising from 36% to 57% over that period (despite a declining portion of government bonds). Similar long-run increases were observed in Europe.

⁷⁸ Rajan (2005) raised similar concerns *ex ante* but was howled down (at the Jackson Hole encomium for Greenspan) by Kohn, Rubin, Summers, Bernanke, Geithner and others (Kay 2015: 56-9).

Table 5. Market Capitalization of All Quoted Companies 1913/14.

	UK	US	France	Germany
	1913	1914	1913	1913
Bonds/GDP %	38	41	5	6
Equities/GDP %	151	50	51	42
All Corporate Securities/GDP %	189	91	56	48
Main Market Share (%)	67	51	83	82

Sources:

Line1: market values; Table 1, with appropriate adjustment from 1914 to 1913 for UK.

Line 2: par values; Table 4 for UK, n. 65 for US, Bozio (2002) for France (adjusted to the GDP figure used in Table 1) and p.14, above, for Germany

Line 3: line 1 + line 2

Line 4: UK LSE-officially-listed equities 69% from Table 6, with 60% of bonds (at levels indicated in Table 1) assumed to be officially-listed all at par; US from n. 65 and at par; France 80% from Bozio for equities and 87% from Table 1 assumptions for bonds, all at market; for Germany I have decreased Burhop and Lehmann's figure of 86% of AG share capital at market listed on Berlin to 84% to allow for *Gewerkschaften* being less Berlin-centered; Table 1's 71% of quoted bonds listed on Berlin is applied to bond market values in that table.

divisive)⁷⁹ debates, but Table 5 confirms that such controversies rightly address a key issue: London's exceptional stock exchange development. On the other hand, the distinguished comparative historians who, a generation ago, inventively "explained" British institutions' lack of the German/American securities market capacity for divorcing ownership from control (Chandler 1990, De Long 1991, Wilson 1995) disqualified themselves by comically aiming at the wrong target.⁸⁰ Yet,

⁷⁹ One American scholar that I respect described them privately as wars of religion. Recent chief executives of Goldman Sachs and Enron are on record as believing they were instruments of God (Kay 2015), and earlier J P Morgan (with more appealing private discretion) hoped the same, but I do not think my informant intended this description as a compliment.

⁸⁰ This is not to deny the broader interest of their underlying concepts of organizational and monitoring capabilities, nor the extensive survival and potential problems of family ownership in all three countries (on

whatever determined the UK's exceptionally high financialization, it was not immutably fixed by path-dependencies or globalization which politicians were powerless to control. RZ - though underestimating the pre-1914 British lead (they put it at only twice the norm, measuring only LSE official list corporate securities at par) - correctly drew attention both to its remarkable reversal by financial repression in the middle decades of the twentieth century (which did not self-evidently improve UK economic performance) and its equally remarkable resurrection towards the end of that century by market fundamentalists (which, some argue, did).⁸¹ One possible resolution of the underlying paradox is that modern analysis using finer-grained data suggests that the quality of financial intermediation - rather than its quantity - influences outcomes (Hasan et al 2015). We do not have similar quality measures before 1914, but we *can* assess some of the possible variables.

FINANCE ON STOCK EXCHANGE BOUNDARIES AND BEYOND

In 1913 the number of companies quoted on all 23 German exchanges was around 1,650⁸² (25 per million people) and that is the full story: other external funding was essentially private equity,⁸³ bank lending or trade debt. Most off-exchange trading was by banks matching bargains in those same securities (Prion 1924: 1053-4; Kikisch 1927: 9-13; Fohlin 2006: 248-52, 303), though there were many unquoted AGs on the sidelines fostered by banks and/or entrepreneurs anticipating an eventual public issue.⁸⁴ The 1,182 French companies listed on all eight exchanges

which Wilson's judgment was sensibly nuanced). Their misconceptions derived from a belief that Germany and the US developed proportionately more large-scale corporations than the UK, another hypothesis lacking statistical support (Cassis 1997, Hannah 1999, Wardley 2006). Merton's admonition (as quoted in Krippner 2005: 174) - that the facts should be established before they are explained - is very old (Selden 1689: cxxi), but bears repetition.

⁸¹ At its nadir in 1974 the UK domestic equity/GDP ratio was only 20% and bond/GDP ratio 3% (LSE 1974: 8); by the twenty-first century equities had returned to 1913 levels; but the UK's corporate bond/GDP ratio has remained exceptionally low. For robust condemnation of later extreme financialization see Kay (2015).

⁸² 1579 AGs and KGaAs, plus an allowance for *Gewerkschaften*.

⁸³ "Private equity" now describes the provision of growth, buyout and venture capital to (often, but not exclusively) private companies by principals or intermediaries who themselves may be private or quoted. Such institutions existed (with less regulatory separation) before 1914, though I am here using the term to mean any outside investor in unquoted securities.

⁸⁴ Only 30% of Prussian AGs were listed in 1913 (and a similar portion for all Germany), but they accounted for 72% of AG paid-up capital (Königlichen PSL 1915: 232-3), while 33% of AGs in a 1909 Germany-wide analysis had below the M500,000 (\$119,000) minimum capital normally required for listing. The remainder were

indicate a similar level (28 per million people), though many more French unlisted companies chose to comply with the 1907 legislation that required publicity for companies appealing to the general public for funds (Guilmard 1904, Batardon 1923: 31-2; Freedeman 1993: 24). This suggests that, despite (or because of) tight government regulation of its exchanges, more off-exchange trades prior to listing and/or informal markets facilitated by bankers and dealers occurred in France than Germany.⁸⁵

Many more (mainly medium-sized) companies can be classified as quoted in the Anglosphere, but the numbers on formal markets have not been as comprehensively counted. Indeed they *cannot* be because the boundaries with less formal markets were not clearly defined and shaded into private equity. Securities directories imply that those available to public investors numbered well above 10,000 in the UK and 20,000 in the US, both in excess of 200 companies per million people: many times the French or German level (not to speak of higher than the level in the US or UK today). What has happened in the last half century or so is a separation of formal stock exchanges from venture capital markets funding firms prior to flotation on those markets, but the Anglosphere's extended funding shows some persistence: the US (and within Europe the UK) have significantly larger private equity markets today (Hill 2015), just as they previously had larger fringe quoted markets.⁸⁶ The few hundred largest corporations on major markets alone accounted for around half their quoted capital and perhaps especially facilitated scale or scope economies, network benefits or monopoly profits, but the many thousands of medium-sized quoted companies may, like modern venture capital, have been more important in promoting competitive diversity and technical experimentation. On these boundaries the rules of the game were very different from

presumably being prepared for listing, self-funding for the time being and/or closely-held pre-GmbH foundations that had not bothered to re-register as GmbHs (43% of 1909 AGs pre-dated 1891).

⁸⁵ Nancy in French Lorraine had no stock exchange (nor did Metz in German Lorraine) but local French bankers made markets for corporate securities there (Brocard 1914). Such trades may partly explain the contrast between Bozio's and Saint-Marc's estimates of market size (p. 14, above).

⁸⁶ Though Toms et al (2015) imply no institutional continuities (lessons had to be painfully relearned) and, on some dimensions, small German banks avoiding securitization have done better than venture capitalists (Kay 2015: 168-72). That may also have been true earlier and more generally (Carnevali 2005).

those for the most liquid securities dominating formal exchanges and we know little about their finances, beyond that personal reputation, trust and face-to-face networking counted for more than listing standards, underwriter evaluations and bond grades being developed on some leading metropolitan markets. Trust and reputation among smaller groups giving greater flexibility than strict regulatory standards may have been precisely what generated extensive fringe market activity, compared with regulated markets (like all German exchanges under statutory rules or the NYSE and LSE official lists under private order regulation).

Guinnane et al (2007, 2008) have argued that the contracting options that American SMEs faced were inferior to European organizational menus. Drawing on revealed preferences in within-country comparisons for support, they show the rapid European take-up of new private company forms (notably the GmbH introduced by Germany in 1892) not available in the US. The suggestion that US laws were less suited to SME needs has been questioned (Hilt forthcoming, Hannah and Kasuya 2015).⁸⁷ The third column of Table 6 approaches the issue from the opposite end of the corporate spectrum from clearly quoted companies, raising questions about whether the problems allegedly posed by their organizational menu seriously troubled American unquoted SMEs. The US had incorporated ten times more close corporations than Germans used their (allegedly superior) GmbH form.⁸⁸ If such European private company forms had advantages that careless US legislators withheld, *international* comparisons of revealed preferences suggest that American entrepreneurs showed massively more willing to consume the slightly flawed dishes on their menu than Europeans gorged on the allegedly superior savours of theirs. This was not MacDonalds versus *cordon bleu*, but a much more even contest, perhaps even one with a strong business bias against Guinnane et al's *cordon bleu* pretensions. Thus half of US corporate capital by par value (the only

⁸⁷ Kulms (2001: 694-5) also casts doubt on whether close corporation shareholder agreements were less subject to judicial attack in Germany than the US.

⁸⁸ 316,909 corporations (from which, say, up to 40,000 quoted need to be deducted) by 1913/14 compared with 26,790 GmbHs.

Table 6. Shares of Quoted and Other Companies in Corporate Share Capital (at par).

	Officially-Listed on Main Exchange	Other Companies Known to be Quoted	Wholly or Mainly Unquoted	Total Corporate Capital/GDP x 100
US 1914	\$12,584m (20%)	\$18,876m (29%)	\$32,611m (51%)	174
UK 1913	£1,898 (51%)	£835m (23%)	£927m (26%)	150
Germany 1913	M11,066m (48%)	M2,347m (10%)	M9,754m (42%)	43

Sources:

Line 1. NYSE data for 1 December 1914 (Comptroller 1915: 106), deducting an estimated \$500m for listed stocks of foreign corporations (\$330m of this accounted for by four companies: \$260m Canadian Pacific Railway (founded in 1881 and in 1883 becoming the first non-US company to list on the NYSE), \$30m National Railways of Mexico, \$25m Underground Electric Railway and \$15m Canadian Southern), to confine the total to US stocks. Note that it may not (for this purpose) be necessary to exclude listed companies like Mexican Petroleum (registered in Delaware) or Cuban-American Sugar (registered in New Jersey), since, as US corporations, they are perhaps included in col 4. Based on Table 3 and allowing for foreign companies, other quoted companies are assumed to be 150% of the NYSE domestic total i.e. \$18,876m. The IRS (Commissioner 1914: 18) reported \$64,071.3m share capital in the fiscal year ending June 1914 in all 316,909 “corporations, joint stock companies or associations and insurance companies” (col. 4 being calculated from that figure), leaving the residual shown in col. 3.

Line 2. The first two cols are from Table 4, with preference shares allocated as in that table’s sources. The paid-up share capital of 60,754 registered companies on 30 April 1913 was £2,425.7m and a year later of 64,692 companies £2,531.9m (Anon 1917: 341), the mean (£2,478.8m) is taken as the end-1913 figure. For total corporate capital, from which cols 3 and 4 are calculated, the statutory, chartered and Dublin-registered companies shown in Table 4 notes are added, the portion of Dublin-registered companies included in that total (that need to be subtracted because already in the UK figure used here) being assumed to equal the unquoted statutory and chartered companies (that need to be added here).

Line 3. The total consists of 5,487 AGs and KGaAs with M17,537m share capital, 26,790 GmbHs with M4,810m, (Kaiserlichen S A 1915: 68*) and an estimated 400 *Gewerkschaften* with M1,000m capital. The total for Berlin and other bourses at market (Burhop and Lehmann 2014) with the additional allowance for *Gewerkschaften* are converted to par for the first two columns by the mean of two similar market/par ratios for end-1913 (RZ 2003 online appendix and Königliches PSL 1915).

measure available for unquoted shares)⁸⁹ was in such de facto close company equity (the residual of

⁸⁹ Does this distort the comparison? American quoted shares were traded below par and European ones generally above. If the cause of this (relative propensities to overcapitalize?) did not apply to unquoted shares, this would not only reduce the differentials in column 4 (in the case of the UK reverse it) but would increase the relative size of the unquoted sector in the US and reduce it in Europe. On the other hand, as we have seen, US corporations were more leveraged. Unquoted companies’ bonded debt varied among countries (and in some civil law countries - but then not usually in the Anglosphere - bonds could be issued by unincorporated enterprises) and its quantity is largely unknown (except for Germany), though was probably small relative to

incorporated enterprises not known to be quoted), compared with 42% in Germany, probably about the same in France, judging from its more limited data,⁹⁰ and only 26% in the UK.

Many of these close companies were family-owned, like American Solvay, which had been able to grow to impressively large size, using a little European private equity and reinvesting the high profits of the highly-protected US market in this capital-intensive sector of chemicals which it dominated. By contrast affiliated European alkali companies in this Belgian industrial group and patent pool (notably the UK's Brunner Mond and Deutsche Solvay) faced tougher competitive conditions and chose to raise external funds on the formal Liverpool, London and Berlin exchanges.⁹¹ A case could be made - on the ground that more dispersion of ownership occurred off formal markets un-noticed by stock exchange directories than in Europe - that the boundary between quoted and unquoted for the US should be further to the right than indicated in Table 6. However, the US lead in clearly private (close) corporations would not thereby be eliminated, since as the final column shows the US had far more corporate capital (even after discounting for its larger market size) of all kinds, especially relative to Germany. Most were incorporated personal and family enterprises that continental European organizational menus had failed to tempt away from traditional unincorporated forms (sole proprietorships or partnerships) or in Britain were more likely

the stocks in this table. In terms of all its capital, the relative size of the US quoted sector is thus probably understated.

⁹⁰ The *Direction Générale de l'Enregistrement* (1901: 590-1) first surveyed prefectural commercial registries in December 1898 but its next (1921: 952) survey was more perfunctory and attempts at interpolation have produced incompatible results. In 1898 values determined by the local tax administration were reported: all extant *sociétés par actions* with an official listing (presumably on any French bourse) had F6,515m share capital of all kinds calculated at average market values of the prior year. For most of the remaining shares (presumably including those traded on the *coulisse* as well as those privately held) the declared values for transmission tax purposes were F5,641m. An additional (surprisingly low) 5% by number of extant shares were not valued because none in their company had been transferred. The market value figure of F6,515m does not match Théry's 1897 figure of F11,124m for the market value of shares on the Paris *parquet* alone: perhaps he included otherwise-registered companies not subject to the *Direction* (Suez? Banque de France? See also Hautcoeur 1994: 22).

⁹¹ American Solvay (Bertrams et al 2013) received early finance from the two American owning families, plus the family-owned Belgian Solvay enterprise (the key patent holder) and Brunner Mond (its quoted British technical adviser). Bunting (1986: 83, 167-8) estimated that 10% of large American industrial corporations had no quotation for their common stock in 1906 and 12% in 1914.

to be traded.⁹² The first comprehensive US data (which the IRS needed to implement its new corporate excise tax) showed 2,913 extant corporations per million people by 1910 (Hannah 2015). Only a few other economies of the Anglosphere (Australia, Canada, Hong Kong, New Zealand, the UK) and a few liberal economies on the continent (Norway, the Netherlands) registered levels above 1,200 corporations per million people (the highest at 2,117 still well behind the US), while Germany and France lagged markedly, at only 403 and 306 per million respectively.⁹³

These “excess” US incorporations were overwhelmingly unquoted, close companies, owned by entrepreneurs and their families,⁹⁴ but what might be called private (or “outside”) equity easily shaded into the traded sector in the US. Some unlisted companies had dozens of shareholders, recruited from among neighbors, acquaintances, employees, suppliers or customers or introduced by banks, auctioneers or other local intermediaries (Lough 1917). American corporations wishing to trade their shares privately or issue shares or bonds to acquaintances and business associates simply did so, as did UK companies until 1907. Thereafter those British companies that were newly legally classified as “private” remained free to sell or trade their shares by simple agreement between buyer and seller only until they had 50 shareholders,⁹⁵ though, if they wanted to breach that limit (and/or to make a general public appeal for funds), a shareholder vote (converting to “public” company form) was all that was required. By contrast German GmbHs had to have *any* private share transfer (more expensively) validated by a notary and for going public required (very expensive) re-registration as AGs, not to speak of a second, supervisory, board (Beigel 1913). That was why many German firms contemplating public issue registered as public companies (AGs rather than the

⁹² In the 1907 census, unincorporated businesses accounted for most German employment in *Gewerbe* (private industry and services, including manufacturing); non-*Gewerbe* was dominated by the state (railways, post, telecoms) or sole proprietors (agriculture).

⁹³ The French lag, especially, is exaggerated by the omission of limited (*commandite*) partnerships without shares, which were more numerous there than in Germany, the US or UK.

⁹⁴ The US tail included smaller firms: only a few US states forbade the registration of companies below the minimum permitted capital for GmbHs of M20,000 (\$4,760). The UK specified no minimum size.

⁹⁵ There was an exemption for employee shareholders.

cheaper, less regulated GmbH) even while closely-held; it also helps explain why all German corporate forms were less popular than the Anglosphere's contractually malleable forms.

The companies trading off major exchanges (and close companies with wider shareholdings only occasionally changing hands) came in many varieties and often had only a few dominant shareholders with voting control. Accounting information, corporate governance or managerial quality of the more marginal of the many thousands of extra UK public companies (especially unlisted ones with modestly dispersed holdings) often fell below LSE standards (Toms 2002; Guinnane et al 2014)⁹⁶ and US entrepreneurs also found the low disclosure and liquidity requirements of some regional exchanges, the curb and OTC markets appealing (Huebner 1910: 504; White 2013). The NYSE's economist sternly (and self-servingly) warned investors that pricing and trading of such smaller issues were more easily manipulated (Meeker 1922). The "blue sky" laws adopted in most US states from 1911 - though largely ineffective in protecting investors - reflected popular dissatisfaction with unscrupulous share pushers (Seligman 1995, Mahoney 2003). "Bucket-shops" even went as far as setting up fraudulent "stock exchanges" in their offices to dupe sucker investors (Brace 1913: 235-7). Kennedy (1987) excoriates the waste involved in poorly-vetted share issues in critical industries in the UK before 1914 and Chambers (2010) documents the poor returns of the late 1920s UK new issue bubble. Seltzer (1928: 24-6) suggests US issues were sometimes as bad in new industries. Many insiders used the peripheral markets of the Anglosphere (which were much larger than the regulated regional exchanges of France and Germany) to unload on an ill-informed and overoptimistic public their least promising (not to speak of downright fraudulent) prospects, rather than - as in more positive accounts of financialization (King and Levine 1993) - accelerating growth for star investments by relieving their financial constraints.

However, the foisting of "lemons" on investors was limited by their own shrewd caution. Those in the "top 1%" - who owned most quoted shares - had not generally become

⁹⁶ Lavington (1921: 202-4) estimated that, in 1911-13, 2,922 new UK companies registered as public raised a modest average of only £28,234 (\$137,415) per company from investors. Only one out of five applied for an initial LSE settlement: the LSE discouraged flotations of less than £100,000.

plutocrats by being suckered, though some - including Rockefellers and Vanderbilts - were accused of suckering others (Lawson 1905). Franks et al (2009) argue that British investors were often well informed about local businesses and that regional networks of trust operated to align the interest of shareholders and managers in many small provincially-quoted companies.⁹⁷ In the US, trusted Boston capitalists operated similarly in developing the telephone industry (Stehman 1925, Pier 1953, Tosiello 1979). The inventor, Alexander Graham Bell, formed partnerships for the first few years with a lawyer and a leather manufacturer that he knew professionally, but they had limited resources, even after the manufacturer sold his own business to fund the risky development, eventually committing \$110,000. Uncertainty about patents, the form in which telephone usage would develop and predatory threats from Edison and Western Union put off other investors and operations were initially outsourced to multiple licensees with access to local capital. In July 1878 the \$450,000 Bell Telephone Company was incorporated, bringing in eleven Boston angel investors (who insisted on voting control and the presidency, while accepting the prior profits claims of the three pioneers) and Bell's independent £100,000 (\$500,000) Telephone Company Ltd was floated in London at the same time.⁹⁸ It became easier to raise funds publicly with the settlement of patent litigation and a truce with Western Union. Shares in the new \$10m American Bell Telephone Company of 1880 changed hands at \$50-\$600 (escalating prices reflecting its perceived success), with 338 holders by the end of that year (though 56% of the shares remained with 12 core holders), and were traded by Boston brokers.⁹⁹ The company became more professionally managed and vertically integrated, issuing bonds and acquiring system operators and manufacturers. By 1886 there were 1,860 stockholders

⁹⁷ Rutterford et al (2015) confirm a strong (but declining) tendency for small local issues to be held by investors living within 25km of the head office or place of listing, though find it was not associated with superior investment performance.

⁹⁸ In 1880 a maverick English judge determined that the Post Office (recent monopolist of domestic telegraphs) also had monopoly rights over the telephone, depressing the company's prospects. Over the next three decades the UK government was a more effective (though inefficient) predator than Western Union, asserting complete control and ownership. J P Morgan later tripped up when he attempted to replicate what he was doing with A T & T on the NYSE in 1901 with the doomed British capitalist alternative (investors sensibly refused to be suckered by Morgan's reputation, leaving him with 85% of the UK successor company's issue).

⁹⁹ It did not appear in the *New York Times* list of Boston Stocks until 21 February 1885, but was traded informally on the Boston curb before that.

(American Bell 1887: 13), but the Boston financial interests retained control. It was not until a generation after foundation - well after it had become one of the largest US corporations - that J P Morgan in 1901 introduced its securities to the NYSE and in 1904 to the LSE, relieving the regionally-limited capital supply under which it had operated.

Lamoreaux et al (2007) describe technically informed, and similarly productive, monitoring by long-term angel investors in Cleveland. Several small banks and trust companies underwrote local securities and when the Cleveland Bourse (as local immigrants naturally referred to their stock exchange) opened in 1900, medium-sized enterprises such as National Carbon (batteries), American Multigraph (office machinery) and White Co (trucks) could modestly broaden their local networks of investors. Even where local investors with power to choose and discipline managers did not retain control, extended liability rules encouraged some dispersed shareholders to monitor boards (Jefferys 1970, Grossman 2007, Acheson et al 2011, Grossman and Imai 2013). In the UK there was a complex ecology of local promoters, proto-venture capitalists, investment trusts, managing agencies and financial groups playing information-sharing and monitoring roles (Anon 1951: 75-84, 101-6, Jefferys 1970, Michie 1981, Chapman 1992, Newton 2003, Cheffins 2008: 168-700, Cochrane 2009, Nye 2011, Rutterford 2012, Jones and Colpan 2012: 70-1, Aldous 2015). The early exit route offered by junior market IPOs in London and the provinces clearly encouraged angel investors.

However, a strong argument that a more restrictive approach would have usefully disciplined negligent profusion in the Anglosphere is made in Burhop et al's (2014) assessment of 1900-13 IPOs on the London junior market. They experienced a high (19%) failure rate compared with IPOs on Berlin (9% in 1884-96, 1% in 1897-1914) or the London official list (2% in 1900-13). Contemporary investment advisers were aware of this (Lowenfeld 1909: 183-98), sagely advising their clients not to get involved in start-ups unless they had insider knowledge, but much opinion in the Anglosphere believed legal proscription would hamstring enterprise (Brace 1913, McQueen 2009: 261-2). Failure is not in itself problematic. On the contrary tolerance of failure and an ability to

terminate unpromising experiments swiftly is the essence of productive venture investing (Nanda and Rhodes-Kropf 2015) and, in an evolutionary perspective emphasising diversity and selection (Burmman 2003), failure is only systemically (as opposed to individually) damaging if better firms do not succeed and if developing resources (including wiser entrepreneurs) cannot be competitively recycled. Yet Burhop et al conclude that investors would have benefitted from German-style legal restrictions closing down the junior market, testing the possibility that high returns by stars compensated for failures only to reject it.¹⁰⁰

Their assessment usefully advances the debate by focusing on quality, but unfortunately it is both too short-term (between two and seven years)¹⁰¹ and based on low - and possibly biased - coverage (243 LSE sampled junior market IPOs with adequate data, out of many thousands of firms traded but not officially-listed). Most of what we know about the differential growth of joint stock companies or the range of returns on patents suggests failure or modest returns are indeed the norm, but more salient compensating outliers are often found (Scherer and Harhoff 2000, Taleb 2007). In any such highly skewed distribution, small samples might be dominated by particularly lucky or unlucky draws.¹⁰² It was hard - even for market professionals - to evaluate an innovative project, since often the only way to learn about its potential was to invest in it and, even then, investors faced incalculable uncertainties, not diversifiable risks (Knight 1921). Today's IPO markets

¹⁰⁰ Unfortunately, they support that conclusion by evaluating the overall return by 1916 on a 1909-13 subset of their IPOs against Moore's LSE index, which is dominated by foreign (particularly American) shares effectively barred to British investors from August 1914 but performing better than permitted investments, many severely restricted or converted to armaments production (compare Dimson et al 2015: 183; *Banker's Magazine* no 779 August 1914, p. 183 and no 869, August 1916, p. 15). Applying the same yardstick to officially-listed domestic firms (which - by other yardsticks - Burhop et al pronounce successful) would show that they, too, "failed."

¹⁰¹ Over half of their 1909-10 UK IPO sub-sample financed Asian rubber plantations, while their German sample is confined to domestic enterprises. The plantation business model involved clearing land and planting new trees from which latex - much needed by the expanding automobile industry - only began generating revenues after seven years, by which time wartime shipping shortages inhibited freight to rubber's main market in the US. This sector clearly, in retrospect, over-expanded, but when irrational investor exuberance bubbles, the "boundaries between scam, deception, self-deception and mistake are fuzzy" (Kay 2015: 132).

¹⁰² Shares in the household chemical manufacturer Reckitt & Son - thinly traded on the junior market by virtue of a provincial listing - registered higher capital gains *alone* than the best performer of their sample on capital gains *plus dividends*. By 1912, Reckitt was more than 60 times the mean size at IPO of their sample and the tenth largest British industrial by market capitalization; as Reckitt Benckiser it remains one of the largest global corporations today.

rely on investors' systematic over-optimism about the "next big thing" (Loughlan and Ritter 1995) and long-run evidence suggests that a disproportionate share of new products, processes and services came from small firms and really big innovations from very few of them (Acs and Audretsch 1987). The social benefits of innovation are higher than the profits appropriated by investors in most industries (Nordhaus 2004), so the social costs of restrictions might have been considerable. It is worth remembering that Massachusetts, to protect local investors from what the state (not unreasonably) judged an over-hyped scam, attempted (ineffectually) to ban investments in Apple's IPO in 1980; by 2015 Apple Inc. was the most valuable firm in the world (Economist 2015b).

The LSE listing committee files include similar¹⁰³ firms that Burhop et al's 1900-13 sampling frame omitted: in 1900 alone two junior market approvals stand out.¹⁰⁴ In that year, Shell Transport & Trading introduced £2m of its shares to the junior market, three years after Marcus Samuel - a London-based banker-underwriter and Asia merchant - founded the company to handle his petroleum interests (the family retained a controlling majority, so it could not be officially-listed). Shell struggled to compete with Standard Oil, but Samuel pioneered tanker shipping between his oilfields and European and Asian kerosene distribution chains, built a managerial and marketing hierarchy based in London, refused an £8m buy-out offer from Rockefeller and sometimes sailed close to the wind by paying dividends out of capital. Temporarily weakened, Shell merged with Royal Dutch Petroleum in 1907 (as the 40% minority partner), started production in California, took over the Rothschilds' Russian oil interests and in 1920 acquired the largest Mexican producer from British rival Pearson. Its ordinary shares (already over four times the issue price when finally officially-listed in 1911) then sold at 14.5 times the issue price and some decades later Royal Dutch Shell became the world's largest corporation.

¹⁰³ One difference was that the 1900 flotations needed both development funds and angel investor buyouts, while Apple was floated only to enable early employees and investors to extract cash; though the service of monetizing such commitments by such value extraction may indirectly encourage angel fundraising.

¹⁰⁴ London Guildhall Library, LSE Archives, MS 18000/1. The suggestion is not that these were typical, but they deserve consideration with those generated by Burhop et al's sampling frame (IPOs buying *Times* advertising, which offered no quality certification and attracted IPOs by known rogues). Introductions (such as the two noted here) were possibly a more common form of listing before 1914 everywhere and (having already developed broader shareholding by informed parties) may have been more successful than prospectus IPOs.

Also in 1900, Marconi's Wireless Telegraph Company first appeared on the junior market with only £137,083 capital (Baker 1970), a more typical size. Since 1897, when he was only 23, the eponymous Italian inventor's experiments had been financed by classic angel investors: family members with London financial connections and their wealthy acquaintances, mainly Irish flour millers, responding to a selectively-circulated (typewritten) prospectus. Distinguished scientists doubted that the upstart Marconi's radio signals would be received in Newfoundland because of the curvature of the earth, but the patented technology the company owned seemed to have enough promise for any angel wanting quick payback to cash out of the shares with a 200% capital gain in 1900 (there was no prospectus, just a "special settlement" introduction facilitating sales to an LSE stockbroker-underwriter representing some more optimistic outside investors and to Albert Ochs, an Anglo-French private banker who joined the board). The LSE listing committee would not allow this on the main market, as Marconi and other insiders insisted on retaining voting control, but junior market investors had no more inhibitions about that than investors today buying shares in Google or Amazon (also not - or at least not yet - put off by the founders' autocratic control and weak corporate governance).¹⁰⁵ Insiders do not always know best in pioneering technologies. Marconi succeeded only after numerous setbacks and outsiders who bought shares on the junior market - against professional advice (Lowenfeld 1909: 186) - needed strong nerves: they received no dividend until 1911, suffered opaque accounting, off-balance sheet manipulation in subsidiaries, involvement in a notorious British political corruption scandal and a roller-coaster ride. Although their ordinary shares by 1908 fell to only 10% of the highest (1900) issue price, they recovered to a very satisfactory 327% by 1912.¹⁰⁶ The longer-term outcomes were also impressive: the company became

¹⁰⁵ There is no consensus on this issue even among today's most acute commentators: in one recent *Financial Times* (30 September 2015) John Kay urged sympathetic consideration of the commitment potential of Amazon/Google share structures, while John Plender blamed the Volkswagen fraud on poor corporate governance driven by exactly such a structure. Hong Kong is one of the few exchanges sufficiently of the Plender persuasion to outlaw such share structures today, as Berlin did before 1914, the NYSE from the 1920s and LSE from the 1950s (though they began to abandon that principle before Hong Kong adopted it in 1987).

¹⁰⁶ Crédit Agricole Archives, Paris, files DEEF 28532/23999. The 1897 and some issues in 1904-6 were made at £1 par, rather than the £2 premium over par of 1900; subscribers at £1, of course, did better: at the 1908 low they had suffered a 70% loss and at the 1912 peak an 881% gain.

one among several British electronics manufacturers (contributing to the development of gramophones, radios, radar, codebreaking equipment and television) and the subsidiaries that governments induced Marconi to spin-off spawned Radio Corporation of America in 1920 (the leading US electronics company),¹⁰⁷ the British Broadcasting Corporation in 1922 (the world's most trusted broadcaster) and Cable & Wireless in 1928 (dominating international telecoms). Such junior market stars compel at least the Scottish verdict "not proven" on Burhop et al's prosecution case for the death sentence, though their findings might support an argument for stronger broker vetting, better consolidated accounting rules and a more structured venture capital sector (on modern lines). It might also have been better to keep control in insider angel networks for longer and delay issues to the general public until performance and prospects were clearer, which Table 6 and the Bell Telephone example hint might have been more common in the US.

Neither British investors - nor those in similarly unregulated US markets - always suffered from fringe financing, but did Germany's increasing¹⁰⁸ illiberalism on that boundary stifle enterprise? As we have seen, Germany had quality (legally-mandated) corporate governance that American industrials lacked, but did this cause it to miss out on more freewheeling - and possibly more innovative - advantages? Financial repression was clearly restraining, but German capital sometimes found alternative channels and fast copying or re-engineering could be as profitable as invention. Telefunken (rivalling Marconi) was founded in 1903, with firm Reich support for naval radio communications beyond British control, as a joint subsidiary of AEG and Siemens. A year later, Deutsche Petroleum (rivalling Shell) was founded by Deutsche Bank. These pathways were presumably chosen because, as in most modern markets (but unlike the pre-1914 LSE), German

¹⁰⁷ US Navy suspicion of British control of warship communications induced the UK parent to divest American Marconi to form the core of RCA (allied with GE and Westinghouse). British Marconi held directly about a fifth of American Marconi equity and Americans about a third (payment for the faltering American rival that Marconi acquired in 1912), but the UK parent and its major shareholders probably held a controlling majority (or close to it), as well as holding key patents.

¹⁰⁸ In the 1870s, Germany (and particularly some "free" cities, see n. 56, above) more closely resembled the Anglosphere, but, alarmed by corporate failures and futures trading, German legislators introduced more restrictive legislation in 1884 and 1896.

exchanges (even regional ones) were barred from listing start-ups.¹⁰⁹ Possibly Germany benefitted from having such established firms and banks (rather than a fickle public or angel networks) nurturing ventures, but Deutsche Bank was itself sufficiently unconvinced of its own oil sector management skills to attempt (unsuccessfully) to sell Deutsche Petroleum to Shell (Chandler 1990: 440). Moreover, any benefit did not take the form of first mover advantage (both were founded later than their British rivals) or large scale (both were smaller in 1914). Yet in other areas of the same industries - notably fine chemicals and heavy electricals - German firms clearly performed more impressively;¹¹⁰ there were yet others - like automobiles - in which both Germany and Britain lagged the US and France; while the US itself lagged Europe in high-tech shipbuilding, armaments, rayon, dyestuffs and electronics. The problem with assessing the role of finance is that many other variables - government regulation, tariffs, university links, labor costs, market size, segmented procurement, industrial clusters, patents, technical and managerial skills, not to speak of luck - played a part in such outcomes. Even well-informed accounts depend as much on their authors' priors as on the evidence: note the widely differing assessments of finance versus other variables in the automobile, electricity and other new industries by Kennedy (1987) and Michie (1981, 1988).

It is thus not easy to benchmark the Anglosphere's complex ecology of angel investor networks, financial trusts, investment groups and promiscuous start-ups against Germany's more ordered, slower-moving, less profuse but also sometimes successful universal banks and corporate bureaucracies, which appear to have encouraged pyramided ownership, often distrusted in the Anglosphere (Bank and Cheffins 2010). However, restrictions on diversity and experimentation by financial repression were not uniformly favored even by major participants in such regulated order. The enthusiastic involvement of Deutsche Bank, Dresdner Bank, Crédit Lyonnais and Société Générale in the London and/or New York markets suggests an appreciation of the merits of

¹⁰⁹ The NYSE, like German exchanges which required a three-year profit record, would also not fund start-ups (indeed it insisted on a *five*-year accounting record), but the NYSE was accordingly a small player in rapidly-growing sectors, compared with the curb and regional markets.

¹¹⁰ However, the most convincing evolutionary analysis of how German dyestuffs firms roundly defeated British and American competitors (Murmah 2003) treats financing as a non-issue.

unregulated, competitive markets was not confined to the Anglosphere (Gallice 1994, Bonin 1996, Pohl and Burk 1998, Kobrak 2007). There was convergence among advanced industrial countries on using more stock exchange finance, but the mixes chosen by investors, businesses, bankers and politicians - of government and corporate securities, of equities and bonds (and, among them, of “junk” and safe), of regulation and liberality, of accounting, anti-director rights or local trust - were in some sectors markedly differentiated nationally. Germany was (sometimes to the chagrin of local capitalists) most inclined to discipline financialization by legal interventions and had an unusually small corporate sector for such an industrialized country, though clearly other drivers of innovation (notably the world’s best universities and impressive skill training) inoculated it against becoming a developmental backwater.

CONSEQUENCES

The view that US finance lagged Europe’s before 1914 is not wholly false. It was slower to enforce accounting disclosures on quoted industrials and the chronic instability of its banks and securities markets was not resolved (as some hoped) by the creation of the Federal Reserve in 1914, with uncomfortable later outcomes. The NYSE also offered investors a more limited (yet riskier) choice of domestic equities, not to speak of much less exposure to government bonds or international securities, than Berlin, London or Paris. However, none of this is surprising for a metropolitan exchange whose monopolistically-restrictive microstructure (White 2013) constrained capacity and increased transaction costs, while serving a more geographically dispersed continent growing faster than Europe, less involved than Europeans in outward investment, but the most prolific and highly leveraged borrower from European investors to build businesses employing millions of European immigrants (the complementary westward financial flows we have noted included those to American Marconi, American Solvay, A T & T, American Viscose, Kodak, Shell and US Steel and around a fifth of US big business was owned abroad, mainly in Britain).¹¹¹ In *domestic*

¹¹¹ See n. 65, above, for foreign ownership amounting to a fifth of US quoted securities. Foreign ownership was concentrated in NYSE-listed industry and railroads and sparser in agriculture, finance, utilities and distribution.

corporate finance - including securities on all markets (regional and European) competing with the NYSE - US corporations unequivocally led in the quoted bond market and led Germany and equalled France (though lagged the UK) in the equity market. The four leading industrial nations had much in common, apart from contrasts resulting from political choices, such as low levels of listed railway equity in Germany and of bank equity on the NYSE. The data are compatible with the view that advanced markets - irrespective of legal origin - were all converging on high levels of financialization, with corporate securities approaching (or even exceeding) 100% of GDP (or, where they did not, government securities making up the deficit via nationalized businesses). Some divergences nonetheless stand out: the UK lead in quoted equities, Germany's extensive nationalization of big businesses run by capitalists elsewhere and legal suppression of most off-exchange corporate securities issues, France's middle-way *penchant* for state guarantees of private sector securities, and the US lead in corporate bonds, regional finance, international borrowing, and unquoted companies. These raise parallel, but difficult, questions about exactly how such financing variations involved principals or intermediaries whose qualitative performance in allocating and monitoring capital mattered for economic outcomes.

It remains an open question whether the many other national markets would show similar conditional convergence, but collectively they accounted for a smaller share of world quoted securities than the four rich countries considered in detail here. Ratios of quoted securities to GDP in the same ballpark can also be found in small "western" economies with similar living standards - Australia, Canada, Sweden and Switzerland - and, more surprisingly, in some poorer emerging markets: Egypt, Hong Kong, Japan, Russia, Brazil, the Dutch East Indies and South Africa. Often this was for reasons not always captured by standard modelling and with differing government/private or bond/stock ratios, and even higher absentee European ownership than the US. Japan, for example, by 1913 had a similar quoted equity/GDP ratio to the US or France and made up its lag in corporate bonds by having extensive government bonds financing state railways and other businesses, the majority issued and held abroad (Hannah and Kasuya 2015; Suzuki 1994; Neymarck

1915). Countries that markedly lagged them - notably un-westernized Islamic countries, Qing China, British India and some of Latin America and Eastern Europe - did so for equally *sui generis* reasons (Hannah 2015). Thus even improved specifications for econometric analyses, dominated by observations for national exchanges with tiny shares of the global market, may still leave large unexplained residuals.

The descriptive statistics presented here also have implications for work in historical empirical finance. The greatest gaps in our knowledge are not the national markets that have been gradually added to assessments of global equity returns to eliminate the survivor bias in NYSE indexes, but the many US and UK securities excluded from existing indexes.¹¹² Non-NYSE US and non-LSE-official list UK companies identified here accounted for more of global equity values before 1914 than the dozen smallest countries included in existing “global” indexes, yet are not plausibly proxied by existing national indexes. The standard Cowles index for the US is seriously overweight in railroads, underweight in industrials and utilities and devoid of financials. While we know little about other markets, they possibly had higher rates of return (Legler and Sylla 2003).¹¹³ Unlike today, even some of the largest companies were not traded on metropolitan markets, so are generally excluded from “national” market indexes. Hence a useful measure of equity returns for large corporates would be a “global top 500” index,¹¹⁴ which would be relatively simple to construct (re-weighted annually to avoid survivor bias) and, given highly skewed firm sizes, might cover half of global quoted equities by value.¹¹⁵ None of these 500 “blue chips” numbered their shareholders in seven figures (as do some companies today), but a few reached six and most approached or exceeded five figures:

¹¹² Dimson et al (2015: 27) report that adding two large and several small markets has improved their 1900 coverage by 13%; but adding non-NYSE US equities or non-officially-listed LSE securities - in the ratios indicated by Tables 3 and 4 - would add much more.

¹¹³ Pre-1914 data for five regional US exchanges are available commercially at www.globalfinancialdata.com.

¹¹⁴ This would include quoted firms, like Standard Oil, Du Pont, Eastman Kodak, northern French coal mines and Reckitt & Sons, excluded from many existing pre-1914 indexes. For the logic of such a “blue-chip” index see Le Bris and Hautcoeur 2010: 144-5.

¹¹⁵ In 2014 the FT Global 500 accounted for 44% of global stock market capitalization. While inequality of firm sizes has increased so has the ratio of global stock market capitalization to global GDP, so a similar ratio before 1914 is not implausible. See also the 1912 top 100 data in Wardley (2006) and the Table 5 totals for equities in four countries in 1913/14, which account for all but six of his global top 100.

they were widely held and liquid by the standards of the time.¹¹⁶ As small firms were more illiquid, usually numbered their shareholders only in dozens or hundreds and perhaps offered higher returns than large,¹¹⁷ this index's meaning would be clearer than an unbalanced composite of differently representative but supposedly "national" indexes (London, Paris and Berlin indexes, for example, are mainly of firms of small scale that were excluded from the Cowles NYSE index). Such reformulations may resolve (or in some cases deepen)¹¹⁸ traditional puzzles about market trends, survivor bias and the equity premium. Addressing them is more urgent than adding another index for the national stock market of Ruritania.

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¹¹⁶ though some had few holders in early trading: Phelps-Dodge and Northern Pacific on the NYSE (with 133 and 368), Singer Manufacturing on the NY curb (with 150) and Underground Electric Railways of London on the LSE and NYSE (with 400).

¹¹⁷ Dimson et al (2015: 42-6) for modern evidence, and there is similarly equivocal historical evidence, with indications of higher returns or higher market/par ratios among smaller firms than officially-listed LSE/NYSE companies, but possibly lower small firm returns in Germany (Fohlin 2006: 267). On the other hand, Annaert et al (2011) find the Belgian top 20 track quite well returns for all Brussels-quoted firms in 1833-2005.

¹¹⁸ Recent additions to global indexes have tended to reduce the equity premium puzzle, though preliminary indications for secondary Anglosphere markets suggest they may deepen it.

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