

World Financial Markets, 1900-1925

Abstract

I characterize the growth and performance of 12 financial markets from 1900 to 1925. I collect data every 28 days on the price, capital issued, coupons/dividends paid, industrial sector, and foreign listing status of individual securities. The dataset contains 1713 government bonds and 9950 equities, which are all (or almost all) securities present in these markets. London is clearly the largest and the central financial market of this era, although New York is rapidly catching up in size. The growth of manufacturing is evident in financial markets as industrial securities overtake railroad securities in importance.

I present a new dataset that describes the financial markets of the early twentieth century. Historical data have proven useful to better understand how financial markets operate. Estimation of the equity-premium (e.g. Goetzmann and Ibbotson (2006)), the efficiency of derivatives markets (Moore and Juh (2006)), executive compensation (e.g. Frydman and Saks (2008)), and the effects of shocks on equity markets (e.g. Barro (2009)) are more powerful with longer time-series. I calculate measures of market return and market size every four weeks between January 1900 and December 1925 for 12 financial markets. I also characterize the industrial composition of these markets, investigate cross-listed securities, and detail the importance of foreign securities.

Perhaps the best-known comparative data set on financial markets through time is that of Dimson, Marsh, and Staunton (2002) (hereafter DMS). Although an excellent resource for making long run cross-country comparisons, it has several shortcomings. It is an amalgam of dozens of existing studies, all of which were constructed to analyze one national market, which have been fused together despite their idiosyncrasies (for example DMS's data series for Germany over the twentieth century combines eight existing studies). Security prices are not measured at the same time, the indices are not constructed in the same way, and the data coverage of each national market is not complete. The negative effects of combining different studies is likely to be serious. For example, Schwert (1990a) has shown that the effects of using the average of the high and low price of a security for a month as the unit of observation (rather than the price on the last day of the month) can erroneously generate: 'first-order autocorrelation of returns ... (and) reduces the variance of returns by about 20%.'

I create a database that is as consistent and uniform as possible across markets and through time. In addition, my database includes the Viennese market, which I calculate as the fourth largest bond market and fifth largest equity market in the world at the turn of the 20th century. Goetzmann and Jorion (1999) also present long-run indices for many national markets. Their data do not extend back before 1921. The additional data presented in this paper will allow researchers to avoid the U.S.-centric bias stressed by Schwert (1990a): 'that researchers have focused most of their attention on these (Center for Research in Security Prices) data because of the(ir) relatively inexpensive high quality'.

The data set presented in this paper has been specifically constructed to allow cross-market comparisons, and avoids most of the problems with existing indices, such as incomplete coverage, and back-filling of data (i.e. constructing an index with a sample of companies that were successful enough to have survived until a point in time). In addition individual security-level data (not just market indices) are available, which allows us to answer such questions as how many foreign government bonds were listed in London, what was the market capitalization of breweries listed in Vienna, or what was the dividend record of Anglo-American (a mining firm with interests in South Africa)? In addition the data set allows the quantification of market size. DMS only present market capitalization figures for the U.S. and the U.K. at a single point in time, 1900.

The first section presents measures of market size. Section two constructs market indices and compares market performance. Section three examines the industrial composition of the twelve markets, and section four investigates the issue of foreign-listed and cross-listed securities. Section five concludes. An appendix describes the data sources.

I Market Size

I calculate the size of the national markets as both the number of issued securities and the value, at market prices, of those securities (see Appendix for details). In Table I I present the number of national government bonds (i.e. excluding provincial and municipal bonds) for each market.¹ London is by far the largest market for government debt with more than three times as many listed securities as Amsterdam in 1900. The pre-war Parisian market is understated in this dataset, due to the data source used (*L'Économiste Français*). Data coverage in *L'Économiste Français* improves from 1915 onwards, which is one reason for the increase in listed bonds in 1915 and 1916. The official list for Paris (available from *Cote de la Bourse et de la Banque*) shows that 112 government bonds were quoted in 1900

¹Siegel (1992) argues that the return on U.S. federal bonds from the Civil War until 1920 was biased downwards due to the 'circulation privileges' derived by commercial banks' holdings of U.S. Treasuries. I use U.S. treasury bond data to maintain consistency with the data for other countries.

(compared to my figure of 42), which would make Paris the second largest market at the turn of the 20th century. Strong growth in Amsterdam listings, and a mild decline in London, led to Amsterdam almost closing the gap with London by 1914. Berlin was the fourth most important market, although most securities listed here were domestic German bonds, in contrast to the international nature of London, Paris, and Amsterdam. There were no government bonds listed in Canadian or South African markets before World War One, these bonds were instead listed in London. All other markets, in particular New York, were far smaller than the big three. Silber (2007) argues in the first decade of the twentieth century: “the weak foundations of America’s claim to maturity should have been obvious.” He stresses the small number, and value, of foreign bonds issued in New York, and the fact that they were not denominated in dollars. In addition Table I (and Tables III and XI) show that the pre- World War One domestic market for U.S. government debt was of a modest size. The bond market in New York expanded quickly during the war (mainly domestic issues) and continued growing during the 1920s as European and Latin American bonds were floated in New York for the first time. London also grew quickly during the war due to the issue of domestic war bonds. However, part of the big increase in listings in 1916 and 1917 is due to two factors. First, I switch to using *The Times* which lists all firms. Second, those securities that were traded, but not officially recognized by the London Stock Exchange, began to be recorded under the title of the ‘supplementary list’ in 1915.

Table II shows the number of listed equity securities for each market. The number of securities is larger than the number of listed firms, since a firm may have multiple classes of equity. Again, London is the largest pre-war market with Berlin the next largest. Paris is the third largest market (the official list shows 263 equity securities in 1900) with Amsterdam and Vienna of roughly comparable sizes in 1900. The Amsterdam, Berlin, and Canadian markets show a strong increase in listings before 1914, as does Madrid, although from a very low base.² The combination of three different data sources for London is less than ideal, as can be seen from Table II. The large ‘drop’ in London listings from 1907 to 1908

²We report data for ‘Canada’ since our data source does not separately identify Toronto and Montreal listed securities.

is due to switching to the price list of *The Economist* which omits many smaller companies, particularly the commercial and industrial ones.

There was almost no post-war growth in listings with the major exception of New York, which was beginning to take over financial leadership from London. Nevertheless, there were still more than four times as many listed securities in London as in New York as late as 1925. Somewhat surprisingly, despite being the losers of the war, there was modest growth in listings in both Berlin and Vienna. It appears that there was also modest growth in the Paris market, although these figures must be interpreted with some caution since they do not cover the complete official list.

I calculate market capitalization figures, the value of listed securities at current market prices, in Table III (government bonds) and Table IV (equities). The numbers are for the first observation in January in each year (January 25, 1901, January 24, 1902 etc.) I convert all figures to British pounds using the market exchange rates quoted in *The Economist* (see Figure 1). Since several markets do not report bid and ask quotes for securities (instead they only report transaction prices for securities that actually traded that day) there is an issue of missing data. To deal with this I infer missing prices by a process of linear interpolation between the two closest observations. Since it is impossible to interpolate prices for many securities at the edges of the data set I use the March 23, 1900 observation for 1900 to avoid underestimating several markets.

Table III confirms the picture depicted in Table I. London is the largest bond market in 1900, although the gap with Paris and Berlin is much smaller than that indicated by looking solely at the number of issues. Although Amsterdam had many bonds listed, they were on average smaller than other markets, which makes Vienna the fourth largest market. The period leading up to 1914 witnessed strong growth in the minor markets of Sydney, Tokyo, and Zurich. One surprise is that a relatively minor market such as Madrid was larger than New York in the decade preceding World War One. Amsterdam and Berlin experienced strong growth in the pre-war period, whereas the largest markets of London and Paris were stagnant.

World War One was a watershed in terms of bond markets. There was virtually no effect

for the markets of the neutral countries (Amsterdam, Madrid, and Zurich) or Japan, which played a minor part in the war. The big effect was on the bond markets of the belligerents. Domestic bond markets came into existence in Canada and South Africa, and expanded from state bonds to federal bonds in Australia. The markets of London, New York, and Paris expanded substantially as a result of domestic war and ‘victory’ bonds. New York grew from almost nothing to temporarily overtake London in size in 1921, before slipping back a little by 1925. The post-war era also witnessed a large expansion in short-term government financing. The U.S. began issuing certificates of indebtedness (maturities of less than a year) once it joined the war in 1917, and also (multi-year maturity) notes. By 1923 4.7% of the U.S. federal government debt was composed of certificates of indebtedness and a further 18.6% by notes (see Garbade (2008) Table 3). In the U.K. in 1923 7.9% of the national debt was funded by Treasury bills (3-month maturity), a large increase on the pre-war figure of 1.9% in 1908-09. Although the war marked the start of American financial dominance during the 20th century, Silber (2007) argues that (p. 161): “the United States had to share financial superpower status for a decade.” The Berlin and Vienna markets also absorbed a lot of war-time financing, however the post-war inflation and then hyperinflation eroded the size of their bond markets to virtually nothing.

In Table IV I compare the sizes of the equity markets. At the turn of the 20th century London was the largest equity market by far. New York was only a third the size of London, and Paris smaller still. Although the data source I use does not contain all equities listed in Paris, the missing securities are the smaller ones, hence unlikely to increase the measured size of that market by a great deal. Berlin was the fourth largest market in 1900, although it quickly moved to surpass Paris by 1914.

Trying to explain the size of national markets has become an influential topic in the social sciences, following the paper of La Porta et al. (1997) that finds that the origin of a country’s legal system is strongly related to the size of its financial market. Rajan and Zingales (hereafter RZ) (2003) and Mussachio (2008) cast doubt on La Porta et al.’s findings by demonstrating that civil law countries had equally large markets early in the twentieth century. Some drawbacks of RZ’s work are that their data only go back to 1913, the data are

not annual (1913, 1929, 1938 etc.), and they are missing several markets (e.g. South Africa and Spain in the early years). My data set allows researchers an expanded set of options for empirical studies.

The calculation of market size is an improvement on the work of DMS who assume that market size is roughly proportional to GDP when they do not possess the data themselves (see their Figure 2-3). RZ (2003, Table III) show that this is not an accurate assumption. RZ find stock market capitalization to GDP ratios between 0.02 (India) and 2.19 (Cuba) in 1913. In Table V I calculate stock market capitalization to nominal GDP figures annually from 1900 to 1925. In addition I calculate average measures for (English) common-law countries, French civil-law, and German civil-law countries. I calculate the averages as the sum of the market capitalization figures for the English/French/German legal origin markets divided by the sum of the nominal GDP figures for those same markets. I use Mitchell's (2003) figures for nominal gross domestic product because Maddison's database only contains data on real output. Mitchell's database is missing several nominal GDP figures that I estimate.³ Capitalization to GDP figures are quite variable, these ratios roughly double for Amsterdam, Berlin, and Canada between 1900 and 1913, while Madrid's ratio increases by 50%. These four market's ratios then fall back roughly to the 1900 level by 1925 (with the exception of Amsterdam which is around one third higher in 1925 than it was in 1900). Market capitalization to GDP roughly halves from 1913 to 1925 in Johannesburg, Paris, and Zurich, whereas in Vienna the ratio in 1925 is only 30% of the 1913 ratio. In contrast the ratios for London, New York, and Sydney were quite stable over time. I find support for the arguments of La Porta et al (2008) that common law countries were more financially developed at the start of the twentieth century, as well as at the end. Although the financial development gap between common and civil law countries was not as pronounced at the start of the 20th

³I use Austrian figures from Getzner and Neck. For other markets for which data are missing during some period (e.g. France from 1914 to 1920) I estimate nominal GDP growth as $(1+\text{nominal}) = (1+\text{real})(1+\text{inflation})$. I use real GDP growth figures from Maddison (2008) and wholesale price inflation figures from Mitchell (2003). I then scale the nominal growth rates over the missing data section so that starting and ending nominal GDP line up with Mitchell's data. Estimated nominal GDP figures (and hence estimated market capitalization to GDP figures) appear in bold font in Table V.

century as at the end, it was still there. I find little support for the ‘reversals’ arguments of RZ (2003) and Musacchio (2008). Common law countries have more developed financial markets in every year between 1900 and 1925. The gap shrinks slightly between 1900 and 1914 (especially with the German civil law countries), but then opens up again in the 1920s.

The market capitalization to GDP ratios in 1913 can be compared with those of RZ (Table V) and Musacchio (2008) for 1913. Our ratios are not directly comparable, RZ attempt to measure only domestic companies, and they attempt to measure all listed equity securities in a country (not just those in the principal stock market). The ratios are quite similar for Canada, Germany, and Switzerland. RZ obtain a ratio 68% higher for Australia, probably due to the large stock markets in Melbourne and Adelaide. RZ find a ratio almost 50% higher for Austria in 1913, which is puzzling. My GDP figures for Austria do not include the Hungarian parts of the Austro-Hungarian empire, which boosts my ratio. The Viennese market was almost completely domestic, and by far the most important in the empire, which suggests that RZ’s figure is too high. Their figure for Japan is much higher than mine, which can partly be attributed to the multiple other Japanese stock exchanges (notably Osaka) and the lack of comprehensive data for unofficially listed firms for Tokyo. The higher ratios that I obtain for Amsterdam and London are due to the large number of foreign firms listed there, which RZ and Musacchio exclude. I am calculating the size of financial markets, not the size of domestic securities. More puzzling differences are for New York and Paris. By this stage New York dominated U.S. financial markets, and I possess all equity securities listed on New York, yet RZ find a U.S. ratio 60% higher.⁴ RZ also find a French market almost double that which I calculate for Paris, although Musacchio’s calculations are just a little larger

⁴RZ have presumably included all of the capitalization of U.S. railroads solely in New York. Around half of all U.S. railroads were cross-listed in London, many were present in Amsterdam and a handful in other European markets. I have been careful not to double count these listings in the calculation of market capitalization. In the absence of authoritative figures on international ownership of U.S. railroads I have attributed most of the ownership (60-70%) to U.S. shareholders, less to British shareholders (20-30%), and a small amount to other European shareholders. The treatment of railroads will be important for calculating market capitalization to GDP figures for New York or London separately, however it will have little effect on the comparison of common law versus civil law markets.

than mine. This can partly be explained by regional French markets, the informal Parisian market called the *Coulisse*, and the lack of complete coverage that I have for Paris. However, my data set contains 9 of the 10 largest French non-financial companies, and 88.6% of the value of assets of the 50 largest non-financial firms, using the list given by Smith (1998). Given that the *Coulisse* catered mainly to venture-capital firms, and the regional exchanges were far smaller than Paris, RZ's calculation for France in 1913 is suspiciously high. The comparison of France and the U.S. is very important to motivate the paper of RZ (p. 6): "why was France's stock market much bigger as a fraction of its gross domestic product than markets in the United States in 1913, even though the per capita GDP in the United States was not any lower than France's?" The relative importance of France vis-à-vis the U.S. is not changed much with my figures, since I find that market capitalization to GDP is substantially less than that reported by RZ in both markets.

DMS have calculated the market capitalization of only London and New York in 1900, and they arrive at figures of £888 million (\$US 4.3 billion, with 783 companies) and £591 (\$US 2.86 billion, with 123 companies) respectively. I obtain figures of £2,208 million (1292 *securities*) for London and £762 million (235 *securities*) for New York. DMS only count the 'residual' equity (i.e. the final claimant on a firm's assets in the event of a liquidation) in a market. For example, according to DMS (p. 23), the largest British railway, the London and North Western, had "a capitalization of \$405 million" at the end of 1899. The London and North Western had four securities listed in the Investors' Monthly Manual. The "Consolidated Stock" with a capitalization of \$403 (my calculation at the start of January 1900), the "4% Consolidated Preference" with a capitalization of \$152 million, the "4% Consolidated Guaranteed" capitalization of \$100 million, and the "3% debentures", which is the company's debt, with a market capitalization of \$193 million. Ignoring the debt, DMS's method only considers the residual equity (in this case the Consolidated Stock) which understates the value of the firm's equity by \$252 million: almost 40% of the equity is excluded. It is possible that the discrepancy with New York may also be explained by the authors' choice to exclude the preference capital of many U.S. firms. The largest component of the market, railroads, which compose roughly half of the market, usually had multiple

classes of equity securities. In any event, DMS' choice substantially understates the size of the major markets. The London and New York markets made extensive use of preferred (and in London preferred ordinary, consolidated preferred, deferred converted ordinary, guaranteed etc.) capital. In contrast, European firms did not generally use such complicated capital structures, and one class of equity was the norm there.

New York experienced fast growth in the pre-war years, increasing from 35% of the size of London in 1900 to around 65% of London's (enlarged) size in 1914. The smaller markets experienced moderate (Sydney, Vienna, Zurich) to fast growth (Amsterdam, Canada, Madrid, Tokyo) in the period from 1900 to 1914. Paris experienced only sluggish growth, and the Johannesburg market shrank in size in the early years of the 20th century as the post-Boer War mining boom ended.

London and New York continued to grow strongly post-war. By the 1920s the gap to the next-largest market, Paris, was enormous. The French market was only around 10% of the size of the Anglo-American ones, measured in pound sterling, partly as a result of the franc's post-war weakness. The Berlin and Vienna markets experienced a sharp decline in value following the war, a combination of the post-war slump and their hyperinflation problems. The secondary markets expanded slowly, with the exceptions of Sydney and Tokyo which performed particularly well in the post-war years.

Equity markets were roughly the same size as bond markets over this period. Bond market were larger at the turn of the 20th century, equity market were larger in the pre-war years, bond markets overtook equity markets due to the huge war time borrowing, and then equity markets almost closed the gap by 1925.

II Market Indices

Section one presented the relative sizes of the various national markets and their growth and decline over the years. Although the measure of absolute size is important for some comparative purposes it is not sufficient. Market size may be expanding due to the listing of new securities, a rise in the prices of existing securities, or an appreciation of the national

currency against the pound. In this section I calculate market indices for each national market and also for the ‘world’. I calculate all indices in sterling units. Although this has drawbacks, it does not make sense to compare nominal returns when several markets experienced moderate to severe (hyper)inflation over the period of the study.⁵

The return on security i in period t , $R_{i,t}$, is $\frac{P_t - P_{t-1} + D_t}{P_{t-1}}$ where P_t is security i 's price in period t , P_{t-1} is its price in period $t - 1$, and D_t is the value of any dividends/coupons paid between periods $t - 1$ and t . I adjust the return for any stock splits, seasoned equity issues etc. The market index is value weighted: $R_{m,t} = \sum_{i=1}^I R_{i,t} W_{i,t}$ where $R_{i,t}$ is the return on security i in period t and $W_{i,t}$ is the weight of security i in period t . Securities are value weighted: $W_{i,t} = \frac{P_{i,t} \text{Issued}_{i,t}}{\sum_{j=1}^I P_{j,t} \text{Issued}_{j,t}}$, where $P_{i,t}$ is the price of security i in period t and $\text{Issued}_{i,t}$ is the number of issued units (shares or bonds) of security i in period t .

Security prices are sometimes missing. A price may be missing because either its bid and ask quotes are missing, or (in the case of Amsterdam, Berlin, and Madrid) no trade took place for a security on the day on which I observe the price list. Therefore, I calculate two indices. In the first one, denoted ‘missing at random’, I assume that the observed returns are similar to the unobserved returns, and I calculate the market return using only those securities for which I observe prices in two consecutive periods. In the second method I fill in missing prices by a process of linear interpolation between the two closest observations. The advantage of the interpolation approach is that the less frequently observed securities (typically the smaller ones) are not often omitted from the index. The obvious drawback is that the assumption of linear interpolation may not be close to the truth. The correlations between these two measures are high, using 28-day returns. Bond market returns all have a coefficient of correlation above 0.9; equity market correlations are above 0.9 with the exceptions of Sydney (0.722), Canada (0.886), and Johannesburg (0.854).

Table VI shows the returns of the ‘world’ bond index and the national markets, measured in pounds sterling. The world market only suffered negative returns during 2 years, 1915

⁵An alternative could be to use consumer price, or producer price, deflators for each market. Since consistently constructed deflators for all markets are unavailable at monthly frequency, I choose to calculate indices in a common currency.

when the price of bonds tumbled as interest rates rose quickly due to increased war time borrowing, and 1920 when the post-war recession struck suddenly. Mean returns for 5-year periods are calculated using the geometric mean formula. I compare five-year and full period (1900-25) returns, calculated using a geometric mean, with DMS at the bottom of Tables VI, VII, VIII, and IX. I convert DMS' five-year real returns to nominal returns in pounds sterling as follows. First, I convert DMS' figures to nominal (domestic currency) returns using the identity: $(1+\text{nominal}) = (1+\text{real}) (1+\text{inflation})$, and DMS' figures for real returns and inflation. Second, I calculate the average annual appreciation (depreciation) of the domestic currency relative to the British pound over the five-year period and I add (subtract) that currency movement to the nominal returns in domestic currency units.

My figures are highly correlated with those of DMS for the larger markets. However, the correlations with the smaller markets are lower or even negative (e.g. Canada). The correlations are calculated using annual data.⁶ In addition the long-run mean returns are sometimes very different. For example, I calculate an average annual for London of 3.2% over the period 1900 through 1925, DMS calculate a figure of 1.4%. Taken together these suggest that there are serious methodological or data coverage differences between our databases. The German and Austrian bond markets were decimated by the effects of the post-war inflation. The other markets tended to have similar long-run average nominal returns of close to 3%, although even the 5-year average returns were quite volatile.

Table VII also presents bond returns. The difference with Table VI is that missing prices are filled in with a linear interpolation. This means that bonds that do not trade frequently are not underrepresented in the indices. For most markets this makes little difference. However, for the markets that were closed for a long time during the war, or those that have many bond price observations missing due to an absence of bid-ask quotes (e.g. Amsterdam and Berlin) the differences can be large. Creators of historical data series of market returns need to consider issues of missing data carefully, since a method that only uses the n largest bonds or stocks in a market may impart serious biases to the results. Figure 2 shows the evolution of the 12 national market indices and the world index from 1900 to 1925.

⁶My thanks to Mike Staunton for providing their annual figures.

Tables VIII and IX contain the same information as Tables VI and VII, but for equities. Unsurprisingly, equity returns were higher and more volatile than stock returns. In 6 of 26 years the world market experienced negative returns, however equities received, on average, a 2.5-3% higher return than government bonds. If we consider the national markets, we can see that Tokyo, New York, and Canada performed the best during this time period, whereas Berlin and Vienna performed the worst. The drawback of assuming prices are missing at random can be seen by comparing the average returns for Johannesburg (Table VIII and IX). South African mining companies that had received bad news would often not trade (and bid and ask quotes would be unavailable) for several months, and then reappear in the stock price list at a lower price. If we construct an index that excludes equities during periods when we can not observe prices (e.g. the missing at random method) then our market return is substantially biased upwards, i.e. a 12.3% average annual return (using a geometric mean) over 26 years, rather than a 3.0% average annual return when we interpolate prices. National and world market indices are depicted in Figure 3.

The calculations of equity returns are quite close to those of DMS for the larger markets. For the largest markets (London, New York, Berlin and Paris) the correlations are all above 0.9. The correlation with the smaller markets is weaker, with zero correlation between our figures for Australia. Problems with DMS' underlying data for Australia have also been raised by Brailsford et al (2008), who note that DMS' data (which come from Lamberton (1958)) exclude the financial sector (which was 29.5% of the market in 1900 and 40.4% in 1925) and only comprise 12 securities in 1905. In addition, DMS' data for Australia exclude the mining sector (49.5% of the market capitalization in 1900), so it is not surprising that the correlation is nonexistent. The long-run mean returns are also quite different for several markets. For example, I calculate a mean return for Amsterdam of 8.3% p.a. over the period 1900-1925, more than double DMS' calculation of 3.4% p.a. DMS' figure for Australia is almost double mine, although the mean returns for the larger markets are much closer.

Finally, I investigate the links between equity returns and the business cycle. I find a positive correlation between equity market returns and the next year's economic growth at an annual frequency (along the lines of Schwert (1990b)). It would be nice to compare these

series at monthly or quarterly frequency, however production figures are not available at higher than annual frequency for a wide selection of countries. I construct ‘world’ real GDP by summing the GDP figures for the 12 countries in my sample, using the data of Maddison (2008) and compare the return on the ‘world’ equity market with the next year’s growth in real GDP (see Figure 4). The correlation between the two series is 0.42 which may suggest that knowledge about future output changes are impounded in stock prices. However, when I calculate these correlation coefficients country by country the results are much less obvious. There are moderate correlations for the U.S. and Germany (both 0.47), and low but positive correlations for Canada, (0.27), Austria (0.21), Switzerland (0.09), and Australia (0.09). My results are similar to those of Schwert, who studies the output-stock return relation for the U.S. between 1889 and 1988. However, I find small negative correlations for the U.K., France, the Netherlands, Japan, and Spain, which casts some doubt as to whether the output-stock return relation hold strongly for all markets. I also calculate the correlation between ‘world’ bond returns and GDP the next year as -0.01, which suggests that bond prices were not particularly sensitive to economic conditions.

III Industrial Composition

I class equity securities into 21 categories: banks, other financial firms, textiles, food production, breweries and distilleries, oil and rubber, engineering (metal processing, car making, and ship building), chemicals, paper, miscellaneous manufacturing, railways, tramways, shipping, precious metals mining, other mining, lumber and fishing and farming, gas, water, electricity and lighting, phone and telegraph, and firms engaged in the services sector.⁷ The equity securities are grouped into six sectors to facilitate their presentation in Table X. The sectors are Finance (banks and other financial firms), Industrial (textiles, food production, breweries and distilleries, oil and rubber, engineering, chemicals, paper, and miscellaneous

⁷I choose these categories to reflect the industrial composition during the early 20th century. The categories could be aligned with Standard Industrial Classification (SIC) Codes (e.g. lumber and fishing and farming corresponds to SIC codes 0100 through 0900).

manufacturing), Transport (railways, tramways, and shipping), Resources (precious metals mining, other mining, lumber and fishing and farming), Utilities (gas, water, electricity and lighting, phone and telegraph) and Services.

I calculate the share of a sector as the market capitalization of all firms in that sector divided by the market capitalization of all firms. I calculate these sectoral shares for 1900, 1914, and 1925. Table X presents the sectoral shares of each national market plus the aggregate or ‘world’ figures. It is immediately apparent that the sectoral composition of these markets was undergoing a profound change during this period. The importance of financial firms was declining in Amsterdam, Berlin, Canada, Madrid and New York; increasing in Sydney and Zurich; and more or less stable in the remaining markets. The manufacturing sector was expanding quickly in all markets, with the single exception of Madrid. Given German and American manufacturing dominance during this period, the importance of manufacturing in these markets is to be expected. A big upswing in the value of manufacturing firms listed in London is seen, although the fraction of the London market devoted to manufacturing is substantially less than the German market throughout this period. The transport sector was declining in most markets, a combination of the poor financial performance of railroads (by far the most important component of transport) and government nationalizations in several markets (e.g. Berlin, London, Tokyo). There are no clear trends for Mining, Utilities, and Services over time.

Unsurprisingly, most of the market capitalization of Johannesburg is made up of mining firms, reflecting the importance of the Witwatersrand Reef upon which Johannesburg is built. The Sydney mining market was far more important during the early 1900s, a boom time for mining in Australia, but mining continued to be a major component of the market throughout the period studied. Finally, services are of minimal significance to all the national markets. Although the service sector was less important (as a share of GDP) during this period than today, the small size of services is due to several factors. First, most service-based firms were unlisted on national securities markets or have been classified into the transport sector. The majority of listed service firms are larger hotels and big retailers; the smaller hotels, smaller retailers, and most other service-based firms do not bother to list

on the stock market. Second, due to data constraints, firms are classified as either 100% services, or 100% something else (e.g. manufacturing). A firm that both manufactures a product and provides after sales service will be classified solely as a manufacturing firm.

IV Foreign and Cross-Listed Securities

It is well known that the period preceding the first world war was one with a great deal of cross-border financial flows and foreign listings of securities, particularly in London and to a lesser extent in Paris and New York (see e.g. Taylor and Obstfeld (2004) and Hoag (2006)). Although government bonds were the primary instruments to transfer capital abroad, with British and French financiers acting as bankers to the world (see Feis (1930)), there was also substantial use of equity finance. Table XI presents the number of securities listed in each market that were foreign securities (equity securities are defined as foreign if the primary domain of the firm's activities was overseas). Recall that since I only collect data on national/federal bonds I exclude domestic municipal bonds, which is why there are few domestic bonds for most markets.

As expected, London was a particularly international bond market with almost all the listed bonds being foreign. Amsterdam, Berlin, and Paris were all very international bond markets throughout the period 1900 to 1925. The development of foreign lending in the New York bond market following World War One is well known (see Cassis (2006) and Michie (2006)), but even by 1925 New York listed only around a seventh the number of foreign bonds as did London. The other national markets were essentially domestic in purpose, with only Zurich listing more than a handful of foreign bonds.

Foreign listings also had a role to play in equity markets. We see that London is by far the most international market with almost equal numbers of foreign and domestic equities throughout the period. Since the London data set omits some of the smaller equity securities (particularly before the war), which tended to be domestic, the importance of international equities is overstated somewhat. In addition, there were many 'free-standing' companies (namely firms incorporated in London or elsewhere but with mining, rail, and plantation

interests spread around the globe, see Wilkins (1988)) that could be counted as domestic concerns. I classify ‘free-standing’ companies as foreign. Amsterdam and Paris were the only other markets to carry a sizable number of foreign equities throughout the period. The equity markets of New York, Sydney, Vienna, and Zurich increased the number of foreign listings following the war, but by 1925 they were nowhere near as international as the London, Amsterdam, and Paris stock exchanges.

The situation a century ago, as it relates to foreign listings, is quite different to the situation today. Sarkissian and Schill (2004) find that in 1998 the U.S. (659 firms) was the largest host of foreign firms on its stock exchanges, whereas even as late as 1925 the NYSE was an unimportant host. London and Amsterdam have maintained their importance over the century (406 firms for London in 1998; 140 for Amsterdam), and markets that were unimportant in the early 20th century have since become important players such as Switzerland with 157 foreign listings in 1998.

In Tables XII and XIII we present data on cross-listed securities. A foreign security is not necessarily cross-listed anywhere (e.g. almost all British ‘free-standing’ companies were only listed in London).

We count up the number of cross-listed securities over the entire period, 1900 through 1925, in each national market. For example, Table XII shows that there were 53 government bonds that were listed on both the Amsterdam and the Berlin stock markets at some time over this 26 year period. The markets of Amsterdam, Berlin, London, Paris, and (after WW1) New York were not only larger than the other markets, but they were also more closely linked by cross-listed government bonds. National governments loans were often floated on the largest markets simultaneously. The extent to which Canadian markets, Johannesburg, Madrid, Sydney, Tokyo, and to a lesser extent Vienna and Zurich, were on the world financial periphery is masked if one only considers market size, rather than links between the markets.

Table XIII presents the same data for equity securities. The story is quite different for equities. While the centrality of London will not come as a surprise, the few cross-listed equities between Paris and Berlin on one hand, and London on the other hand suggest

different forces were at work in equity markets. The central cluster now appears to be a triangle between London, New York, and Amsterdam. There were many cross-listed equities between London and the former colonies of Australia, Canada, and South Africa (in line with the results of Sarkissian and Schill (2004) find evidence of a colonies effect with contemporary data). Virtually the whole of the Johannesburg stock market was also present on the London list (many South African mines were also listed, albeit unofficially, in Paris, which is why they do not show up in Table XIII). There appears to be a small network of the German-speaking exchanges, Berlin, Vienna, and Zurich; but apart from this the other exchanges appear to be quite insular. One possibility for the divergence between Tables XII and XIII is the different nature of bonds and equities. Bonds usually required much greater amounts of capital, which was easier to procure from the large European capital exporting countries. After the initial amount was raised there was virtually nothing the bondholder needed to do other than clip his or her coupon every six months, except in the case of a default. Therefore coordinated decision making between bondholders of different nationalities was not particularly important. On the other hand, the capital needed for a company was usually much less, and entrepreneurs could usually raise these funds from a single market if they so desired. The really large equity securities (usually railroads) were the most likely to have been cross-listed, due to the requirements of large amounts of capital from multiple sources. Even after the initial funds were raised to start a company, coordinated decision making was necessary: managers needed to be appointed, projects undertaken, employees hired etc. Shareholders from countries with the same language, laws, and customs would *ceteris paribus* find it easier to work together to run a company. This can explain the links between London, New York, Canada, and Sydney, and also within the German network, although Amsterdam does not fit neatly into this picture.

Size mattered for integration. The larger the market, the more likely there was to be links with other (large) markets. However, this was not the only important issue, language and culture appear to have some part to play in explaining the financial network of the early 20th century (as they do today, see Sarkissian and Schill (2004)). Given the tendency of foreign listings to cluster on one principal market in the world at a given time (see Sarkissian

and Schill (2009)) the dominance of London during the early 20th century, when it was (still) the dominant financial power, is unsurprising. However, the slow increase in foreign listings on New York during the 1920s as it gradually took over leadership from London is somewhat unexpected. A further unanticipated result is the international importance of the Amsterdam market, which has generally been written off as a second tier player after the Napoleonic wars (see Cassis (2006) and Michie (2006)).

V Conclusion

This paper documents the evolution of 12 major financial markets over the period 1900 to 1925. The relative sizes of national markets are compared, confirming that London was the pre-eminent market before the First World War. The growth of New York is documented, as is the importance of the other major markets of Amsterdam, Paris, and Berlin. Equity markets are of a roughly equal size as bond markets during this era. The industrial composition of markets changes rapidly during this period as the manufacturing sector increased dramatically between 1900 and 1925, and the railroad sector declined.

The interrelationship between the 12 markets is also explored. The large number of foreign securities on many national exchanges, particularly Amsterdam, Berlin, London, and Paris, testifies to their importance as international centres of finance. The number of cross-listed securities is calculated. It shows that although the big European *bond* markets listed many of the same securities on their exchanges, the network of *equity* markets was quite different. The Amsterdam-London-New York triangle contained many of the same firms listed in two or more markets. There is also tentative evidence of a smaller Germanic triangle of Berlin-Vienna-Zürich. The remaining equity markets have few direct links with each other, with the exception of London and her former colonies.

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Appendix

Price data are collected every fourth friday e.g. January 27, 1900, February 24, 1900, March 23, 1900. The price is either the average of the bid and the ask quote (if there were market makers quoting bid and ask prices for that market) or the transaction price for that day (if there was a trade on that day for a particular security).

Coupons and dividends are entered in the time period when the security went “ex-coupon” or “ex-dividend” if the “ex” date is known, otherwise they are entered in the time period when the payment was made to holders. If neither the “ex” date, nor the payment date, are known the payments are allocated evenly throughout the year.

The nominal capital figures for bonds, or the number of issued shares, are generally updated every January and are assumed to be constant throughout the year. However, if there was a major change in capital during the year, for example a stock split, a seasoned equity issue, or a consolidation of multiple government bonds into a single bond, then the capital figure is changed in the time period in which the change took place. I adjust all prices for the effects of changes in the capital structure of the firm (e.g. bonus issues, rights issues).⁸

Securities are classified into 22 separate industries (see Section 4). Information on the industry classification comes from the stock exchange lists (which often grouped securities by industry), investors’ manuals (e.g. Van Oss’ *Effectenboek*, *Salings Börsen Jahrbuch*), articles in contemporary newspapers, and the internet.⁹

Securities are classed as either domestic or foreign. The classification of government bonds is usually straightforward; I treat colonial bonds as foreign bonds. Equities are classed as foreign if the firm had its major area of operations in a foreign territory, or a colony

⁸I have not collected data on corporate bonds. The corporate bond sector was usually much less important than the equity and government bond sectors, although the London and New York corporate bond markets were large.

⁹Although it may sound unlikely to be fruitful, Google searches are a highly effective way of finding out the business that firms (particularly firms with unusual names) were engaged in. Historical societies, architectural websites devoted to old buildings, and auction sites for old share and bond certificates were particularly useful.

(e.g. Indian railways are considered foreign securities in London). ‘Free-standing’ firms (see Wilkins (1988)) are classified as foreign.

Data sources for the 12 markets are found below.

Amsterdam Data for the Amsterdam market come from *Nieuw Algemeen Effectenblad*. *Nieuw Algemeen Effectenblad* reports the daily high and low transaction prices for every equity and bond traded in Amsterdam. I supplement this with various issues of *Van Oss’ Effectenboek*, which contains dividends, industry grouping, and information on capital operations.

Berlin Pre-1917 data come from *Norddeutsche Allgemeine Zeitung*. This source contains transaction prices for all securities listed on the Berlin exchange. Post-1917 the data come from *Amtliches Kursblatt der Berliner Wertpapierbörse*, the official stock exchange record. The *Kursblatt* contains transaction prices for all securities listed on the Berlin market. Data on dividends, industry, and capital operations come from various issues of *Salings Börsen Jahrbuch*.

Canada Data for Toronto are available from *The Financial Post*, *The Globe and Mail*, and *Monetary Times*. I use the *Monetary Times* and *The Globe and Mail* from 1900 to 1906, and *The Financial Post* from 1907 until 1925. *The Financial Post* reports all stocks and bonds listed on the Toronto and/or Montreal exchange, and states that it reports prices for each security from the market in which each security is most actively traded, without giving further details. Hence, some of the data will consist of prices from the Montreal exchange and some from the Toronto exchange, and it is possible that over time the recorded prices of some securities may have switched from Toronto prices to Montreal prices or vice versa. *The Financial Post* also reports dividend data, and its pages contain details of securities’ capital operations. Missing data from *The Financial Post* have been augmented with price lists from *The Globe and Mail*. The combination of these three sources should provide an almost complete record of the companies listed on Montreal or Toronto.

Johannesburg Price data come from two Johannesburg daily newspapers, the *Rand Daily Mail* and *The Star*. Data on dividends and capital operations comes partly from the *Rand Daily Mail* and *The Star* and partly from the *South African Mining Journal*. Since

most South African mines were cross-listed in London, I also use *The Investor's Monthly Manual* to obtain information on dividends and capital.

London I thank Ben Chabot for providing the data on London from 1900 through 1907. His data were collected from the *Money Market Review*. I use *The Economist* from 1908 through 1914. I collect price data for mining companies from 1900 to 1914 from the London daily newspaper *The Times*. The scope of the coverage in *The Economist* declines dramatically after 1914, so I switch to *The Times* for all security prices from 1915. An advantage of *The Times* is that it gives a complete list of every transaction each day, the disadvantage is that it does not report very many bid and ask quotes. Information on dividends and capital operations comes from various issues of *The Investor's Monthly Manual*, *The Stock Exchange Official Intelligence*, and *The Mining manual and mining year book* (1925 issue).

Madrid I use the official publication of the Bolsa de Madrid, the *Boletín de Cotización*. It contains transaction prices, dividends, and official announcements about capital operations of all listed companies. Additional data is obtained from various issues of *Anuario Financiero y de Sociedades Anónimas*.

New York I thank Ben Chabot for providing data on equities for the New York Stock Exchange (NYSE) and curb companies that traded in New York between 1900 and 1925. His data come from *The Commercial and Financial Chronicle*. In addition I collect data on U.S. and foreign government bonds that traded on the NYSE from *The New York Times*. Information on coupon payments and the issued capital of each bond comes from various issues of *Moody's: Governments and Municipals*.

Paris I collect price data on the *Parquet*, or official market, from *L'Économiste Français* which contains most, but not all, of the listed securities. Data on dividends, coupons, and capital operations come from *L'Économiste Français*, *Cote de la Bourse et de la Banque*, and *Annuaire Général des Sociétés Françaises par Actions*.

Sydney I use two Sydney daily newspapers the *Daily Telegraph*, and the *Sydney Morning Herald* to obtain price data, as there was no official stock exchange publication until 1911. These newspapers contains bid and ask quotes for a selection of securities that traded on

the Sydney Stock Exchange. The official publication of the Sydney Stock Exchange, the *Monthly Stock and Share List*, contains bid and ask quotes, transaction prices, dividends, and capital operation information on all listed securities. The official list begins publication around 1911, but it was only published once a month, and many issues are missing before 1917, so it is not used. Comparison of the newspapers with the official list indicate that the Sydney market had many more listed securities than are present in my data set, although the newspapers contain all the larger companies, and many of the smaller companies. Data on dividends, and capital issued come from the two daily newspapers as well as the *Monthly Stock and Share List* and *T.J. Thompson's Stock and Share Report*, which was published by a prominent Sydney broker.

Tokyo I collect Japanese data from the Japanese language daily newspaper, *Asahi Shimbun*. The *Asahi Shimbun* contains a complete list of those securities that are officially listed, but there are many securities (e.g. almost all the banks) that are not officially listed. These data are augmented with *The Japan Times*, an English language newspaper which contains several brokers' quotes on officially and unofficially listed securities. However, data on the unofficial market is patchy. Data on dividends and capital come from *Kabukai 20nen* (20 years of the stock market).

Vienna I use *Amtliches Coursblatt der Wiener Börse*, the official list, to compile price and dividend data of all listed equities and government bonds. Data on the issued capital of each security comes from various issues of *Compass*, an investor's manual.

Zurich I obtain price and dividend data from *Kursblatt der Zürcher Effektenbörse*, the official list of the Zurich stock exchange. Information on capital issued comes from *Vademecum des bourses de Bâle, Zurich et Genève* and various issues of *Schweizerisches Finanz-Jahrbuch*.

Table I - National Government Bonds Listed

Number of national bonds (either foreign or domestic) listed on each exchange in January of each year.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	500	76	57	0	closed	268	6	7	42	5	2	31	6
1901	531	97	63	0	closed	268	7	6	42	5	3	31	9
1902	567	116	78	0	0	268	6	6	41	5	3	31	13
1903	572	122	81	0	0	265	3	6	40	4	4	28	19
1904	585	131	85	0	0	263	4	6	41	4	4	29	18
1905	591	136	86	0	0	264	3	6	39	4	6	29	18
1906	608	147	93	0	0	259	4	6	36	5	10	28	20
1907	614	150	91	0	0	255	4	15	36	4	8	30	21
1908	600	152	93	0	0	235	4	17	36	4	7	30	22
1909	610	153	99	0	0	235	4	18	37	4	6	30	24
1910	629	155	105	0	0	240	4	19	37	3	6	34	26
1911	641	156	106	0	0	241	6	19	37	5	4	36	31
1912	653	157	106	0	0	242	6	21	37	6	4	39	35
1913	663	164	105	0	0	246	6	18	36	8	4	39	37
1914	677	171	112	0	0	239	6	18	36	9	5	40	41
1915	679	closed	closed	0	0	273	6	18	78	8	5	closed	closed
1916	831	175	closed	1	0	386	7	19	111	9	5	closed	closed
1917	898	179	closed	2	1	434	7	27	113	6	5	closed	37
1918	940	182	closed	3	1	464	7	33	113	7	5	closed	38
1919	973	181	closed	6	1	475	8	35	116	9	2	44	39
1920	1004	181	80	8	3	484	7	35	115	8	2	42	39
1921	1013	182	77	10	3	487	7	43	115	8	2	41	38
1922	1041	178	76	10	3	510	10	50	116	9	2	40	37
1923	1068	181	67	11	4	528	13	64	111	8	2	39	40
1924	1055	182	64	12	3	531	14	68	99	11	2	29	40
1925	1043	175	62	12	3	510	12	83	98	17	2	29	40

Table II - Equity Securities Listed

Number of equity securities (either foreign or domestic) listed on each exchange in January of each year.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	2882	166	510	95	closed	1292	6	235	159	141	30	174	74
1901	3102	230	523	100	closed	1357	8	254	159	183	30	183	75
1902	3443	256	703	96	110	1402	10	277	158	184	31	186	74
1903	3594	286	755	94	127	1379	13	294	157	193	30	186	80
1904	3629	296	788	88	137	1349	17	289	156	203	33	190	83
1905	3751	295	828	88	142	1421	20	282	152	199	37	198	89
1906	3843	302	855	94	141	1462	23	289	145	193	45	197	97
1907	3994	329	881	126	136	1507	25	287	145	208	42	205	103
1908	3770	339	884	129	134	1234	30	292	143	214	50	213	108
1909	3802	352	890	142	131	1203	37	297	145	210	53	226	116
1910	3874	377	910	160	133	1198	40	294	146	213	55	228	120
1911	3978	425	925	170	135	1216	41	291	147	204	57	241	126
1912	4108	452	941	205	133	1232	41	285	147	212	79	256	125
1913	4158	483	947	205	132	1244	42	282	148	213	76	266	120
1914	4179	497	945	210	130	1245	42	281	146	216	80	267	120
1915	4154	closed	closed	197	127	1301	43	325	163	217	81	closed	closed
1916	4777	505	closed	198	128	1837	44	338	222	207	88	closed	closed
1917	5017	527	closed	208	127	2017	45	338	243	200	101	closed	114
1918	5340	565	886	219	132	2235	47	357	254	189	105	closed	115
1919	5519	600	873	222	132	2334	48	367	267	188	120	249	119
1920	5736	616	864	228	137	2448	52	438	274	186	112	263	118
1921	5856	628	871	228	137	2492	52	481	277	193	105	278	114
1922	5900	639	878	227	123	2508	55	492	275	203	97	294	109
1923	5972	622	930	232	122	2456	55	535	269	206	97	341	107
1924	6141	614	1046	237	119	2475	55	552	247	214	87	382	113
1925	5961	581	1050	234	111	2381	58	548	243	205	91	344	115

Table III - Government Bonds, Market Capitalization (£, millions)

Market capitalization is calculated as the current market value of all listed bonds from Table I. Domestic currency units have been converted to pounds sterling using market exchange rates from The Economist.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	5177	256	1188	0	closed	1517	148	280	1186	7	14	553	29
1901	5503	267	1407	0	closed	1544	217	258	1195	7	18	555	36
1902	5758	284	1538	0	0	1614	222	260	1188	6	18	581	47
1903	6051	385	1657	0	0	1654	258	259	1149	6	19	598	65
1904	6262	429	1687	0	0	1632	257	231	1129	5	19	806	67
1905	6369	425	1707	0	0	1700	267	229	1125	5	37	807	67
1906	6571	433	1758	0	0	1759	297	226	1133	4	79	810	72
1907	6593	434	1712	0	0	1724	346	314	1101	4	71	814	73
1908	6478	432	1705	0	0	1683	331	277	1110	4	63	801	72
1909	6662	433	1813	0	0	1696	354	287	1144	4	56	801	74
1910	6834	453	1909	0	0	1738	308	278	1170	3	60	839	77
1911	6992	452	1968	0	0	1775	311	274	1223	18	34	847	90
1912	6875	443	1932	0	0	1726	308	283	1202	20	32	839	89
1913	6628	431	1959	0	0	1680	309	278	1069	22	31	757	92
1914	6518	423	1958	0	0	1599	301	271	1031	24	73	745	93
1915	5676	closed	closed	0	0	1671	305	262	1251	23	70	closed	closed
1916	6843	362	closed	21	0	2603	319	369	1556	94	78	closed	closed
1917	6901	362	closed	41	15	2712	359	502	1555	91	78	closed	78
1918	10031	358	closed	68	15	4358	448	1823	1830	140	65	closed	88
1919	14831	343	closed	143	15	5190	385	4665	2813	176	54	642	89
1920	15227	316	593	297	44	5687	561	5588	1730	164	52	106	91
1921	14403	298	402	408	40	5227	373	5391	1893	209	50	37	75
1922	14684	312	159	410	39	5641	427	5108	2202	228	48	14	96
1923	14567	332	46	415	53	6577	501	4539	1706	224	46	6	121
1924	13753	355	67	438	37	6545	222	4372	1304	236	44	9	126
1925	13720	352	82	397	37	6619	238	4392	1180	248	41	11	123

Table IV - Equity Securities, Market Capitalization (£, millions)

Market capitalization is calculated as the current market value of all listed equity securities from Table II. Domestic currency units have been converted to pounds sterling using market exchange rates from The Economist.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	4500	83	434	61	closed	2208	37	762	620	52	23	183	38
1901	4692	116	405	62	closed	2220	36	967	590	56	23	175	42
1902	5443	127	445	72	182	2420	36	1389	555	52	24	176	38
1903	5973	136	474	90	216	2613	45	1548	554	51	31	177	38
1904	5621	131	528	78	194	2448	45	1329	562	53	30	183	40
1905	6345	147	629	94	218	2742	47	1550	591	52	34	195	46
1906	6946	165	707	123	164	2922	52	1828	607	62	57	205	55
1907	7080	178	780	145	138	2929	64	1754	621	72	103	231	64
1908	6068	158	722	133	114	2540	66	1325	602	61	55	228	63
1909	6917	182	774	167	150	2709	74	1812	626	65	59	233	68
1910	8286	217	887	200	193	3453	84	2105	690	74	58	252	73
1911	8548	228	1095	223	178	3507	83	2033	690	78	62	290	82
1912	8198	232	1136	251	143	3054	87	2014	724	79	81	320	78
1913	8456	246	1202	304	143	3138	88	1987	782	84	78	325	78
1914	8082	241	1186	275	118	2937	84	1940	719	89	84	331	78
1915	7648	closed	closed	239	108	2932	78	1935	621	88	63	closed	closed
1916	8501	266	closed	270	108	3261	84	2412	595	92	111	closed	closed
1917	8899	300	closed	253	111	3380	96	2500	706	92	195	closed	81
1918	8858	351	1084	224	112	3495	129	2099	769	99	222	closed	89
1919	9252	360	618	250	121	4039	119	2295	850	106	232	172	89
1920	11914	486	314	310	167	5673	146	3433	630	120	451	94	90
1921	10030	422	343	285	133	4433	101	3355	435	113	260	87	64
1922	8988	318	269	256	116	3918	99	3012	465	155	220	102	59
1923	10361	294	156	285	129	4541	109	3911	454	153	186	78	65
1924	11937	324	736	311	119	4864	102	4367	454	162	187	232	79
1925	12716	358	708	302	129	5381	105	4721	468	171	188	101	86

Table V - Equity Market Capitalization to GDP

Market capitalization (from Table IV) is divided by nominal GDP from Mitchell (2003). English, French, and German (legal origin) figures are calculated as the sum of market capitalizations of the relevant markets divided by the sum of nominal GDPs of those same markets. Bolded figures are those for which nominal GDP was estimated (see text). French-origin markets are Amsterdam, Madrid, and Paris. German-origin markets are Berlin, Tokyo, Vienna, and Zurich. English-origin markets are the remainder.

	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich	English Origin	French Origin	German Origin
1900	0.56	0.27	0.28	n.a.	1.23	0.12	0.20	0.48	0.28	0.09	0.39	0.38	0.51	0.42	0.28
1901	0.75	0.26	0.27	n.a.	1.16	0.12	0.23	0.48	0.29	0.09	0.38	0.43	0.50	0.44	0.27
1902	0.81	0.29	0.28	n.a.	1.31	0.12	0.31	0.44	0.26	0.09	0.36	0.38	0.58	0.42	0.28
1903	0.84	0.28	0.33	n.a.	1.42	0.14	0.33	0.41	0.26	0.11	0.36	0.38	0.61	0.40	0.28
1904	0.79	0.30	0.28	n.a.	1.30	0.14	0.28	0.43	0.26	0.10	0.36	0.38	0.55	0.41	0.29
1905	0.86	0.33	0.30	n.a.	1.42	0.14	0.30	0.45	0.26	0.11	0.34	0.42	0.58	0.43	0.31
1906	0.93	0.36	0.35	n.a.	1.49	0.14	0.31	0.43	0.28	0.17	0.34	0.44	0.58	0.42	0.34
1907	0.98	0.37	0.39	n.a.	1.47	0.15	0.28	0.40	0.29	0.27	0.35	0.49	0.55	0.40	0.36
1908	0.85	0.35	0.37	n.a.	1.28	0.16	0.23	0.41	0.25	0.14	0.34	0.48	0.49	0.40	0.33
1909	0.95	0.36	0.41	n.a.	1.35	0.17	0.26	0.39	0.25	0.15	0.34	0.49	0.50	0.40	0.34
1910	1.09	0.40	0.45	n.a.	1.68	0.19	0.29	0.42	0.26	0.15	0.36	0.50	0.58	0.44	0.36
1911	1.10	0.47	0.47	1.18	1.62	0.18	0.27	0.39	0.25	0.13	0.38	0.52	0.57	0.41	0.41
1912	1.04	0.45	0.50	0.90	1.38	0.19	0.25	0.37	0.24	0.17	0.40	0.48	0.49	0.40	0.41
1913	1.06	0.47	0.55	0.90	1.33	0.18	0.24	0.40	0.23	0.15	0.41	0.50	0.49	0.42	0.42
1914	1.06	0.53	0.51	0.78	1.23	0.16	0.24	0.40	0.23	0.17	0.50	0.51	0.47	0.41	0.47
1915	n.a.	n.a.	0.43	0.71	0.99	0.12	0.23	0.27	0.23	0.12	n.a.	n.a.	0.43	0.27	n.a.
1916	0.78	n.a.	0.41	0.63	0.95	0.10	0.24	0.21	0.21	0.17	n.a.	n.a.	0.41	0.23	n.a.
1917	0.96	n.a.	0.30	0.59	0.77	0.08	0.20	0.21	0.20	0.21	n.a.	0.29	0.34	0.23	n.a.
1918	0.94	0.45	0.24	0.54	0.67	0.09	0.13	0.23	0.21	0.17	n.a.	0.20	0.26	0.24	0.34
1919	0.73	0.31	0.23	0.48	0.73	0.08	0.13	0.20	0.20	0.14	n.a.	0.19	0.27	0.22	0.23
1920	0.77	0.14	0.23	0.60	1.01	0.09	0.14	0.15	0.21	0.21	n.a.	0.18	0.30	0.19	0.18
1921	0.83	0.13	0.29	0.54	0.94	0.10	0.18	0.20	0.18	0.13	n.a.	0.19	0.32	0.26	0.14
1922	0.68	0.09	0.26	0.53	0.95	0.11	0.17	0.16	0.25	0.12	n.a.	0.19	0.32	0.20	0.11
1923	0.65	0.06	0.28	0.54	1.16	0.12	0.21	0.16	0.22	0.12	n.a.	0.21	0.37	0.20	0.09
1924	0.66	0.25	0.31	0.46	1.22	0.12	0.22	0.18	0.23	0.11	0.77	0.24	0.38	0.23	0.24
1925	0.74	0.21	0.28	0.48	1.28	0.11	0.24	0.17	0.22	0.14	0.33	0.26	0.42	0.22	0.20
Rajan and Zingales (2003)															
1913	0.56	0.44	0.74	n.a.	1.09	n.a.	0.39	0.78	0.39	0.49	0.76	0.58			
Musacchio (2008)															
1900	0.60	0.20	0.23	n.a.	0.44	0.24	0.71	0.52	0.39	0.32	0.50	0.82	0.36	0.32	0.46
1913	0.56	0.44	0.74	0.22	0.33	0.31	0.95	0.54	0.39	0.49	0.76	1.23	0.44	0.37	0.73

Table VI: Market Return - Government Bonds (£, missing at random)

Market returns are value weighted. All returns that are unobserved in a period are dropped, and the remaining return observations are used.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	3.0	3.4	2.4	closed	closed	1.7	2.5	4.1	4.9	1.7	2.6	3.8	2.4
1901	5.0	7.9	8.6	closed	closed	3.5	9.5	3.6	2.5	-0.8	2.7	7.3	11.7
1902	4.8	5.0	6.1	closed	closed	4.4	10.0	2.1	3.4	1.9	8.5	5.4	3.9
1903	2.2	3.7	3.8	closed	closed	0.5	4.5	-0.2	1.5	0.3	0.5	4.1	1.7
1904	3.6	1.4	2.9	closed	closed	4.4	9.4	0.7	3.4	1.3	0.4	3.1	2.7
1905	4.4	1.7	2.7	closed	closed	5.2	15.3	1.1	3.8	6.3	11.4	3.9	3.7
1906	2.4	2.3	0.6	closed	closed	1.6	24.1	3.9	-0.4	7.0	3.8	3.3	3.1
1907	2.2	5.7	1.7	closed	closed	1.7	-0.4	-0.7	4.3	-1.4	0.6	2.5	-0.4
1908	4.5	5.6	5.9	closed	closed	3.5	11.3	2.2	4.1	5.5	11.8	2.7	5.3
1909	5.8	9.2	7.1	closed	closed	4.3	9.4	1.5	5.7	2.8	15.0	5.3	5.5
1910	3.0	3.4	5.0	closed	closed	2.2	3.7	3.3	1.5	2.9	3.7	2.9	3.1
1911	1.9	0.9	1.9	closed	closed	2.1	3.6	1.1	1.8	2.7	-0.9	1.7	1.5
1912	0.3	0.6	0.9	closed	closed	0.7	5.4	3.3	-1.4	0.5	0.9	-1.5	-0.5
1913	0.9	2.5	0.8	closed	closed	0.2	1.1	0.7	0.0	5.3	4.9	2.5	3.8
1914	0.1	-11.5	-5.3	closed	closed	-1.3	6.1	-1.1	-11.2	3.2	1.5	-3.3	-3.5
1915	-4.8	10.6	closed	closed	closed	-3.6	3.1	4.5	-15.9	2.9	15.1	closed	0.0
1916	6.1	7.1	closed	5.5	closed	3.8	22.1	3.0	6.3	2.5	4.9	closed	5.4
1917	4.0	4.3	closed	-0.1	5.0	2.7	21.1	0.8	2.8	3.6	4.4	closed	10.1
1918	5.4	-5.1	closed	8.0	2.6	7.1	-11.8	3.6	14.2	0.9	n.a.	closed	-5.3
1919	0.3	-0.3	-41.4	27.2	5.0	0.6	23.2	31.1	-35.3	3.9	n.a.	-88.1	7.3
1920	-5.8	-12.6	-18.4	-1.3	-2.7	-3.0	-29.9	2.4	-28.9	-2.0	n.a.	-44.2	-8.8
1921	5.8	9.3	-58.6	6.1	5.5	15.2	0.4	-1.2	16.1	7.1	n.a.	-62.4	29.0
1922	0.7	6.5	-81.0	3.2	14.1	13.6	3.2	-3.8	-17.7	5.2	n.a.	-66.6	4.7
1923	4.0	9.6	183.4	12.3	4.7	4.6	-7.2	12.5	-23.1	2.8	n.a.	-10.7	1.0
1924	2.3	6.7	12.3	-1.6	4.6	6.7	4.1	-2.9	-3.5	4.4	n.a.	35.6	4.8
1925	0.2	8.4	-4.1	2.5	6.0	3.7	3.8	2.2	-31.7	6.8	n.a.	7.8	2.9
Geometric Mean													
1900-04	3.7	4.2	4.7	n.a.	n.a.	2.9	7.1	2.1	3.1	0.9	2.9	4.7	4.4
1904-09	3.8	4.8	3.6	n.a.	n.a.	3.3	11.7	1.6	3.5	4.0	8.4	3.5	3.4
1910-14	1.3	-1.0	0.6	n.a.	n.a.	0.7	4.0	1.5	-2.0	2.9	2.0	0.4	0.9
1915-19	2.1	3.2	-41.4	9.7	4.2	2.0	10.6	8.1	-7.5	2.7	8.0	-88.1	3.4
1920-24	1.3	3.5	-27.2	3.6	5.1	7.2	-6.8	1.3	-12.8	3.4	n.a.	-38.9	5.5
1900-25	2.4	3.1	-7.6	5.9	4.9	3.2	5.0	2.8	-4.6	2.9	5.0	-17.0	3.5
Geometric Mean (DMS)													
1900-04	n.a.	2.5	0.2	2.3	6.1	0.6	10.4	2.8	2.8	-1.4	4.4	n.a.	8.5
1904-09	n.a.	1.8	-1.1	2.1	3.6	1.6	9.9	2.6	2.7	4.7	7.9	n.a.	6.7
1910-14	n.a.	0.5	-3.5	2.4	3.4	-0.5	2.4	3.4	-1.0	1.0	-1.4	n.a.	4.6
1915-19	n.a.	2.4	-37.5	-4.9	0.6	-1.4	15.9	6.8	-8.2	-0.3	12.4	n.a.	7.7
1920-24	n.a.	3.0	4.7	8.2	5.5	7.2	-13.8	1.8	-13.8	6.1	-4.2	n.a.	4.0
1900-25	n.a.	2.3	-8.4	2.0	3.9	1.4	4.5	3.5	-5.0	2.6	4.2	n.a.	6.1
Correlation with DMS													
	n.a.	0.674	0.939	-0.033	0.351	0.913	0.952	0.930	0.948	0.737	0.762	n.a.	0.766

Table VII: Market Return - Government Bonds (£, interpolated)

Market returns are value weighted. All returns that are unobserved in a period (due to missing prices in that period or the previous period) are inferred.

Missing prices are replaced by a linear interpolation of the two nearest observed prices and returns calculated with the imputed prices.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	3.0	4.1	2.1	closed	closed	1.7	2.5	4.1	4.9	2.0	-0.6	3.8	2.4
1901	5.1	7.9	7.3	closed	closed	3.5	9.5	3.6	2.5	0.1	3.1	7.3	9.7
1902	4.9	5.7	5.8	closed	closed	4.5	9.8	2.1	3.4	0.5	9.9	5.4	4.1
1903	2.3	2.9	3.5	closed	closed	0.6	4.8	-0.2	1.5	-1.4	1.4	4.1	2.4
1904	3.3	2.5	2.2	closed	closed	4.4	9.3	0.7	3.3	1.5	0.4	3.1	2.8
1905	4.1	2.7	2.0	closed	closed	5.2	14.6	1.1	3.8	8.9	11.4	3.9	2.8
1906	2.5	1.7	1.3	closed	closed	1.6	22.6	4.0	-0.3	8.2	5.3	3.3	3.0
1907	2.5	3.9	2.7	closed	closed	1.7	0.3	0.3	4.3	-2.7	1.0	2.5	0.4
1908	4.6	5.2	5.7	closed	closed	3.5	11.0	2.5	4.1	4.3	11.8	2.7	4.9
1909	5.8	6.7	7.0	closed	closed	4.3	9.3	2.0	5.7	2.7	15.0	5.3	5.6
1910	3.1	3.6	4.7	closed	closed	2.2	4.1	3.4	1.5	3.5	3.7	2.9	2.9
1911	1.9	1.6	1.7	closed	closed	2.1	4.0	1.2	1.8	2.5	-0.8	1.7	1.5
1912	0.5	1.2	1.1	closed	closed	0.7	5.6	2.9	-1.4	0.5	0.9	-1.5	-0.4
1913	1.0	1.7	1.4	closed	closed	0.2	1.8	0.4	0.0	4.7	5.0	2.5	2.8
1914	-4.3	-10.2	-2.3	closed	closed	-1.1	6.6	-0.6	-10.5	3.2	1.5	-3.3	-2.4
1915	-8.1	-2.9	closed	closed	closed	-4.2	3.3	4.0	-14.9	0.9	17.1	closed	-3.7
1916	-0.6	-1.9	closed	5.5	closed	1.3	21.8	3.2	5.0	4.0	5.9	closed	-0.8
1917	-0.2	-2.8	closed	-0.1	6.6	3.2	20.9	0.7	-0.1	5.6	7.3	closed	10.2
1918	3.2	-8.1	closed	8.0	6.0	6.8	-11.7	3.7	12.9	1.3	n.a.	closed	-7.3
1919	-3.1	-7.8	-38.8	27.2	6.7	-0.1	23.0	31.4	-35.2	3.9	n.a.	-83.2	2.0
1920	-6.0	-12.0	-19.4	-3.5	-5.1	-2.9	-29.8	2.3	-28.0	1.0	n.a.	-62.6	-11.6
1921	5.7	7.1	-58.2	6.1	4.3	14.4	0.9	-1.3	15.7	10.1	n.a.	-61.1	27.6
1922	0.9	3.8	-68.1	3.2	13.8	12.8	4.3	-3.8	-17.4	8.3	n.a.	-55.3	5.0
1923	3.7	6.0	53.6	12.3	4.0	4.6	-7.6	12.4	-21.6	4.7	n.a.	4.9	1.1
1924	2.5	5.3	30.4	-1.6	3.8	6.7	4.2	-2.9	-3.2	5.7	n.a.	27.9	5.0
1925	0.2	7.9	-37.5	2.5	5.8	3.7	3.6	2.3	-30.2	6.4	n.a.	12.0	2.8
Geometric Mean													
1900-04	3.7	4.6	4.2	n.a.	n.a.	2.9	7.1	2.1	3.1	0.5	2.8	4.7	4.2
1904-09	3.9	4.0	3.7	n.a.	n.a.	3.3	11.3	2.0	3.5	4.2	8.8	3.5	3.3
1910-14	0.4	-0.6	1.3	n.a.	n.a.	0.8	4.4	1.5	-1.8	2.8	2.0	0.4	0.8
1915-19	-1.8	-4.8	-38.8	9.7	6.4	1.3	10.6	8.1	-8.2	3.1	10.0	-83.2	-0.1
1920-24	1.2	1.8	-26.4	3.1	4.0	6.9	-6.6	1.2	-12.2	5.9	n.a.	-38.6	4.7
1900-25	1.4	1.2	-8.9	5.7	5.0	3.0	5.1	2.9	-4.5	3.4	5.4	-15.4	2.6
Geometric Mean (DMS)													
1900-04	n.a.	2.5	0.2	2.3	6.1	0.6	10.4	2.8	2.8	-1.4	4.4	n.a.	8.5
1904-09	n.a.	1.8	-1.1	2.1	3.6	1.6	9.9	2.6	2.7	4.7	7.9	n.a.	6.7
1910-14	n.a.	0.5	-3.5	2.4	3.4	-0.5	2.4	3.4	-1.0	1.0	-1.4	n.a.	4.6
1915-19	n.a.	2.4	-37.5	-4.9	0.6	-1.4	15.9	6.8	-8.2	-0.3	12.4	n.a.	7.7
1920-24	n.a.	3.0	4.7	8.2	5.5	7.2	-13.8	1.8	-13.8	6.1	-4.2	n.a.	4.0
1900-25	n.a.	2.3	-8.4	2.0	3.9	1.4	4.5	3.5	-5.0	2.6	4.2	n.a.	6.1
Correlation with DMS													
	n.a.	0.539	0.631	0.004	0.386	0.934	0.956	0.928	0.950	0.708	0.742	n.a.	0.732

Table VIII: Market Return - Equity Securities (£, missing at random)

Market returns are value weighted. All returns that are unobserved in a period are dropped, and the remaining return observations are used.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	3.2	13.3	-6.3	4.0	closed	0.3	-3.3	20.5	3.0	0.5	-0.1	-2.0	8.6
1901	7.6	13.7	-0.3	10.5	closed	7.2	1.2	22.3	-3.1	-5.9	11.4	1.6	5.4
1902	4.5	9.4	6.1	16.1	-6.6	2.8	10.4	7.0	3.4	-5.2	17.4	5.3	7.7
1903	-3.3	-6.4	13.1	-11.6	-25.9	-3.8	1.9	-14.0	5.2	5.6	-2.1	7.4	6.2
1904	15.1	21.0	12.1	12.5	99.9	10.8	1.9	26.6	8.7	5.9	12.2	8.4	16.6
1905	11.1	18.9	9.3	14.0	-5.6	8.0	4.4	19.4	6.4	26.6	47.9	8.7	10.1
1906	2.8	14.8	5.9	1.4	34.2	2.1	22.0	-4.1	6.4	18.1	67.0	9.6	5.5
1907	-10.5	-14.2	-4.6	-10.5	-3.2	-9.4	3.0	-21.3	1.3	-6.5	-44.3	-0.4	-4.7
1908	15.0	24.8	6.7	27.1	85.3	8.1	9.8	36.1	6.7	11.4	8.5	3.5	8.6
1909	13.3	13.9	16.0	15.2	31.9	10.8	10.8	14.1	12.9	14.5	29.3	14.7	13.6
1910	3.0	3.7	6.6	7.2	-6.6	4.4	2.3	-2.1	3.5	4.8	-0.4	11.8	7.5
1911	2.7	6.1	5.7	11.2	-27.4	0.7	6.8	2.2	8.5	3.0	8.4	5.9	2.3
1912	5.2	5.6	3.2	14.6	14.6	5.1	5.7	3.3	10.3	8.1	2.3	1.7	2.2
1913	-1.6	2.8	3.4	-6.6	-13.4	-3.2	-0.3	-2.7	-3.9	7.2	6.8	4.7	3.9
1914	-10.4	-8.8	-13.8	6.9	7.9	-5.8	-2.7	-2.5	-15.5	0.7	-11.2	-3.9	3.7
1915	19.3	29.3	closed	15.0	43.7	11.3	10.6	31.1	-8.3	5.9	84.4	closed	closed
1916	10.6	16.5	closed	6.9	22.6	10.9	18.8	6.1	24.8	7.8	44.9	closed	10.4
1917	1.4	23.4	closed	-11.0	13.4	11.7	35.6	-14.4	15.6	22.7	14.2	closed	14.4
1918	4.2	0.6	-53.3	23.2	12.0	20.7	-4.6	15.3	13.5	15.6	-10.2	-14.2	-5.8
1919	22.8	44.7	-64.9	44.4	39.7	26.7	31.0	47.8	-26.1	8.3	71.1	-57.8	1.3
1920	-17.4	-17.7	27.3	-8.1	-20.5	-18.9	-29.1	-13.1	-33.2	-17.3	-24.1	-21.5	-24.5
1921	-5.8	-25.3	-17.5	-3.4	-6.5	-6.1	-1.9	-11.5	12.9	0.8	0.0	11.4	-6.9
1922	16.2	0.2	-61.4	16.0	44.4	30.6	15.9	17.6	0.5	30.0	-14.6	-38.5	13.9
1923	17.6	19.5	419.3	15.2	15.2	7.1	-1.6	13.2	3.3	5.8	14.3	170.6	19.4
1924	11.0	11.6	-18.0	6.0	24.7	18.9	4.2	14.0	8.7	9.2	-3.4	-54.8	12.3
1925	10.6	24.4	-36.1	18.8	12.6	9.8	5.6	18.2	-13.3	15.5	23.6	-19.5	9.2
Geometric Mean													
1900-04	5.3	9.8	4.7	5.8	11.4	3.3	2.3	11.4	3.4	0.1	7.5	4.1	8.8
1904-09	5.9	10.7	6.5	8.7	24.5	3.7	9.8	7.0	6.7	12.3	14.1	7.1	6.4
1910-14	-0.4	1.7	0.7	6.4	-6.2	0.2	2.3	-0.4	0.1	4.7	0.9	3.9	3.9
1915-19	11.4	22.0	-59.5	14.3	25.6	16.1	17.3	15.2	2.1	11.9	36.2	-39.8	4.8
1920-24	3.4	-3.8	11.5	4.7	9.1	4.8	-3.7	3.1	-3.2	4.6	-6.5	-8.0	1.4
1900-25	5.2	8.3	-4.8	8.3	12.3	5.6	5.4	7.5	1.1	6.9	10.0	-3.9	5.2
Geometric Mean (DMS)													
1900-04	n.a.	5.4	4.8	5.6	10.3	1.9	7.6	11.2	3.2	12.6	14.8	1.6	7.5
1904-09	n.a.	8.1	6.8	11.3	5.7	3.9	10.0	9.7	6.6	13.5	13.1	6.6	3.1
1910-14	n.a.	3.9	0.3	2.7	-4.0	1.3	1.9	-2.0	3.4	13.2	7.3	-1.5	3.9
1915-19	n.a.	15.0	-27.0	11.3	19.0	14.0	17.8	17.5	0.0	5.6	33.9	-32.5	-0.7
1920-24	n.a.	-14.7	16.5	7.3	4.0	5.9	-7.7	4.3	-3.0	18.6	-15.3	-15.2	2.1
1900-25	n.a.	3.4	-2.6	8.3	7.1	5.5	6.3	8.5	0.6	12.6	10.5	-9.7	3.3
Correlation with DMS													
	n.a.	0.816	0.998	0.745	0.723	0.907	0.621	0.975	0.933	0.033	0.828	0.973	0.870

Table IX: Market Return - Equity Securities (£, interpolated)

Market returns are value weighted. All returns that are unobserved in a period (due to missing prices in that period or the previous period) are inferred.

Missing prices are replaced by a linear interpolation of the two nearest observed prices and returns calculated with the imputed prices.

	World	Amsterdam	Berlin	Canada	Jo'burg	London	Madrid	NewYork	Paris	Sydney	Tokyo	Vienna	Zurich
1900	2.9	6.9	-5.6	4.5	closed	0.3	-3.9	18.8	2.7	-6.8	-1.3	-2.2	6.7
1901	7.5	9.2	-1.4	10.0	closed	7.4	1.2	21.4	-3.0	-3.7	12.3	1.7	3.1
1902	4.1	4.2	6.4	15.2	-6.2	2.8	8.1	6.2	3.4	1.6	18.2	5.4	7.0
1903	-3.4	-1.6	11.6	-11.4	-13.6	-3.5	0.0	-12.2	5.2	2.3	-3.7	7.5	7.8
1904	13.7	14.5	11.3	11.0	16.6	10.3	2.3	25.2	8.5	5.4	12.1	8.2	14.0
1905	10.7	12.3	9.0	13.6	-15.8	9.7	6.7	18.0	6.5	27.9	42.8	8.6	5.1
1906	2.6	7.1	5.9	1.5	-8.3	2.3	25.8	-3.7	6.0	18.5	61.0	9.6	4.1
1907	-10.2	-7.5	-4.3	-9.6	-13.5	-9.1	1.0	-19.7	1.3	-9.7	-44.9	-0.4	-4.7
1908	14.1	16.8	6.3	24.5	37.7	8.3	9.3	33.7	6.7	12.3	8.9	3.4	7.8
1909	12.7	10.9	15.4	14.0	20.4	10.2	10.1	13.8	12.8	12.9	23.3	14.6	12.2
1910	3.2	3.6	6.3	7.4	-4.7	4.7	2.1	-1.8	3.6	2.9	10.0	11.7	6.0
1911	3.1	5.7	5.2	11.1	-16.1	1.5	5.4	2.0	8.5	4.5	15.4	5.9	2.2
1912	5.0	5.2	3.2	13.7	1.8	5.2	4.5	3.2	10.2	8.8	4.9	1.6	1.2
1913	-1.2	-0.9	3.2	-6.1	-11.5	-1.9	-0.7	-2.6	-3.9	8.6	8.1	4.6	2.6
1914	-4.5	-1.0	-8.1	-4.2	-2.8	-4.6	-4.0	-2.3	-13.0	0.2	3.2	-3.9	3.2
1915	10.1	17.0	closed	13.7	8.5	5.9	11.5	30.0	-11.4	4.1	67.4	closed	closed
1916	7.8	11.4	closed	4.4	10.1	8.8	19.5	5.5	16.7	5.9	39.8	closed	8.3
1917	4.1	14.9	closed	-7.9	5.6	10.8	34.4	-13.4	11.9	18.6	7.6	closed	11.3
1918	5.2	0.4	-49.4	16.8	11.5	17.4	-3.3	14.7	12.6	12.6	-3.5	-11.9	-5.8
1919	18.3	30.2	-62.0	35.9	27.3	22.8	21.6	43.7	-26.7	4.1	87.9	-55.4	-0.8
1920	-21.6	-14.6	19.6	-10.4	-22.8	-27.5	-29.9	-13.0	-32.5	-6.9	-42.4	-20.3	-24.0
1921	-7.3	-19.7	-18.9	-4.8	-4.7	-7.3	-6.0	-7.8	9.3	-5.8	-5.0	5.2	-6.6
1922	13.4	-3.1	-61.1	18.6	29.4	21.2	10.9	17.8	1.0	-1.6	-13.7	-38.9	13.0
1923	16.4	14.0	410.3	14.2	12.0	7.8	-2.3	13.2	1.1	9.6	9.7	127.0	16.7
1924	11.0	9.0	-17.4	3.0	23.9	16.3	5.8	15.2	6.1	10.7	-5.3	-52.7	11.7
1925	9.4	19.5	-34.5	17.9	17.3	7.6	4.7	18.2	-14.2	16.6	26.0	-18.6	9.2
Geometric Mean													
1900-04	4.8	6.5	4.2	5.5	-1.9	3.3	1.5	11.0	3.3	-0.4	7.2	4.1	7.7
1904-09	5.6	7.6	6.3	8.2	2.0	4.0	10.3	6.8	6.6	11.7	11.2	7.0	4.7
1910-14	1.0	2.5	1.8	4.1	-6.9	0.9	1.4	-0.3	0.7	5.0	8.2	3.9	3.0
1915-19	9.0	14.4	-56.2	11.6	12.4	13.0	16.1	14.4	-0.9	8.9	35.5	-37.3	3.0
1920-24	1.3	-3.8	9.7	3.5	5.7	0.4	-5.5	4.3	-4.4	0.9	-13.3	-11.3	0.9
1900-25	4.5	5.8	-4.3	6.9	3.0	4.4	4.5	7.5	0.4	5.5	9.3	-4.3	4.1
Geometric Mean (DMS)													
1900-04	n.a.	5.4	4.8	5.6	10.3	1.9	7.6	11.2	3.2	12.6	14.8	1.6	7.5
1904-09	n.a.	8.1	6.8	11.3	5.7	3.9	10.0	9.7	6.6	13.5	13.1	6.6	3.1
1910-14	n.a.	3.9	0.3	2.7	-4.0	1.3	1.9	-2.0	3.4	13.2	7.3	-1.5	3.9
1915-19	n.a.	15.0	-27.0	11.3	19.0	14.0	17.8	17.5	0.0	5.6	33.9	-32.5	-0.7
1920-24	n.a.	-14.7	16.5	7.3	4.0	5.9	-7.7	4.3	-3.0	18.6	-15.3	-15.2	2.1
1900-25	n.a.	3.4	-2.6	8.3	7.1	5.5	6.3	8.5	0.6	12.6	10.5	-9.7	3.3
Correlation with DMS													
	n.a.	0.858	0.999	0.806	0.927	0.882	0.645	0.978	0.947	-0.002	0.861	0.954	0.890

Table X: Industrial Composition

Market industrial composition by value. Industry share is calculated as the market capitalization of all securities in that industry divided by the total market capitalization. The industries are Finance (banks and other financial firms), Manufacturing (textiles, food, breweries, oil and rubber, engineering, chemicals, paper, and miscellaneous), Transport (railways, tramways, and shipping), Resources (precious metals mining, other mining, and lumber, fishing and farming), Utilities (gas, water, electricity and lighting, phone and telegraph) and Services.

		Finance	Manufacturing	Transport	Resources	Utilities	Services
Amsterdam	1900	51.9	0.9	34.0	12.5	0.0	0.7
	1914	25.9	7.9	46.2	11.6	5.2	3.3
	1925	16.4	20.6	32.4	17.9	10.1	2.7
Berlin	1900	31.8	21.9	23.5	17.7	5.0	0.1
	1914	33.2	31.9	13.8	13.9	6.8	0.3
	1925	15.6	49.5	7.9	18.4	7.7	0.9
Canada	1900	52.1	9.4	21.2	4.4	13.0	0.0
	1914	30.2	19.2	33.2	1.0	16.5	0.0
	1925	25.3	34.6	14.5	1.2	24.1	0.2
Jo'burg	1900	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	1914	21.6	1.9	0.0	76.5	0.0	0.0
	1925	21.6	3.4	0.0	74.6	0.0	0.4
London	1900	16.5	9.6	51.2	15.1	5.9	1.7
	1914	16.4	14.7	46.0	13.8	7.8	1.3
	1925	16.9	36.8	23.7	10.4	8.4	3.8
Madrid	1900	67.7	20.9	10.8	0.0	0.7	0.0
	1914	54.9	20.0	22.9	0.6	1.4	0.2
	1925	41.5	18.7	15.7	3.1	20.4	0.6
New York	1900	8.9	21.0	59.9	2.2	7.2	1.0
	1914	6.5	28.8	47.1	6.3	10.7	0.6
	1925	3.9	61.9	17.1	5.7	7.0	4.5
Paris	1900	23.9	6.3	47.3	16.6	5.6	0.5
	1914	32.4	6.0	36.9	21.8	2.6	0.3
	1925	25.8	19.4	30.4	15.6	7.8	1.1
Sydney	1900	29.0	10.3	3.9	49.5	5.1	2.3
	1914	38.5	18.1	9.8	23.1	3.7	6.8
	1925	40.4	27.5	5.5	15.8	2.4	8.4
Tokyo	1900	7.8	4.2	85.3	0.0	1.8	0.9
	1914	8.1	33.6	41.5	1.0	15.0	0.7
	1925	6.0	54.1	16.6	2.5	20.1	0.7
Vienna	1900	30.4	20.3	40.7	4.7	2.5	1.4
	1914	41.7	26.4	19.9	8.6	2.3	1.2
	1925	28.5	45.9	8.4	12.3	3.5	1.4
Zurich	1900	50.1	16.0	33.4	0.0	0.2	0.3
	1914	61.5	26.1	7.8	0.1	3.9	0.6
	1925	63.9	25.3	3.5	0.4	6.4	0.6
World	1900	20.6	12.6	47.0	13.0	5.7	1.1
	1914	21.3	20.1	37.2	13.0	7.5	1.0
	1925	13.3	45.3	19.8	9.8	8.2	3.6

Table XI: Domestic and Foreign Listings

Bonds (Table I) and equities (Table II) are separated into domestic and foreign based on the issuing government (bonds) or the principal location of the firm's activities (equities).

		Bonds		Stocks	
		Domestic	Foreign	Domestic	Foreign
Amsterdam	1900	2	74	117	49
	1914	3	168	342	155
	1925	25	150	456	125
Berlin	1900	7	50	491	19
	1914	19	93	911	34
	1925	15	47	1037	13
Canada	1900	0	0	94	1
	1914	0	0	200	10
	1925	12	0	223	11
Jo'burg	1900	n.a.	n.a.	n.a.	n.a.
	1914	0	0	130	0
	1925	3	0	111	0
London	1900	6	262	773	519
	1914	7	232	626	619
	1925	31	479	1137	1244
Madrid	1900	3	3	6	0
	1914	5	1	40	2
	1925	10	2	56	2
New York	1900	7	0	232	3
	1914	4	14	275	6
	1925	13	70	524	24
Paris	1900	3	39	135	24
	1914	2	34	125	21
	1925	12	86	191	52
Sydney	1900	5	0	140	1
	1914	9	0	209	7
	1925	17	0	183	22
Tokyo	1900	2	0	30	0
	1914	5	0	78	2
	1925	2	0	87	4
Vienna	1900	29	2	173	1
	1914	32	8	260	7
	1925	27	2	320	24
Zurich	1900	2	4	65	9
	1914	10	31	88	32
	1925	24	16	84	31
World	1900	140	360	2256	626
	1914	264	413	3284	895
	1925	341	702	4409	1552

Figure 1: Exchange Rates (£ per unit of foreign currency, Jan 1900 = 100)

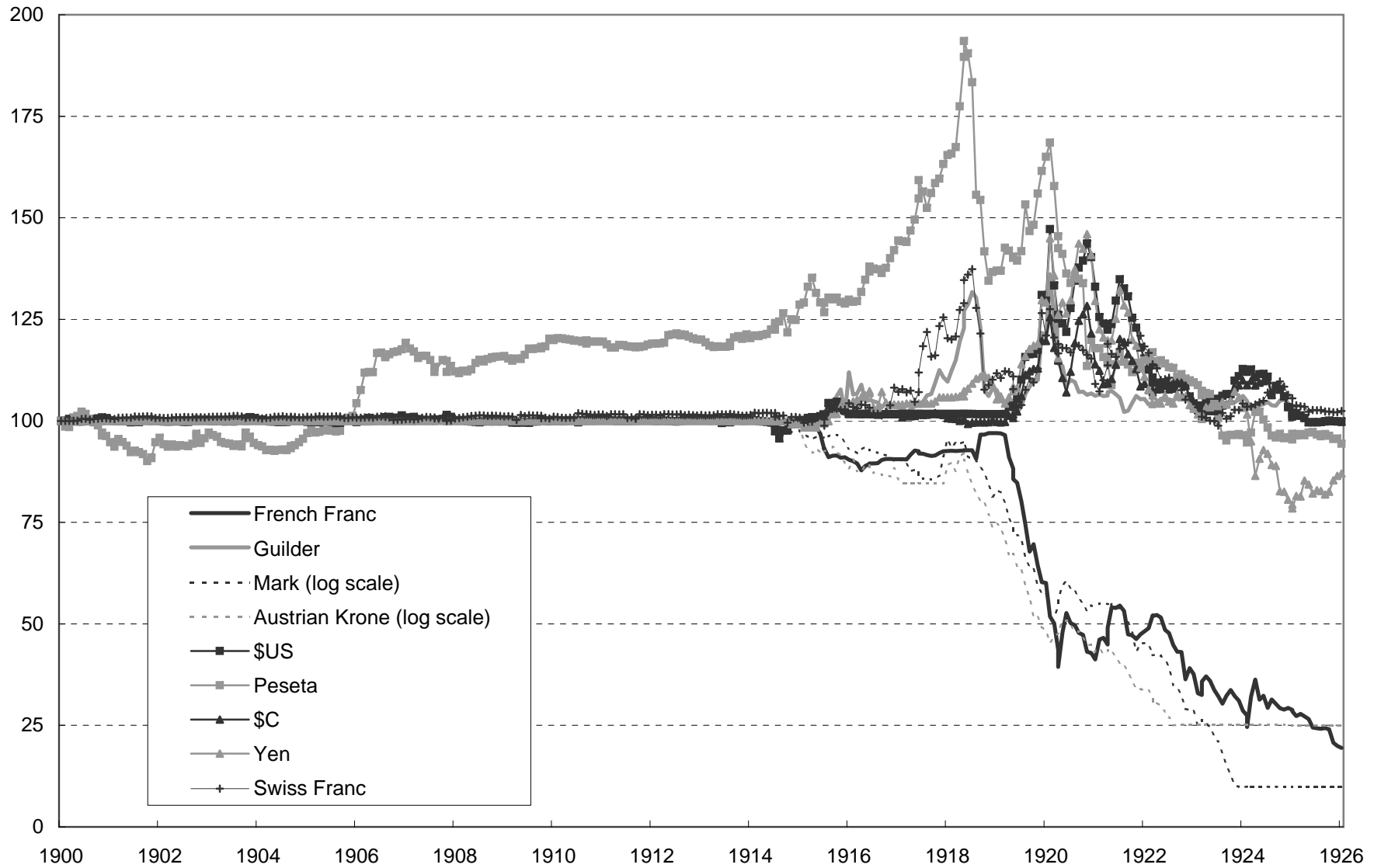


Figure 2: Market Indices of Government Bonds (£, interpolated, Jan 1917=100)

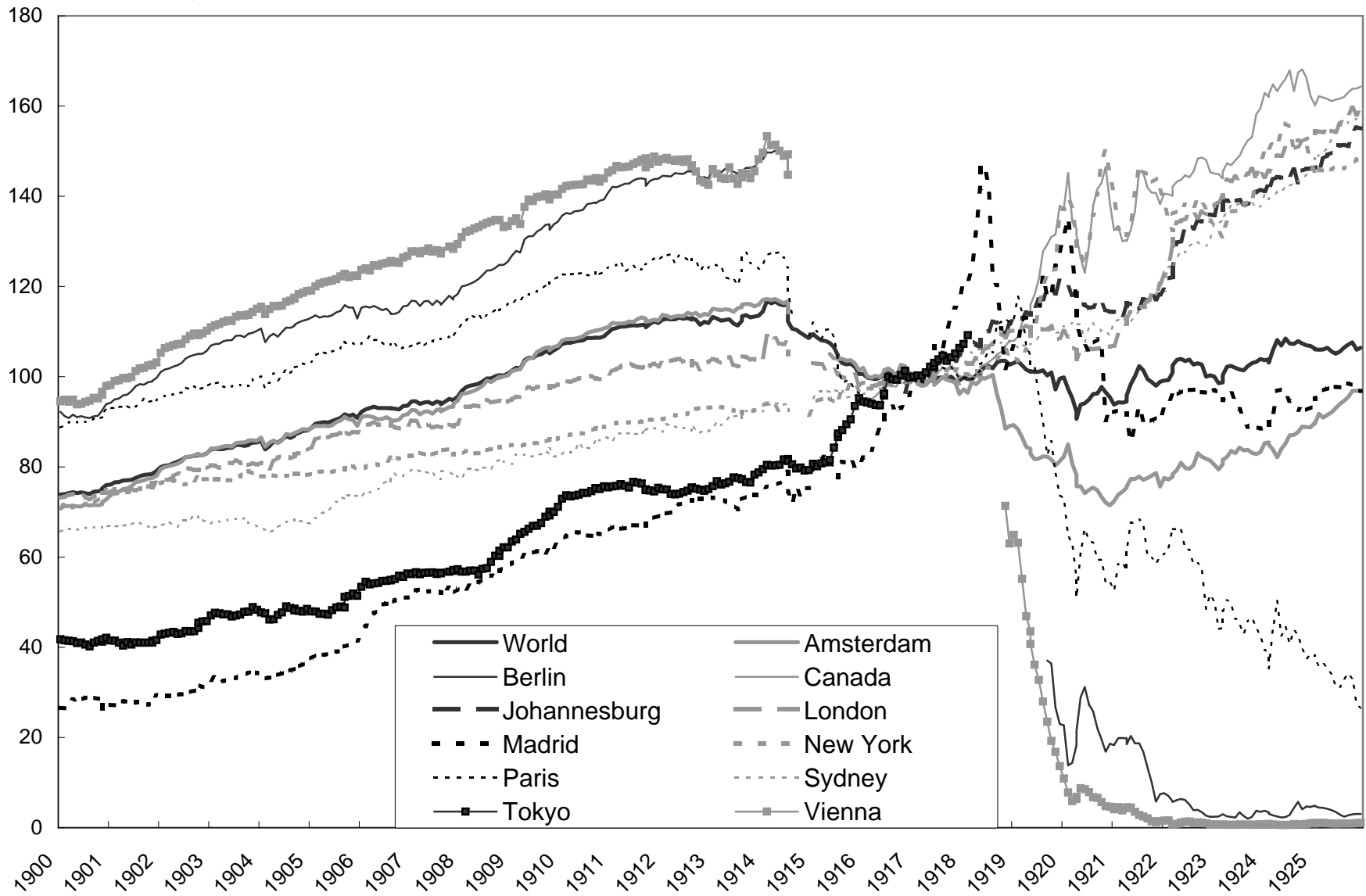


Figure 3: Market Indices of Equity Securities (£, interpolated, Jan 1917=100)

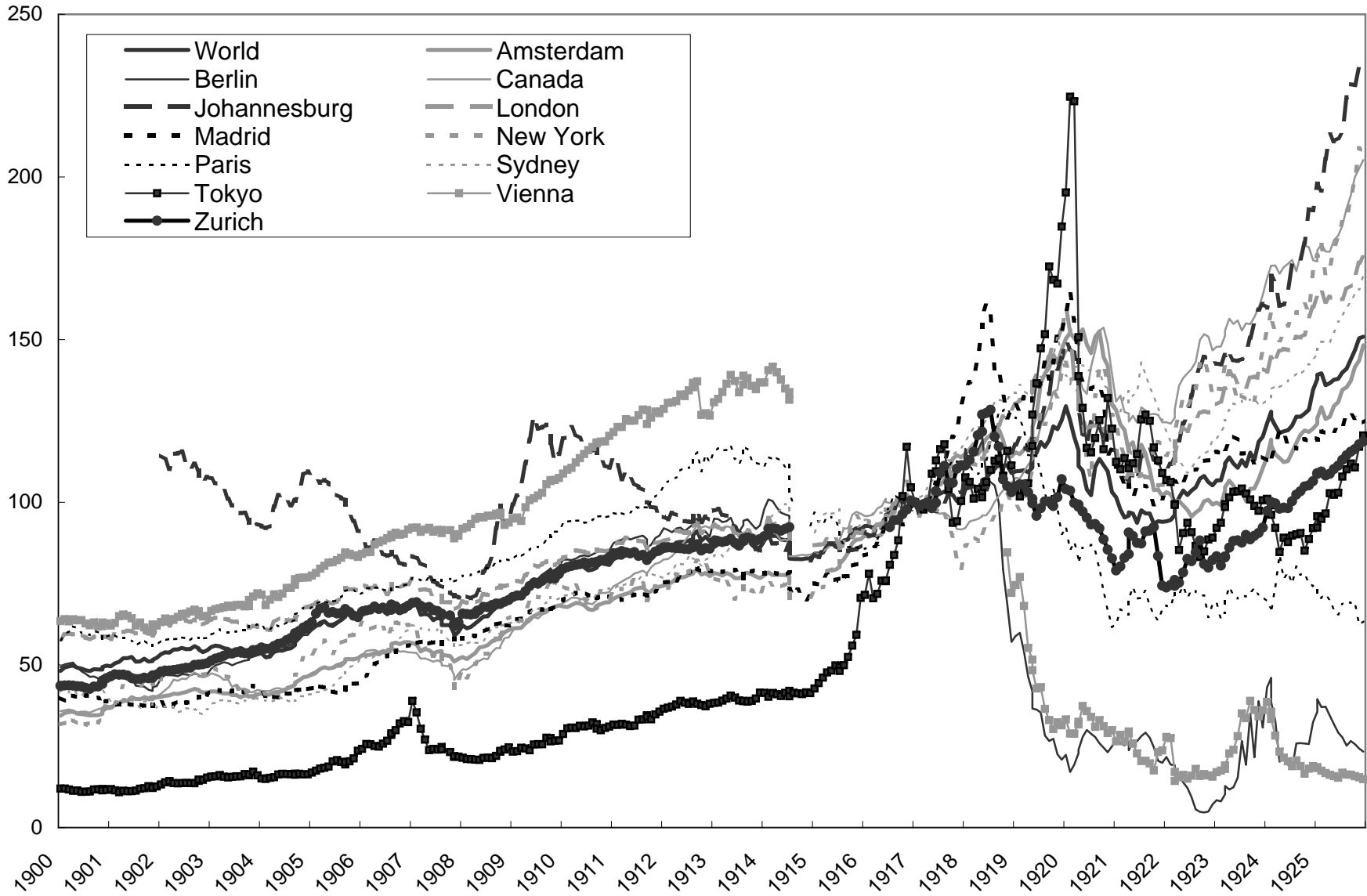


Figure 4: World GDP Growth and World Equity Returns (missing at random)

