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Peter Nyberg – Mika Vaihekoski

Descriptive analysis of the Finnish stock market: Part II



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DESCRIPTIVE ANALYSIS OF THE FINNISH STOCK MARKET: PART II

Peter Nyberg – Mika Vaihekoski*

Comments welcome.

February 18, 2014

Abstract

This paper continues the data collection procedure and analysis set forth in Nyberg and Vaihekoski (2009). A number of new time series that are commonly used in finance literature are collected, created, and analyzed for the first time. These series include, among others, monthly dividend yields and market capitalization values. The series are also compared with GDP to evaluate the overall role of the stock market in the Finnish economy. The value-weighted average dividend yield from 1912 to 1988 is 4.98%. The average stock market capitalization to GDP ratio is found to be 15.14%.

JEL-classification: G10, G11, N24

Keywords: Stock market, financial history, dividend yield, capitalization values, trading turnover, Finland, Helsinki Stock Exchange, Nasdaq OMX

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1 INTRODUCTION

There is a growing interest in the historical development of financial markets and their role in the economy.¹ In addition to analyzing stock market returns and equity premium, research on the history of stock markets has used quantities such as monthly trading volumes, market capitalization values, and dividend yield series. Trading volumes and the market value of listed stocks can be used to quantify the importance and role of the stock market in the economy. To this end, one commonly used variable in empirical studies is the overall stock market capitalization to GDP ratio (c.f., e.g., Brown, Martinsson, and Petersen, 2013). In addition, dividend yield has been found useful for describing and forecasting time-varying risk premiums on the stock market (for recent evidence, see, e.g., Cochrane, 2008). Dividend yield has also been used to test for the existence of speculative bubbles in the market (see, e.g., Koustas and Serletis, 2005; in Finland, see Taipalus, 2006).

This paper aims to facilitate future long-term-oriented research on the Finnish stock market and to explore the market's role in the economy. In our earlier work (Nyberg and Vaihekoski, 2009 and 2010), we reviewed the early history of the Helsinki Stock Exchange and collected past stock market prices, dividends, equity capital values, nominal share values, and information on issues and stock splits for October 1912 to February 1970. Based on the collected data, we created an all-share value-weighted total return stock market index for Finland that, when combined with available similar index series for the 1970s to the present day, covered the entire history of the Finnish stock market. In this paper, we continue the data collection process and the analysis of the history of the Finnish stock market. Our main focus is the collection of a number of new time series that allows us to create, for the first time, a monthly dividend yield series for the Finnish stock market, together with monthly market capitalization data and several other series that are commonly used in finance literature.

Our original database covered the early history of the Helsinki Stock Exchange, from 1912 to 1969. In this paper, we augment our database from 1970 to the end of 1988, after which time most of the series are available from other sources. Once we have constructed our data series, we provide a descriptive analysis of how the series have developed over time. In addition, we review the

¹ See, e.g., Dimson, Marsh, and Staunton (2002, 2008), Annaert, Buelens, and De Ceuster (2012); in Nordic countries, see, e.g. Andersen (2011), Graflund (2002), Nielsen and Risager (2001), Nyberg and Vaihekoski (2014), and Waldenström (2007).

institutional features and development of in the Finnish stock market, particularly in the 1970s and 1980s. We also provide a review of the relevant Finnish literature on the development of the local stock market. Finally, we make our data available to other researchers.

The remainder of the paper is as follows: Section 2 provides a short review of the history of the stock market in Finland during the 1970s and 1980s. Section 3 reviews the data collection procedure and the time series construction process. Section 4 shows the results from the descriptive analysis of the data. Section 5 concludes and offers suggestions for future research.

2 REVIEW OF THE FINNISH STOCK MARKET IN THE 1970S AND 1980S

Nyberg and Vaihekoski (2011) concentrated on reviewing the early history of the Helsinki Stock Exchange (HSE), from its establishment on October 7, 1912, to the end of their sample period, 1969. They also reviewed the more contemporary history of the HSE. Here, we concentrate on the changes that took place in the stock exchange in the 1970s and 1980s, and we also describe the institutional framework and overall investment environment during these decades.

At the beginning of the 1970s, the Helsinki Stock Exchange had already established its role in the economy. For example, Kock (1975) notes that publicly listed companies accounted for approximately 40% of the total equity capital of all companies in Finland (excluding housing co-operatives). Nevertheless, in many respects, the Finnish stock market was still quite underdeveloped. However, market development started to gain speed in the 1970s, when a couple of major changes occurred. First, companies started to raise increasingly more capital from the stock market by issuing new stock. This was in part due to the removal of the stamp duty on bonus issues (6%) and cash issues (2%) in the beginning of 1969.

Second, companies started to issue so-called common class B shares, or preference shares, as they are typically called in the Finnish literature, in increasing numbers.² Preference shares typically had only one vote, compared with 10 or 20 votes attached to ordinary shares. Thus, preference shares

² Class B or preference shares differ from preferred shares in the USA because of the voting power attached to them (c.f., e.g., Broussard and Vaihekoski, 2012). Note that the law did not limit the existence of different classes of shares, and some companies had two different series listed, even during the early years of the HSE.

basically acted as a source of new equity capital for a firm, but kept ownership in the hands of ordinary shareholders. To attract investors, companies often promised preferential dividend rights to preference shares, up to a certain level. Ultimately, these preference shares were also listed on the stock exchange, often with the moniker “E” (for *etu*, preference), “B” or “II” to distinguish them from “K” (*kanta* in Finnish, *stamaktier* in Swedish, ordinary shares), “A”, or “I”. A small number of companies even had their “C” series listed, whereas other companies had only one of their multiple series listed (often the preference series).³

A number of minor changes also took place. Beginning in March 1970, the stock exchange combined its A and B lists into one list with an industry class categorization. The A and B lists had been established in 1951 to separate more (A list) and less (B list) frequently traded stocks. In 1968, a new law was approved that basically ended the issuance of index linked government bonds. Banks also abandoned similar structures for bank accounts. These bonds and bank accounts had been very profitable and thus very popular among investors. As they were no longer available, a lot of money was transferred to the stock market resulting a major surge in the prices. Tax legislation was also changed multiple times in the 1970s, and the changes typically decreased the unfavorable tax treatment of stock investments. This led to increased public interest in stock market investment.

Companies’ financial reporting also started to improve slowly in the 1970s. Helsingin Sanomat began a yearly competition for companies’ annual reports (c.f., Lindström, 2013). The quality of reporting improved considerably after 1974, when legislation was changed and companies were required to provide more detailed financial statements.⁴

As a result of the public demand for more information about listed companies, a number of stock-investment-oriented publications started to appear. In 1972, Kock started to publish annual books

³ An example of a company with several listed series of shares is the paper industry company Kaukas, which had three different listed series (A, B, and C). A shares had one vote, whereas B and C had one vote for every one hundred shares. The C series had the first right to dividends, up to 8%. If the dividend was less than 8% during any year, C shares even had a retroactive right to dividends before A and B shares. If the dividend was greater than 8% in any year, the dividend for C shares was 1% lower than the dividend for A and B shares, but not less than 8%.

⁴ Lindström (2013) notes that the quality and quantity of information provided by companies improved considerably after the change. He notes that in many cases, the quantity of information provided by the companies prior to 1974 was only a few pages.

aimed at investors that contained information about Finnish listed companies.⁵ These books are a true treasure trove of information on anything concerning these companies, including, e.g., their financial accounts, ownership structure, and history, as well as their stock market performance. The books also provide information about the overall development of the stock market and, at times, the bond markets as well. Commercial banks also started to publish books that contained stock market information on listed companies.⁶ In addition, newspapers started to show an increased interest in the stock market. For example, Finland's leading newspaper, Helsingin Sanomat (from May 1970), and Talouselämä magazine (from July 1973) started to calculate their own stock market indices (Kock, 1975). In 1977, KOP Bank also began to calculate its own stock market index, and SYP Bank renewed its old index, which had been available since 1926 (c.f., Nyberg and Vaihekoski, 2010).

During the 1980s, the stock market in Finland took several major steps in its development as a number of changes took place in the Finnish stock market and economy. First, there was a gradual abolishment of restrictions on the movement of capital to and from Finland. In the first phase, foreign investors started to show an increased interest in Finnish shares. Thus, a law dating back to 1939 that limited the amount of equity capital that foreigners could own started to become more relevant in practice.⁷ Stocks owned by foreigners were stamped or printed with an amendment disclosing foreign ownership. Stocks that were available to all investors became known as unrestricted or 'free' shares, and those that were restricted to Finnish investors became known as restricted shares ('sidottu' in Finnish). As a result of higher foreign demand, the stock exchange decided to quote these unrestricted shares separately from the restricted shares starting on January 2, 1984. These stock series were quoted with moniker "v" for vapaa (free).

Second, Finnish companies decided to capitalize on the international interest displayed in Nordic securities and issue stock directly to international investors. Some companies also decided to dual

⁵ Kock also published a monthly Pörssitieto-bulletin from 1975 until 1979. A more detailed description of the history behind the publications can be found in Lindström (2013).

⁶ For example Kock (1981) lists Bensow, Gyllenberg, HOP, KOP, OKO, PSP, SKOP, and SYP as banks that provide an annual publication on stock market for their clients. KOP and SYP are also mentioned separately as providers of educational material to the general public. Lindström (2013) notes that Unitas (later SYP) had started to publish an annual publication that covered the HSE as early as from the beginning of the 1950s.

⁷ The degree of foreign ownership in Finnish companies was restricted to 20% of total equity capital, but initially the law did not apply to banks and insurance companies. From 1979 forward, the ownership of banks was restricted to Finnish investors. In April 1987, the maximum unrestricted equity capital for Finnish firms was increased to 40%, with the condition that the voting power attached to unrestricted shares still could not exceed 20%.

list abroad (e.g., KONE dual listed B unrestricted shares on the Stockholm Stock Exchange starting on September 13, 1982), and some companies even listed shares on multiple stock exchanges (e.g., Nokia was ultimately listed in Stockholm from 1983 forward, London 1987-, Frankfurt 1988-, Paris 1988-, and New York 1994-). Pursiainen (1998) provides a complete list of these companies.

Third, some Swedish companies decided to dual list on the HSE. These companies were AGA Ab (from 1985 forward), Asea Ab (1986), Investment Beijer Ab (1986), and Volvo Ab (1988). These companies issued a fixed number of their B class shares to the Finnish market. In each of these cases, dual listing in Finland was short-lived and lasted only a few years. This was partly due to changes in legislation because Finnish investors were able to invest abroad freely starting in 1990. At the beginning of 1993, all restrictions on foreign ownership of Finnish firms were removed; thus, the final step in the equity market's liberalization process was taken.

Fourth, market capitalization and trading turnover developed favorably during the 1970s and 1980s. Brokers at the HSE started to provide weekly stock quotes for companies not officially listed on the exchange on a so-called "Brokers' List" (starting on May 21, 1981) and "OTC List" (from the end of 1984 forward). Companies included on the Brokers' List varied considerably at first but, starting in 1983, companies were accepted on the List with a separate decision by the brokers. The OTC List initially had an inferior reputation compared with the Brokers' List and comprised three separate categories, but these categories were combined in 1985 (Kock, 2012). Inclusion on these lists did not require permission from the company. In addition, stock series with redemption clauses were traded on these lists, contrary to the HSE main list (Main List).

Approximately 90 companies were listed on the Brokers' List. Some companies were quoted first on the Brokers' List, but later applied for official listing on the HSE. There were also companies that decided to end their official listings and become listed on the Brokers' List. Trading on these semiofficial lists was transferred to the HSE's electronic trading system in the 1990s. In 1996, both lists were made an official responsibility of the Exchange. The Exchange combined all companies on the Brokers' List and OTC List into a new list, the I List. Ultimately, both lists were merged into the Main List.

Fifth, from 1980 to 1990, there was an increase in the number of listed companies on the main exchange, and trading volume doubled several years in a row in the early 1980s. As wealth started to accumulate, investing in stocks became even more popular. Banks started to offer information to all of their clients (e.g., KOP published 'Arvopaperi uutiset' six times per year starting in 1980). The Finnish Association of Stock Investors (Osakesäästäjien keskusliitto, established in 1980) also started to publish its own magazine focused on stock investments, 'Arvopaperi' (engl. Security/Asset). Another magazine, 'Pörssilehti' (engl. Stock Exchange magazine), was published for the first time in 1987 by a commercial publisher.

Sixth, there were major legislative changes. A new corporate law (Companies Act) came into force in 1980. It included several changes that were relevant to investors, and, in general, shareholder rights were improved. For example, the maximum difference in voting rights between stock series was limited to 1:20. The law also mandated how the companies had to treat minority shareholders and how they had to provide financial information to all investors in an equivalent fashion (c.f., Rainio, 2006). Another major change took place a couple of years later, in August 1989, when the Securities Markets Act (495/1989) took effect. The aim was to improve the efficiency of the stock market and to mandate equal treatment of all investors. In addition, taxation generally became slightly favorable to stock investments, although there were minor exceptions (e.g., the stamp duty on all trades was increased from 1 to 1.4% of the value of the transaction in 1985, unless both parties were foreigners, in which case the stamp duty had been abolished previously, in 1984).

New financial instruments were also increasingly issued to the market and traded on the HSE. For example, the law on mutual funds (Act on Common Funds) was finally passed in 1987, which led to the introduction of open-ended mutual funds to Finnish investors. Finally, there were some major technological advances that had a considerable influence on trading, settlement and depository systems. Fully automatized electronic trading started in 1989, which ultimately led to lower trading costs. In Kock (1987), one can even see advertisements for financial software (programs for online-connection terminals and for portfolio management) that were aimed at common investors.

3 DATA

To construct our new series, we have to augment our original monthly and yearly stock database, which covered the years from 1912 to 1969, with data from 1970 forward. Our initial search for the available time series using existing databases yielded disheartening results. In some cases, we found that the databases were in risk of disappearing, due to changes in programs used to access databases and in the media used to store them. Our main interest is in the time period from the establishment of the Helsinki Stock Exchange, in October 1912, to the end of 1988 because most of the data series analyzed here are available for the period beginning in March 1988 to the present, e.g., from Datastream. Thus, our sample period (1912-1988) covers more than 76 years, or 915 months, of data. During the process, we also updated our database for the pre-1970 period, if we came across new or more accurate information relative to our previously collected data.

3.1 Listed securities and their prices

Our data collection starts with a review of all of the stocks listed on the Helsinki Stock Exchange after 1970. Following Nyberg and Vaihekoski (2010), we collect and photograph month-end stock market quotation lists from daily newspapers. In most cases, we use the leading Finnish language daily business newspaper, *Kauppalehti*, but in some cases we also use the leading general interest daily newspaper, *Helsingin Sanomat*. For each month we aimed to collect price quotations from the very last trading day of the month. These quotations were typically printed in the first newspaper published in the following month because. Due to weekdays, holidays and stock exchange closings, the last trading day was often not the last calendar day of the month.⁸ We also updated our database for the pre-1970 period. In other words, we were able find stock market information for certain days that were closer to the month-end than the information we had used in Nyberg and Vaihekoski (2010). The list of the month-end dates used is in the Internet Appendix to this paper (available from the authors upon request).

Using the information from the stock exchange price list we supplemented our earlier list of traded securities with data from 1970 to the end of 1982. For each security, we noted the month-end when it made its first appearance on the stock exchange, as well as the first month-end when it

⁸ The one notable exception is November 1980, when the journalist union declared a strike, and the last newspaper published in November is was on the thirteenth of the month.

disappeared from the stock exchange. In addition, we updated information on delisting dates for securities that were on our earlier list, if they were delisted before the end of 1982. Ultimately, we created a list of all securities quoted on the stock exchange (stocks, bonds, debentures, newly issued stocks, and subscription rights) from 1912 to the end of 1982. We then supplemented this list with stocks that were listed on the Main List after 1982, but before 1989, using data from the Hanken School of Economic's database. Finally, we checked the dates of listings and delistings against the lists kept by Kock and Kauppalehti on their websites. Our list is included in the Internet Appendix.⁹

In the end, we had information on 1162 securities that were listed on the Helsinki Stock Exchange at some point in time between 1912 and 1988. Following earlier literature, we decided to exclude companies on the unofficial Brokers' List and OTC List from our analysis because their price and other financial information is often unavailable (e.g., Kock covers only some of the companies on these lists in his books).¹⁰ In addition, the companies traded on these lists changed, sometimes quite rapidly, especially during the first couple of years. Moreover, the value of trading on these lists was minor when compared with the Main List. Note also that bonds listed on the HSE in the 1920s were not included because they were quoted on a separate list.

Out of the 1162 securities, only a fraction was stocks in which we were interested, for a couple of reasons. First, a significant number of stocks that were issued in secondary seasoned equity offerings were initially listed separately because they typically did not have same dividend rights as the old shares. In addition, the quotation list included a large number of bonds, debentures, and subscription rights (coupons) that were traded separately after an issue. In the end, the total number of companies whose stocks were traded in Helsinki during the sample period was 205. This number is somewhat of an approximation because it was sometimes a judgment call whether a company that changed its name could be considered a new company. Similarly, if two companies merged into one and continued under the name of either of the merging companies, it was not always clear whether the new entity formed a new company

⁹ The Internet Appendix shows the names of the listed series as shown in the newspaper for the first time (in Swedish if the information was taken from Mercator newspaper). We also collected information on subsequent names, but this list is not provided here due to space limitations.

¹⁰ As a minor detail, we discovered during the process that price information on the OTC List and the Brokers' List was available in files that were created by the Brokers' Association using a Pascal program created by Professor Seppo Pynnönen (see Pynnönen, 1991). Unfortunately, these files were of a proprietary format and it is almost impossible to open the files without reverse engineering the file format.

Once we had the information for the first and the last months that a stock was listed, we continued updating our stock price database. Because Nyberg and Vaihekoski (2010) collected stock prices from October 1912 to February 1970, we supplemented the database by collecting stock prices from newspapers from March 1970 to February 1982. As in our previous work, we decided to use the bid price offers. From 1982 forward, we used the bid prices from the database created by the Hanken School of Economics. This database includes bid and ask prices and the number of stocks traded from 1982 forward on a daily basis.¹¹ In addition, the database includes average trade prices from 1982 to 1989, and last closing prices are available from 1989 forward. For our analysis, we selected bid prices throughout the sample period, from 1912 to 1988. If an observation was missing, we used the last available price for the month, and, if that was not available, we used the price from previous month. The information was stored in a price matrix, \mathbf{P} . This price matrix was filtered against the listing and delisting dates. The price matrix acts the main component in the empirical analysis (e.g., as a condition of whether a company is included in the analysis).

3.2 Book equity and nominal values

Once we had created the database on stock prices, we collected the stocks' nominal values and the corresponding equity capital values. The nominal values allowed us to calculate the number of shares for any stock series, given the total book value of the equity for that series. The former is always the same in Finland for all of the stock series issued by a particular company, but the latter is not. In other words, when a company had more than one stock series, it was fairly typical for one of the series to represent more than half of the equity capital, with the rest of the equity capital being distributed among all other series.

As in Nyberg and Vaihekoski (2010), we collected both time series on an annual basis. Thus, all issues (bonus, cash, to public/clients, and directed) are reflected in the amount of equity (and number of shares) from the end of the year. Similarly, all splits (including reverse splits) are

¹¹ During the data collection process we also looked at other information sources. Even though it is evident that stock prices were collected from 1970 forward in Berglund et al. (1983), for the purpose of constructing the WI-index, we have been unable to find the data. We did discover a file titled "Berglund.zip" that contained total return indices for all stocks listed on the stock exchange from March 1970 forward, and information on prices, trading volumes, and dividends from 1982 forward. Unfortunately, the file did not include the original price observations from 1970 to 1981. As far as we know, the missing price observations were stored on mainframe computer tapes, but the tapes were destroyed before the information was retrieved and stored elsewhere.

reflected in the nominal values, and the number of shares, from the month-end when they took place. As a result, when we calculated dividends and dividend yield, the dividends were adjusted for splits on a monthly basis.¹² Increases in nominal value (and book equity) that were accomplished without the issuance of new stock certificates (typically by stamping the new nominal value on the existing certificates) are reflected in our data from the end of the year. This might produce a slight downward bias on dividend yields, if the increase took place early in the year, before the dividend was paid in April, but it seems that companies typically increased nominal values after the dividend for the prior year was paid.

When collecting information, our main sources were Kock's series of annual books (Pörssitieto) on Finnish listed stocks and HSE's annual reports from 1983 forward (earlier reports did not cover company specific information). In addition, we used Osuuspankki's and KOP's annual publications on publicly listed stocks. The information at the time of listing was also stored for the year-end immediately prior to listing, for technical reasons. Specifically, this allowed us to include stocks in our analysis as soon as they had a stock price available (instead of waiting for the first full year of their listing). As a result, stocks had dividend yields and market values starting at the end of the month in which they were listed.

There were some unique cases that required particular attention. First, we had to make some special adjustments for the four Swedish companies (ASEA, AGA, Investment Beijer, and Volvo). The nominal value of their shares was converted into FIM. In practice, we used values from OKO Bank's publication from the year the company in question was listed. The nominal value was kept the same throughout the sample period. The book equity for each of these companies was the nominal value (in FIM) multiplied by the amount of stock issued by the company to the Finnish market. The second special case was related to stock that companies had redeemed. During the sample period, the law basically prohibited stock buybacks, but it was possible to redeem stock in certain cases. This typically occurred with the aim of annulling the shares. In these cases, we followed the practice adopted by the HSE, and used adjusted book equity for the redeemed stock (c.f., e.g., Kuusinen/Corum).

¹² For example, a dividend of 5% on a nominal value of 100 FIM equals 5 FIM. If the company splits the stock later in the year with, say, a 1:4 ratio, the adjusted dividend when calculating the dividend yield is 1.25 FIM until the next dividend is paid.

As a result of the collection process, we had two $(Y+1) \times N$ yearly matrices: **BE**, a matrix containing the book equity value of each series, and **NV**, a matrix containing the nominal values for each series from 1911 to 1988. Using these matrices, we could create a matrix containing the number of shares available, **NOS**, by dividing the former matrix by the latter using element by element division. All values are at the end of the year. After this, we expanded the last two matrices into monthly matrices, **mNV** and **mNOS**, by taking the Kronecker product between a 12×1 vector of ones and the matrix in question. As a result, the values for December were copied for the following eleven months, i.e., January through November. In practice, we also adjusted the **mNV** matrix for splits. Because the monthly number of shares, **mNOS**, was dependent on the former, it was also adjusted for splits. Therefore, the monthly nominal values and the number of stocks reflect split-adjusted values.

3.3 Dividends and dividend yields

One of our main interests in this paper is the dividend yield series. Prior to this study, to our best knowledge, there is no historic dividend yield time series available for the Finnish stock market that covers the whole history of the HSE. We are aware of only one historic series that covers the latter part of the sample period. It was calculated by Statistics Finland and it is available on a monthly basis from January 1972 to November 2006. The series was also calculated on a quarterly basis from 1966 forward. Annual values are available from 1960 forward (see, e.g., Kock, 1982). The same series is also available from a commercial data vendor, Global Financial Data (see Taipalus, 2006).

The series by Statistics Finland has some issues that we tried to resolve. First, it is not available on a monthly basis for the entire sample period. Second, it is based on monthly price averages. This is always a bit problematic from a researcher's point of view because of the autocorrelation structure introduced into the series due to the averaging of price observations. Third, the weighting structure used to calculate the index is not ideal because weights were kept constant throughout the year (until 1987). From 1988 forward, monthly mid-month market weights were used. Fourth, before 1970, stocks listed on the B list were excluded.

In this paper, we aim to collect an all-share, value-weighted dividend yield series using month-end prices from the HSE from October 1912 forward. Because dividend yields for individual stocks are

available for March 1988 and later, from, e.g., Datastream, we decided to calculate dividend yields for individual stocks from October 1912 to the end of 1988.

First, we augmented our earlier dividend database, which covered the years 1913 to 1969, by collecting cash dividend rates for the year of 1912 and from 1970 to 1988.¹³ Our main sources are HSE's Iron Book, Kock's annual Pörssitieto books, and the annual publications by KOP Bank and OKO Bank. Because all of these books tended to remove delisted companies from the group of companies that were covered, information for the last (partial) year was found primarily in newspapers (Mercator, Kauppalehti, Helsingin Sanomat) or, in some cases, in files recovered from the Hanken School of Economics. Depending on the source, dividends were sometimes given as a dividend rate (%) of the nominal value and sometimes given as the actual cash dividend paid. To preserve the consistency of the database, we always recorded the former and always used the year when the dividend was actually paid, not the financial year from which the dividend was paid because it is relevant for the dividend yield.¹⁴

As usual, there are a few special cases. First, during the early years of the stock exchange, a number of insurance companies' stocks were traded, even though investors had not paid the full nominal value. Investors were required to pay a specified amount of the full nominal value each year until it was fully paid. Because book equity and nominal values reflect the full value, we adjusted dividend yield to match the actual dividend paid, which was based on the paid (in Mercator, 'inbetalt') nominal value (i.e., a 10% dividend rate on paid nominal value was converted to a lower dividend rate of the book equity nominal value). Second, some special dividends were paid during the sample period, and in these cases, the dividend rate was calculated manually (see Nyberg and Vaihekoski, 2010). Third, dividends paid by Korvausosakkeiden hallinnointiyhtiö (Holding Concern Company, HCC) were handled manually due to the major size of both the company and its dividends, as well as the timing of the dividends (always July).¹⁵ Finally, we decided to use the

¹³ We also updated our earlier database, e.g., by using information found in books by Jernström (1931, 1934). In addition, we added dividends for 1911 that were paid in spring 1912 (before the stock exchange was opened) in order to calculate the dividend yields for October 1912 to March 1913.

¹⁴ In practice, one has to be careful when collecting data on dividends and dividend rates. This is because some sources adjust dividends for splits and even for issues, whereas other sources do not.

¹⁵ HCC was set up by law to handle the shares that the government had asked large Finnish companies to issue to the government free of charge, as a sort of tax to cover post-war rebuilding. See Kock's web-site for more information (<http://www.porssitieto.fi/osake/holding.html>). These stocks were issued in 1945 and 1946, and they show up in our matrix of book equity at the end of the year they were issued.

same dividend rates for unrestricted shares because they always had the same dividend rights as restricted shares in the same share class category.¹⁶

In the end, we had a $T \times N$ matrix of dividend rates, **DR**. Following Nyberg and Vaihekoski (2010), we assumed that dividends were always paid in April because information on the exact payout dates is not available for most of the sample period. To calculate the paid cash dividend against the coupon, we had to (element-by-element) multiply the nominal values matrix by the dividend rate matrix. Because the nominal values matrix was given at the end of the year and potentially, a company could have had a split before the dividend was paid, we used the split-adjusted monthly nominal value matrix in calculating the actual cash dividend matrix, **D**.

The actual effective dividend yield is calculated as the sum of dividends paid during the previous twelve months, adjusted for splits, divided by the current month-end stock price. Combining the individual dividend yields and the market capitalization data, we were able to calculate the value-weighted dividend yield for the entire market. For comparison, we also calculated the equally weighted dividend yield series, in which all companies were given the same weight, as well as the book equity-weighted series.¹⁷ During the sample period, stock buybacks were not allowed.

To extend our value-weighted dividend yield series until the end of 2012, we first augmented our data with dividend yields from Statistics Finland (from January 1989 to December 1991). Then, from January 1992 to December 2012, we calculated the market-wide dividend yield by taking a geometric difference between the 12-month return on the value-weighted OMXH total return index (TRIND) and the 12-month return on the corresponding price index (PRIND):

$$DY_t = \frac{\left(\frac{TRIND_t}{TRIND_{t-12}} \right)}{\left(\frac{PRIND_t}{PRIND_{t-12}} \right)} - 1.$$

¹⁶ Minor adjustment was also required for 1963, when the old FIM was replaced with the new one (which was equal to 100 old FIM).

¹⁷ Note that when calculating dividend yield, we did not include newly issued stock series because they typically had rights to only half (or less) of any dividend paid during the first year following the issue. Furthermore, if a company issued a new dual-class stock series before April, the dividend yield during the first year was assumed to be zero, although, in most cases, one knew that it would be equal to the series already listed on the stock exchange, especially if the two series did not differ with respect to their dividend rights. The former produces a slight upward bias to the series, and the latter produces the opposite. Overall, we do not consider this a major issue.

We also used this method to calculate dividend yields using the WI-index and the price index by the HSE, which is available from the beginning of 1987. Unfortunately, this approach proved to be unusable as the dividends yields were found to be negative for certain months as the indices handled the dividends differently.

3.4 Splits and issues

To confirm that we had the correct nominal values for each stock, as well as the correct number of shares, we also collected information on splits from 1970 to 1988, similar to Nyberg and Vaihekoski (2010). Our main sources were, again, the abovementioned books. Overall, we found 43 splits and two reverse splits (Partek and Otava) during this period. We then combined these splits with the information for the pre-1970 period. The Internet Appendix lists the splits that we found from October 1970 to the end of 1988. Because it was not our main interest to calculate returns for the post-1970 period, we did not track issues on a monthly basis.¹⁸ Increases in equity capital due to bonus and cash issues are reflected in the annual, year-end, **BE** matrix. We did, however, update our earlier database on issues for the pre-1970 period.

3.5 Market capitalization data

To calculate value-weighted indices for the market, we need the market capitalization values for stocks. To calculate these series, we use the monthly split-adjusted number of stocks matrix, **mNOS**, and (element by element) multiplied it by the monthly matrix of stock prices, **P**, to obtain the market values for each stock series. The total market capitalization value is the sum of the capitalization values for all stocks listed on the stock exchange at the end of that particular month. This series was also calculated from October 1912 to the end of 1988 because more recent data series are available from many data vendors. Here, we augmented our data series from 1989 to the end of 2009 using data from Bank of Finland and NASDAQ OMX Helsinki.

¹⁸ Interestingly, Lindström (2013) discusses his role in the calculation of the Unitas stock market index during the 1970s and 1980s. He notes, for example, that he had complete and detailed records on paper of all issues done by the Finnish companies. Sadly, he notes that these records have most likely been destroyed, because Unitas Bank has gone through many mergers over the years (it is currently part of Nordea Bank).

3.6 GDP

To study the role of the stock market in the economy, we also collected the Gross Domestic Product series for Finland from 1912 forward, in nominal terms, at market (current) prices. Annual values for GDP are taken from Hjerpe (1989). Quarterly data are also available from the beginning of 1975 from Statistics Finland. One could even use monthly data for part of the sample period using an index from the Bank of Finland, which calculated an unofficial monthly index for GDP using a combination of monthly sub-indices. The Bank published the index values in its Monthly Bulletin publication. However, we decided to use the official annual data for the entire period.

3.7 Stock market index

Because we updated our earlier databases on stock prices, nominal values, book equity, dividends, and issues during the collection process, we also decided to recalculate the stock market index that we introduced in Nyberg and Vaihekoski (2009). The updated index is provided in the Internet Appendix.¹⁹

The index values differ slightly from earlier index values. The first source of the differences is changes in the dividend and book equity matrices. The second source of the differences is updates to the price matrix. These updates were primarily because we were able to find price quotations that occurred closer to the end of the month for a few months by using other newspapers in addition to Mercator. As a result, a few stocks became listed a month earlier than before. Similarly, a few issues were brought back by one month if the price reaction became visible by the end of the prior month.²⁰

The third source of the differences is the fact that we went through the Mercator newspaper for ads and information regarding issues for which we had not previously been able to obtain the necessary information from other sources. As a result, we were able to track down an additional 19

¹⁹ The index covering the whole period from 1912 to the end of 2009 is available from the corresponding author's website.

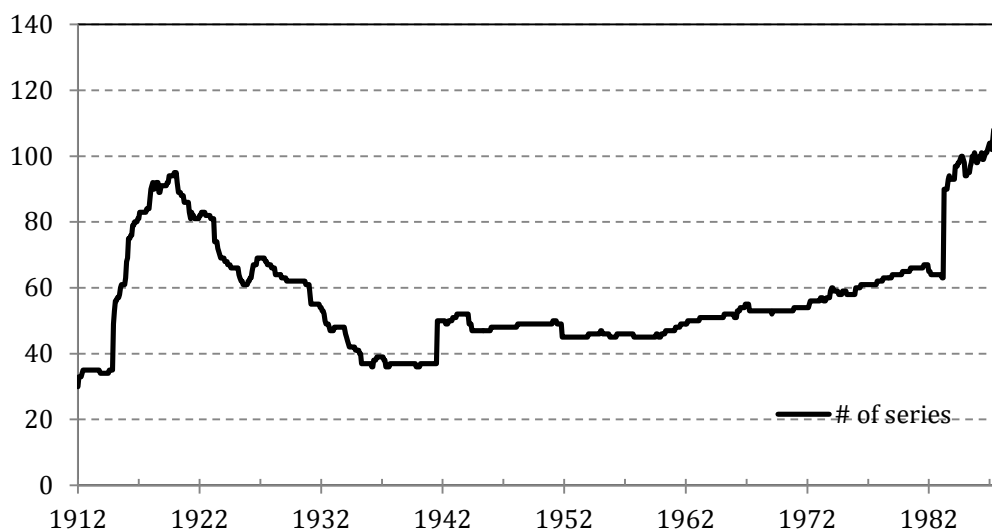
²⁰ This happened if we did not know the exact date that the subscription right was separated from the stock, and, hence, we used the price reaction as a way of pinpointing the date. For example, if the separation happened, on March 31st, the price adjustment was not visible on prices if we did not have access to prices from the very last day of the month. Thus, the adjustment would have taken place in April in our earlier index.

cash issues and six bonus issues for the period from 1912 to March 1970.²¹ In many cases, we were also able to pinpoint the timing of issues more accurately because the newspapers typically provided the exact timing of issues. Finally, we found a couple of misplaced prices in the database, due to prices being presented incorrectly in the Mercator newspaper. Overall, however, the changes are not major, and the mean monthly return from 1912 to 1969 is now 1.198%, compared with 1.193% in Nyberg and Vaihekoski (2010).

4 EMPIRICAL RESULTS

4.1 Number of listed stocks

The number of stock series listed on the Stock Exchange from October 1912 to December 1988 can be seen in Figure 1. The average monthly number of stock series was 57.659.



²¹ Overall, we found 324 cash issues (in Nyberg and Vaihekoski, 2010, we had 305 issues). Using information in Kock's books, we estimate that 44 cash issues were left out, because we were not able to find the exact conditions (issue price and/or ratio) for the issue. Similarly, we found 196 bonus issues (in Nyberg and Vaihekoski, 2010, we had 190 issues). Moreover, we updated the subscription rules for a few issues. Sometimes the rules were quite complex. For example, Kymmene (currently UPM Kymmene) had an interesting mixed issue in September 1917. Specifically, Kymmene offered a new share for every eight old shares owned, for a price of 1700 FIM, together with one new share for each old share *and each new share* owned. Another example is Lohja in 1987. Namely, they had a split and a bonus issue taking place at the same time. The nominal value of a share was split from 75 FIM to 20 FIM, but at the same time the company issued new bonus shares so that the owners of one old share ended up with five new shares. In these cases, the price adjustment factor (eq. 3.1) in Nyberg and Vaihekoski (2010) has been modified accordingly.

Figure 1. Number of stock series listed at the end of each month on the Main List of the Helsinki Stock Exchange from October 1912 to December 1988.

The first increase took place in 1915 – a couple of years after the stock exchange was opened – reflecting the increased interest in the stock exchange. It was followed by a period that was characterized by a number of mergers between companies, especially banks, as well as some bankruptcies. Another increase took place in 1942. This was caused by the decision to add 13 new companies to the list in response to a special request by the government, which was aimed at least partially at containing rising stock prices (Kantanen, 2012). The number of listed stock series started to increase again in the 1960s. This was primarily due to companies' decisions to issue and list separate dual-class stock series. A huge jump in the number of listed series took place in 1984, when the HSE made the decision to list unrestricted shares separately.

4.2 Dividend yield

Figure 2 shows the dividend yield series for the Finnish stock market. Two series are provided: value-weighted and equally weighted. The former puts more weight on large companies, whereas the latter puts more weight on smaller firms. Panel A in Table 1 shows the descriptive statistics for both of the series.

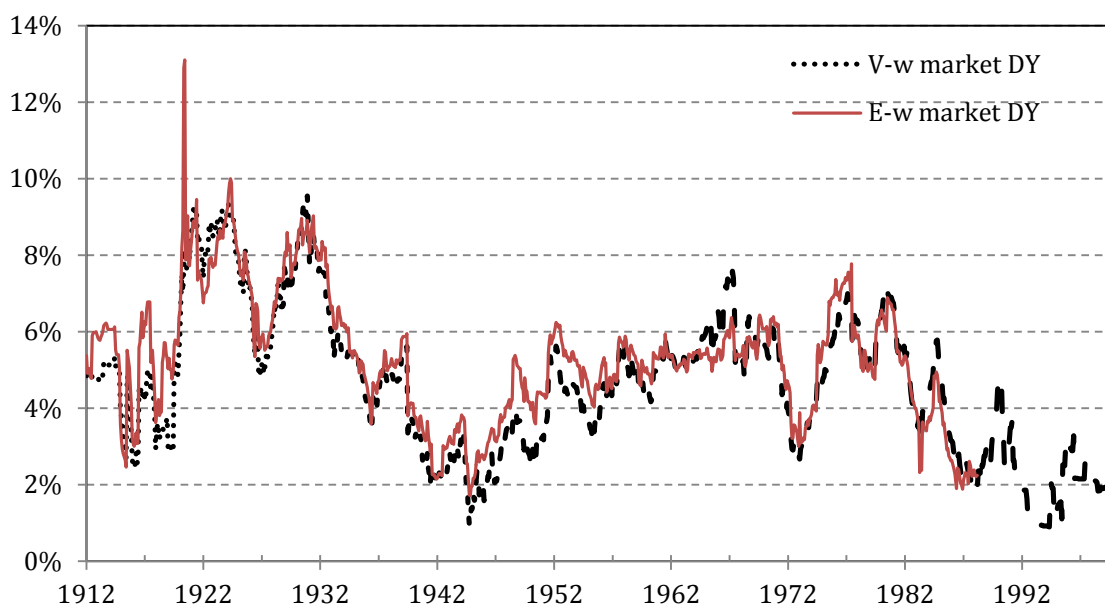


Figure 2. Value-weighted and equally weighted dividend yield for the Finnish stock market from October 1912 to December 2012 (for the equally weighted series the sample ends in December 1988). From 1912 to 1988, dividend yield is the ratio of the split-adjusted dividend paid within the last twelve months divided by the current month-end stock price. From 1989 to 1991, we use data from Statistics Finland; thereafter, the dividend yield is calculated as the return difference between value-weighted total return and price indices.

A number of observations can be made based on this Figure. First, the dividend yield has varied quite considerably over the years. The first increase took place in 1921. This was caused primarily by a few companies going bankrupt following fairly high dividends in the previous year (leading to high dividend yields). In contrast, during and after the Second World War, and following the Oil Crisis in the 1970s, dividend yields were expectedly lower than on average. Dividend yields were also low during the tech-boom at the turn of the millennium, due to an increase in market capitalization that was not accompanied by a corresponding increase in dividends. Somewhat surprisingly, the value-weighted and the equally weighted dividend yields are fairly similar throughout the period for which we have data on both series.

The average dividend yield during the sample period, from 1912 to 1988, was 4.974% when calculated using market capitalization rates and 5.309% when calculated using equal weights. This is somewhat surprising because Kothari and Shanken (1997) found US companies' value-weighted average (4.40%) to be higher than the equally weighted average (3.65%) during 1926-1991. The standard deviation of the dividend yield series is comparable to that in Kothari and Shanken (1997).

We also decided to compare our dividend yield series with the one constructed by Statistics Finland, which is available at the monthly level from January 1972 forward. Figure 3 shows both time series. As expected, our series shows quicker movements due to the use of month-end stock prices, instead of smoothed averages, as well as our allocation of dividends to April. Similarly, the inclusion of all (smaller) companies and all stock series (unrestricted having typically higher prices) in the analysis could arguably be reflected in the overall levels. In general, we can say that both series track each other quite closely.

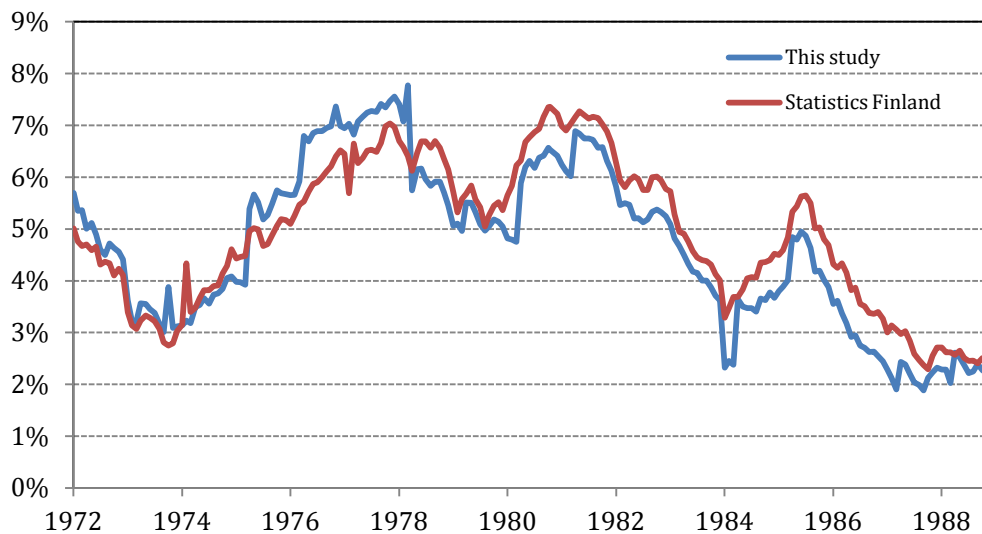


Figure 3. Comparison of the dividend yield series in this study and the series by Statistics Finland. Sample period is from January 1972 to December 1988.

We can also calculate the average dividend rate (cash dividend divided by nominal value). Using the equally weighted average, we estimate the dividend rate to be 10.01% of the nominal value. Obviously, it is higher than the dividend yield. The standard deviation is 7.56%, again in line with the expectation that dividend rates vary less than dividend yields. The result can also be used as a measure of companies' dividend policy because it shows how the dividend rate changed over the years.²² Finally because we know the number of stocks for all companies, we can also calculate the approximate total amount of dividends paid by listed companies and divide it by GDP. The average ratio is 0.71% from 1913 to 1988. This information can be used to measure the role of publicly listed companies' dividends in the economy.

4.3 Stock market and the economy

Figure 4 shows the market capitalization value of the stock exchange and the sum of book equity values of the listed companies. We can see that the market capitalization values have climbed almost steadily after the establishment of the HSE. At the same time, book equity has also

²² Corporate dividend policies typically follow either a fixed (range of) dividend payout ratio (i.e., gross dividend payments/net income) or fixed dividend rate. Anecdotal evidence suggests that during the sample period, companies were likely to smooth dividend rate changes by adjusting the nominal value of the stock (c.f., Lindström, 2013, 44).

increased. On average, the annual growth rate for the market value of listed companies has been 17.9% from 1912 to 1988.

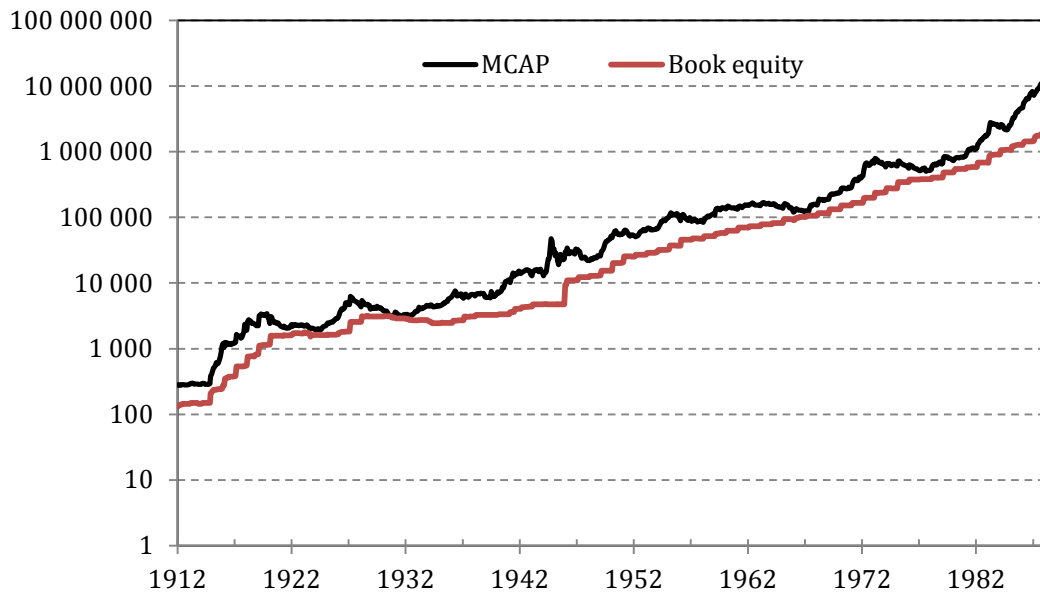


Figure 4. Total book equity values and market capitalization (MCAP) values of the stocks listed in the Helsinki Stock Exchange from 1912 to 1988. Month-end values (million new FIM) are used. Note that a logarithmic scale is used for the y-axis.

To analyze the role of the stock market in the economy, we calculate the ratio of stock market capitalization to GDP. There is large body of evidence that more developed financial markets, which are typically measured with variables in which the MCAP-to-GDP ratio plays a central role, are associated with a better allocation of capital and that financially developed countries can take better advantage of their investment opportunities (c.f., e.g., Wurgler, 2000). Figure 5 shows the development of this ratio. Monthly market values are used in the denominator and annual GDP values are used in the numerator. Descriptive statistics for the series can be found in Panel B of Table 1.

Figure 5a.

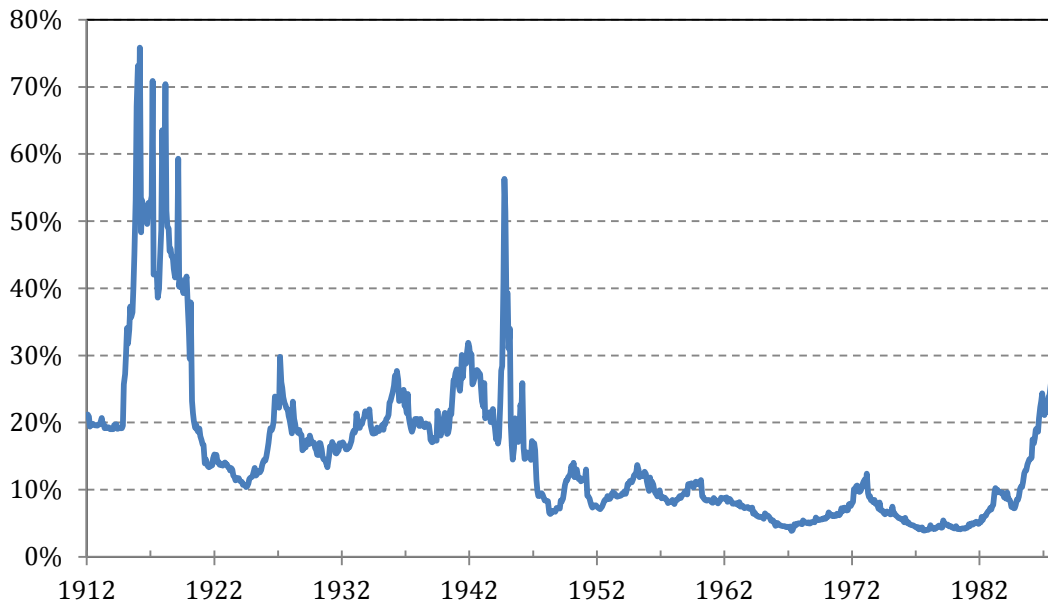
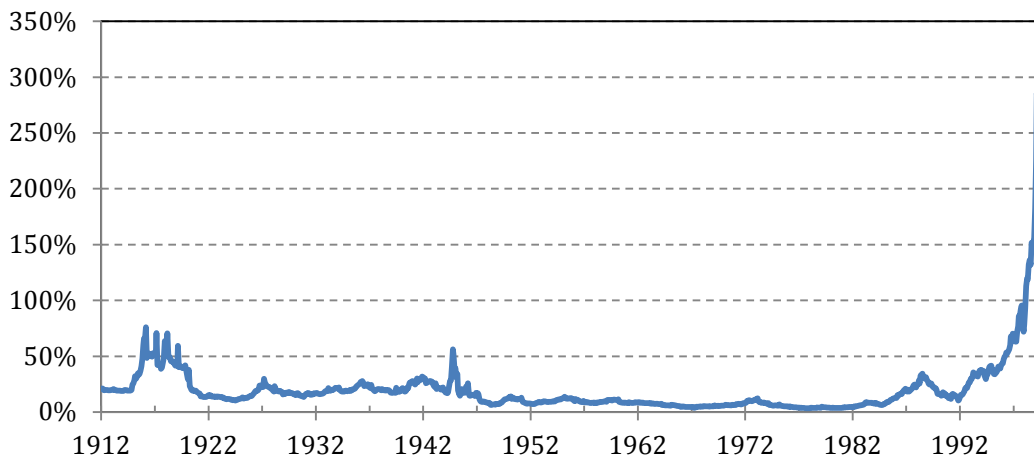


Figure 5b.



Figures 5a and 5b. Stock market capitalization to GDP ratio. Month-end market capitalization values of the stocks listed on the Helsinki Stock Exchange from 1912 to 1988 (fig. 5a) and from 1912 to 2012 (fig. 5b) divided by GDP. GDP and market values are measured in current values. Annual values are used for the GDP series.

The market capitalization to GDP ratio has varied significantly throughout the sample period. There are three sudden increases that warrant closer examination. The first increase occurred in 1916, only a few years after of the establishment of the HSE. It was caused by the increased interest of companies in joining their peers at the stock exchange, which in turn caused a sudden

increase in the number of companies listed on the stock exchange. In addition, companies started to issue increasing amounts of new stock which, together with a more favorable outlook for the future after WWI, caused the combined market values of companies to increase considerably.

The second spike in the market capitalization ratio took place in the summer of 1945. It was caused primarily by higher stock valuations reflecting the end of WWII. The third increase started in the early 1990s and coincided with the liberalization of the financial market that led to the abolishment of restrictions on foreign ownership. The relative size of the stock market grew even larger as the technology-oriented HSE was affected by the world-wide tech boom at the turn of the millennium. The boom in the mobile industry in particular (especially Nokia Corp.) drove the valuations. At the highest valuation levels, in April 2000, the ratio of market valuation to GDP was 325%. In recent years, after the financial crisis in 2008, the ratio has steadily been over 50%.

In general, one can say that for most of its history, the Finnish stock market has been quite small compared with the rest of the economy. On average, from 1912 to 1988, the monthly capitalization to GDP ratio was only 15.14%, with the maximum being 75.9%. The standard deviation of the ratio is 11.2%. Comparing the relative size of the stock market in Finland with the relative size of stock markets in other countries, we can see that, from an international standpoint, the Finnish stock market has indeed been quite small historically. For example, Demirgiic-Kunt and Levine (1996) report that, based on market capitalization ratios, Finland ranked as the 26th largest market across 41 countries. The average ratio for all countries from 1986 to 1993 was 41%. If the markets are ranked by the sheer market capitalization value, Finnish stock market was the 35th largest in the world at the end of year 2012 (Global Stock Markets Factbook 2013).

4.4 Stock market trading activity

We can also study the amount of trading taking place on the stock exchange. Figures 6a and 6b show the value of trading divided by market capitalization value and by GDP. Descriptive statistics are given in Panel C of Table 1. The former measure, trading turnover ratio, measures the relative turnover of the stock exchange and the overall liquidity and activity of the market. It can also be used as a proxy for trading costs. The latter measure, total value traded to GDP ratio, augments information provided by the market capitalization ratio by revealing additional information on the

relative size of stock market activity in the economy and the overall liquidity provided by the stock market.

Figure 6a.

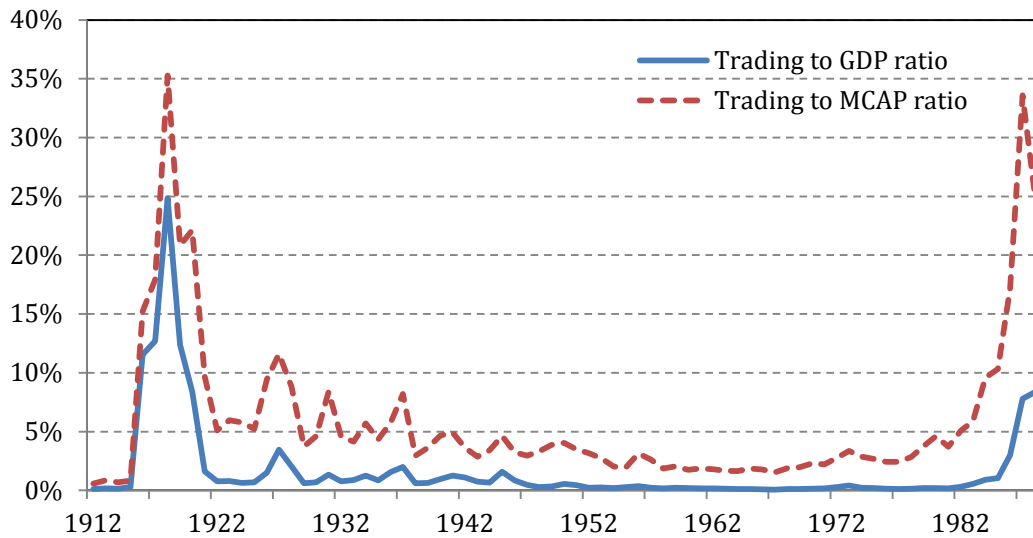
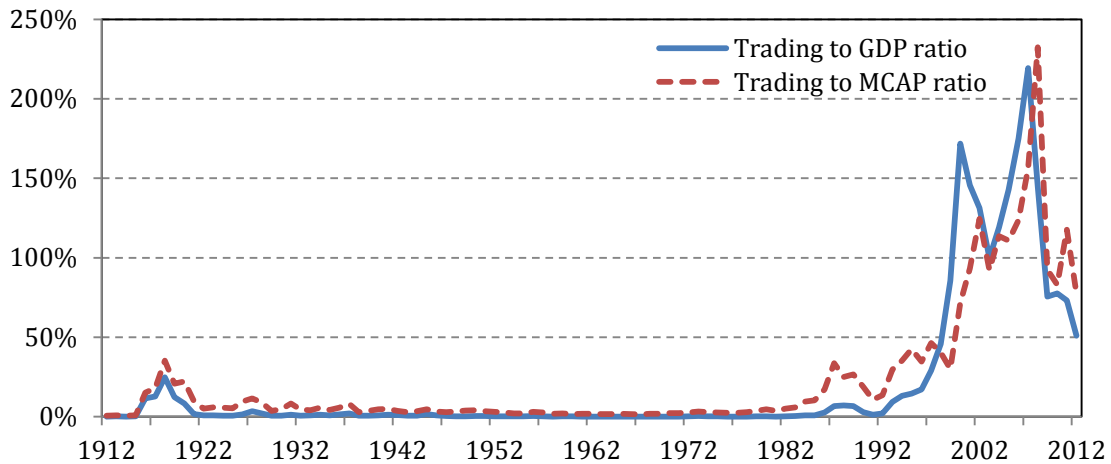


Figure 6b.



Figures 6a and 6b. Yearly trading volume divided by the market capitalization value of the stocks listed in the Helsinki Stock Exchange (MCAP) and the value of the GDP from 1912 to 1988 (fig. 6a) and from 1912 to 2012 (fig. 6b). Trading volume is the total value of trading of stock and stock-related warrants (typically traded after issues). Market capitalization value is the year-end value.

We see that there are several periods when trading activity suddenly increased. The first period took place around the beginning of the 1920s and was followed by increases in the 1920s and 1930s. However, the biggest change started to take place towards the end of the 1970s. Since then,

there has been a strong upward trend in relative trading volume. The average annual trading volume to GDP ratio from 1912 to 1988 was 1.69%. If trading turnover is compared with market capitalization value, the average is 5.94%. Demirgüç-Kunt and Levine (1996) report that, based on trading turnover to GDP ratios, Finland ranks as the 27th market across 41 countries. The average ratio for all countries using data from 1986 to 1993 was 15%.

4.5 Additional analysis

To study the relative valuation levels of the stock exchange, we calculate a proxy for the price to book ratio, namely, the price to nominal value ratio (P/NV). We report market-wide averages for the sample period from 1912 to 1988. Figure 7 plots the monthly series. Again, we provide both value-weighted and equal weighted series. The former puts more weight on the large companies, whereas the latter puts more weight on the smaller firms.

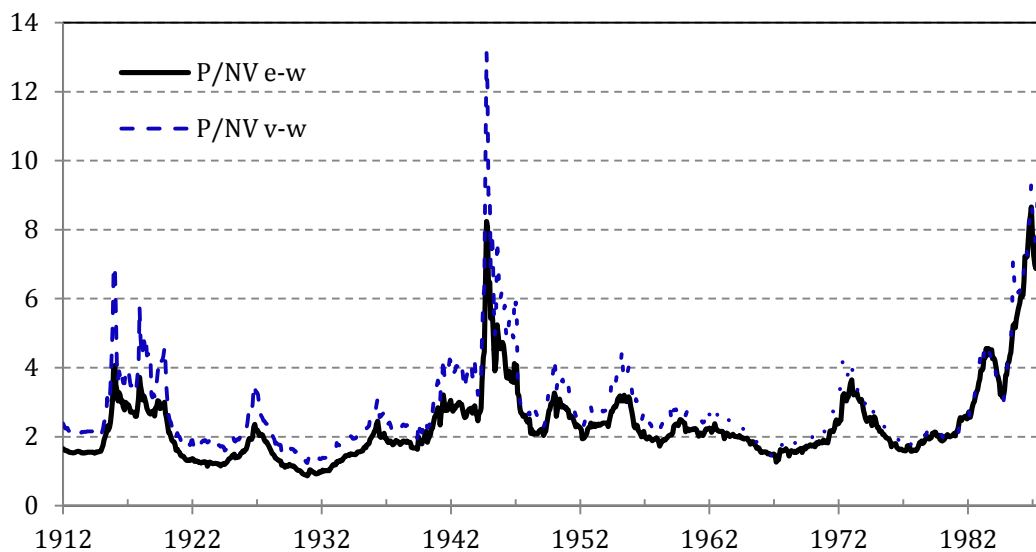


Figure 7. Average value-weighted and equally weighted price to nominal value ratio for the stocks listed on the Helsinki Stock Exchange from October 1912 to December 1988.

Panel D in Table 1 shows that on average, the value-weighted P/NV-ratio has been 2.93 with a standard deviation of 1.55. Interestingly, the price-to-nominal value ratio has been lower, averaging only 2.39, indicating somewhat lower valuation. The ratio has clearly increased after wars, as one would expect, but overall the series seems to be quite stationary, if we exclude the development in

the late 1980s. This reflects the fact that companies in many cases increased the nominal values of their shares instead of increasing the dividend rate (c.f., Lindström, 2013).

For general interest, we also calculate the market capitalization value of Nokia in the Helsinki Stock Exchange and compare it to the total market. It is well-known that in the 1990s and early 2000s, the heyday of the mobile industry, Nokia single-handedly accounted for more than 70% of the market capitalization of the HSE. However, the situation was very different before the 1990s. In Figure 8, we have calculated the relative share of market capitalization represented by Nokia's all stock series since Nokia became listed in 1915.

Another commonly used variable in finance literature (e.g., Demirgüç-Kunt and Levine, 1996) measures how concentrated a stock market is. From the standpoint of stock market development, a less concentrated market is a better one. Here, we calculate the market share accounted for by the five companies with the largest market capitalization during the sample period. That is, we calculate the sum of the five largest stock series' capitalization values divided by the market capitalization value. The result is also shown in Figure 8.

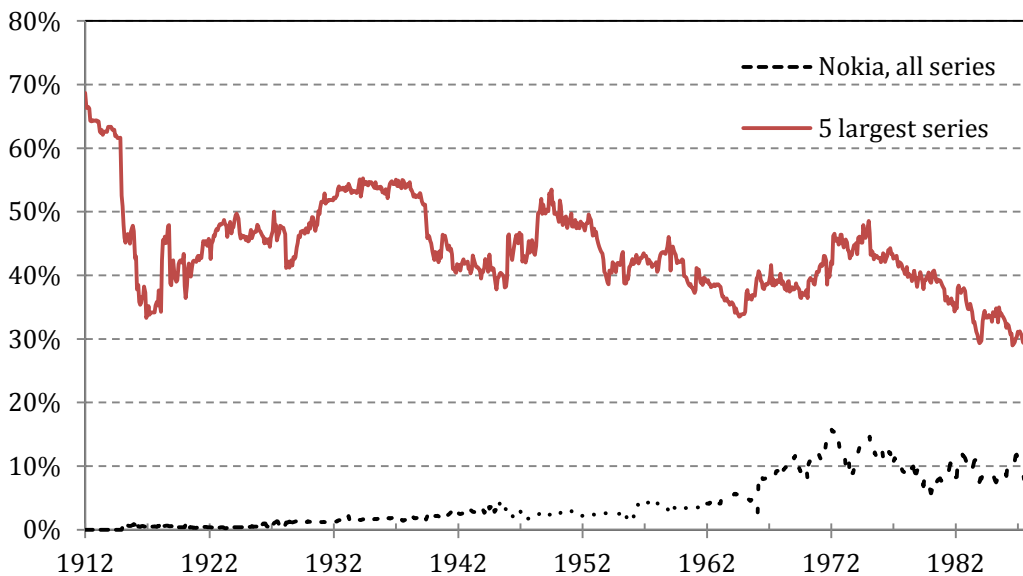


Figure 8. Market value of Nokia's all stock series to the total market value of all stocks from October 1912 to December 1988. A similar ratio for the five largest stock series is also shown. Note that because Nokia was first listed in September 1915, the values prior to that time are zero.

It is evident from Figure 8 that Nokia did not play as important a role in the Finnish economy during the sample period as it did in the 1990s and 2000s. In fact, its share of stock market capitalization value did not exceed 10% until 1968. Although Nokia's role was not as major as it became later, it is quite evident that the HSE was still significantly concentrated, given that the five largest companies represented more than 60% of the market value. This started to change as more and more companies became listed. Overall, one can say that there is a clear negative trend in concentration after the late 1930s.

5 CONCLUSIONS

In this paper, we continued the historical analysis of the Finnish stock market set forth in Nyberg and Vaihekoski (2009 and 2010). For this purpose, we collected monthly data to create some of the most commonly used financial time series and conducted a descriptive analysis of these time series. In most cases, the series were collected from the establishment of the Helsinki Stock Exchange, in October 1912, to the end of 1988, after which time most of the series are available from commercial databases. We have also analyzed some selected series through the end of the 2012.

Our first series of interest is the dividend yield index for the entire market. Aggregating stock level dividend yields, we were able to create value-weighted and equally weighted dividend yields for the Finnish market from October 1912 to December 1988. The series show that the value-weighted monthly average dividend yield is 4.98% (if extended to cover period up to 2012, the average is 4.51%), which is comparable to, e.g., Kothari and Shanken (1997).

We also studied the size of the stock market and its role in the economy. First, we calculated the market capitalization value of listed stocks, and compared it to the market value of the GDP. The average MCAP-to-GDP ratio from 1912 to 1988 (2012) is 15.15% (31.77%). These averages reflect the fact that, during most of the period analyzed, the stock market did not play a very important role in the Finnish economy. However, towards the end of the period, the situation changed, and at times the value of the stock market was over three times the value of gross domestic product.

Finally, we studied trading activity on the stock exchange. By calculating the ratio of trading value to market capitalization value, one can observe the relative activity of the stock market. One can see that, during the sample under analysis, the market was initially quite active until the Second

World War (albeit the trend was descending), after which trading levels remained quite suppressed until the early 1980s, when the market started to become more active again.

Having a number of long time series collected together for the first time allows for further study of a number of issues. It would be interesting to compare our results with other markets in more detail, or examine, for example, the long-run predictability of the stock market using dividend yield or the relationship between trading turnover, gross domestic product, and stock market returns. Furthermore, it would be interesting to combine the variables collected for this study with other financial variables to study the dividend payout ratios as well as the overall financial behavior of listed companies. Finally, it would be interesting to study the role of the stock market as a source of financing for companies. These questions are left for future research.

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Table 1. Descriptive statistics for estimated time series

Descriptive statistics are calculated for the monthly time series for different sample periods. Panel A shows the dividend yield series for the market using companies' market capitalization weights (value-weighted) and equal weights. Panel B shows the ratio for the market value of the listed companies to the value of the GDP. Panel C shows two series that are related to the turnover. The first one is the value of the trading divided by the market cap. The second is similar, but the value of the trading is divided by the value of the GDP. Panel D shows the market price to nominal value ratio, which is divided by one hundred for presentation purposes. The sample size is 915 (1203) monthly observations from October 1912 to December 1988 (2012).

Asset return series	Period	Mean (%)	Std. dev. (%)	MIN	MAX
Panel A: Dividend yield					
Market, equally weighted	1912-1988	5.31	1.67	1.72	13.10
Market, value-weighted	1912-1988	4.98	1.77	0.96	9.55
Market, value-weighted	1989-2012	3.01	1.28	0.90	6.48
Market, value-weighted	1912-2012	4.51	1.85	0.90	9.55
Panel B: Market value					
MCAP/GDP	1912-1988	15.14	11.21	3.43	75.87
MCAP/GDP	1989-2012	84.64	60.27	10.30	325.09
MCAP/GDP	1912-2012	31.77	42.93	3.43	325.09
Panel C: Turnover					
Turnover / GDP	1912-1988	1.65	3.74	0.07	24.85
Turnover / GDP	1989-2012	77.27	64.46	1.25	219.36
Turnover / GDP	1912-2012	19.62	45.10	0.07	219.36
Turnover / MCAP	1912-1988	5.94	6.77	0.58	35.29
Turnover / MCAP	1989-2012	75.72	52.27	10.74	232.46
Turnover / MCAP	1912-2012	22.52	39.58	0.58	232.46
Panel D: P/Nominal value					
Market, value-weighted/100	1912-1988	2.93	1.55	1.24	13.14
Market, equally weighted/100	1912-1988	2.39	1.26	0.86	8.66

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