

Swedish stock prices and returns and bond yields, 1856–2006*

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January 11, 2007

Abstract

This chapter presents details on the construction of statistical evidence showing the evolution of returns on Swedish stocks and fixed-income securities over the past one hundred and fifty years, 1856–2006. The data are mostly compilations of previous research but some new time series are presented, including stock prices from the period 1906–1918 and a structured monthly series of the official discount rate from its introduction in November 1856. Looking at the data shows that...

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* I would like to thank Björn Hansson and Hossein Asgharian for generously sharing their data.

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1 Introduction

This chapter presents statistical evidence on the long-run evolution of Swedish financial market returns over the past one hundred and fifty years, 1856–2006. Specifically, returns on stock investments on Sweden’s dominating secondary stock market, the Stockholm Stock Exchange, are documented since 1906, the short-run risk-free rate of return from 1856 whereas a representative long-run government bond yield is recorded from 1887 onwards.

2 Stock prices and returns, 1906–2006

The Swedish stock price and stock return indices presented in this chapter are all composite market indices of the Stockholm Stock Exchange. As sources for these indices have been used two Swedish financial chronicles, *Kommersiella Meddelanden* (1906–1918) and *Affärsvärlden* (1919–2006) except for the period 1995–2002 when the price and return indices of the Scandinavian Information Exchange (SIX) was used.

The subsections below contain details on the construction of these included indices and how they have been adjusted in order to be homogenous and consistent over the entire time period. Most of the data series presented here were made available thanks to the tremendous research efforts of Birger Möller (1962) and Per Frennberg and Björn Hansson (1992).

2.1 Stock price index, 1906–1918

Between 1906 and 1922, the Stockholm-based financial chronicle *Kommersiella Meddelanden* published a monthly capital-weighted stock price index, the *KM*-index (KMI). KMI only includes firms listed on the so-called A-list at the Stockholm Stock Exchange, i.e., the official main market containing the most traded firms. It is calculated as the ratio between the end-of-period market value of all A-list firms divided by their respective book value. In other words, KMI was a crude market-to-book ratio.

There are two problems with KMI in terms of comparability with later indices. First, KMI does not contain any corrections for accrued dividends over the year. More importantly, Östlind (1945, p. 260) points out that KMI does not seem to adjust sufficiently for bonus issues or new issues. This is particularly problematic for the World War I-period when there was relatively large activity in terms of share issuances at the Stockholm Stock Exchange (see, e.g., Altheimer, 1988 and Waldenström, 2002). Fortunately, Östlind (1945, pp. 260f, 877) presents an “augmented” KMI with adjustment for the new issues made.¹ A problem with Östlind’s index, however, is that it does not include bank stocks on the A-list. I add these on using the KMI subindex for bank stock prices and bank capital weights published by *Kommersiella Meddelanden*.

¹ Ironically, Östlind constructs his index using data on new issues published by the source of KMI itself, namely *Kommersiella Meddelanden*.

Altogether, the final stock price series used for the period 1906–1918 is KMI before December 1913 and the Östlind (1945) augmented KMI between January 1914 and November 1918.

2.2 Stock price index, 1918–1995

Starting in December 1918, the weekly Swedish financial chronicle *Affärsvärlden* published a composite stock price index that would later be called *Affärsvärldens Generalindex* (AFGX).² This index has ever since been one of the main Swedish stock price indices used, not least because of its long history. AFGX is a capital-weighted index and included up to 1998 only firms on the Stockholm Stock Exchange A-list, just like KMI. From 1998 onwards AFGX also includes firms on the so-called O-list, containing the (previously) unlisted firms.

Frennberg and Hansson (1992) use AFGX as their base index, but perform a number of adjustments in order to make it fully comparable over time. These adjustments differ between subperiods depending on changes in the methods to calculate the published indexes.

2.2.1 Subperiod 1: December 1918 – December 1921

Affärsvärlden's index is listed as “Changes in market value of the 41 most important industrial, transport and shipping firms”.³ It is not a pure price index as it contains dividends paid out during the year. Using data on dividend payouts at the end of each year, however, Frennberg and Hansson (1992) then subtract the monthly (one twelfth) accrued dividends from the index in order to get a pure stock price index.

2.2.2 Subperiod 2: January 1922 – December 1923

During this period, *Affärsvärlden*'s index reflects prices of the 37 most important firms and, unlike the previous subperiod, does not include any dividend yields. Hence, it is a pure price index. This time, however, Frennberg and Hansson (1992) add on the prices of banking stocks using capital weights based on information in Möller (1962, p. 187).

2.2.3 Subperiod 3: January 1924 – December 1927

In this period, the index is called *Affärsvärlden*'s *Totalindex* and is basically the same as the previous indices except that dividends are once again added on to the index. For that reason, Frennberg and Hansson (1992) subtracts the estimated value of accrued dividends as done for subperiod 1.

2.2.4 Subperiod 4: January 1928 – December 1934

During this subperiod, *Affärsvärlden*'s *Totalindex* was adjusted so as to also include the banking stock index again using weights based on Möller (1962). Notably, the newspaper calculated two separated indices, one that included and one that excluded the two firms dominated by the Swedish industrial magnate Ivar Kreuger, *Svenska Tändsicksaktiebo-*

² Strictly speaking, AFGX was introduced in 1937 and the predecessors had other names as is described in the main text.

³ In Swedish: *värdeförändringar i milj. kr å de 41 viktigaste industri-, trafik- och rederipappren (Affärsvärlden 1920, p. 4220).*

laget (later Swedish Match) and L M Ericsson. The final index uses the former up to and including March 1932 and the latter thereafter. The reason for this division is the dramatic collapse of the Kreuger empire in mid-March 1932 following Ivar Kreuger's suicide in Paris. By switching index at this time, the finally used index captures the entire price drop caused by the "Kreuger crash" while avoiding the problems generated by the fact that the two companies were not listed during a long time after the crash. Except for this measure, Frennberg and Hansson also adjust for an awkward correction for accrued dividends that *Affärsvärlden*'s published index contains.⁴

2.2.5 Subperiod 5: January 1935 – December 1959

The index used in this period is Möller's (1962, pp. 185ff) augmented version of AFGX, in which holding and insurance companies were added on to the market value used to calculate AFGX.

2.2.6 Subperiod 6: January 1960 – December 1986

In this period, Frennberg and Hansson (1992) adjusted the published AFGX by subtracting paid out dividends and adding accrued dividends.

2.2.7 Subperiod 7: January 1987 – December 1994

Between 1987 and 1994, AFGX was calculated as a pure stock price index and is therefore used without any adjustments.

2.2.8 Subperiod 8: January 1995 – December 2006

Between 1995 and 2006, the stock price index of the Scandinavian Information Exchange (SIXGX) was used. The reason for switching from AFGX to SIXGX mainly rests on practical concerns, more precisely that only the SIX index had an easily available corresponding stock returns index during this period.⁵

2.3 Stock return index, 1918–2006

The returns of a stock investment can be divided into three parts: capital gains (i.e., the change in stock price between two periods divided by the initial period's price), dividends and yield from reinvested cash flows. A stock price index, as the one previously discussed, does only reflect the first of these components. Hence, in order to compute a stock return index one has to add the dividends and the yields of reinvested cash onto the stock price index. This is what Frennberg and Hansson (1992) did for the period December 1918 – December 1989 and Björn Hansson and Hossein Asgharian have done for the period up to December 2005. Specifically, they use the Stockholm Stock Exchange market return index of the Scandinavian Information Exchange (SIXRX) between January 1996 and December 2006 for data availability reasons.

⁴ Specifically, the index makers subtracted a twelfth of a standard annual interest rate of five percent instead of the actual dividends paid out.

⁵ According to Björn Hansson.

2.4 Dividend yields

Data on dividend yields were collected by Frennberg and Hansson (1992) for the period 1919–1989.⁶ For the period thereafter, the dividend yield was calculated as follows. First, the difference in percentage change between the stock return index and the stock price index was calculated for each month. Then this differential was aggregated up at the annual level and a dividend index point computed, from which then the monthly dividend yields (Dividend index/Price index) was calculated.⁷

3 Short-term and long-term market interest rates, 1856–2006

3.1 Short-term risk-free yield, 1856–2006

The short-run market interest rate is thought of as proxying the *risk free* rate of return. Financial economists usually measure the risk-free rate by a one-month (30-day) treasury bill issued by the government. Unfortunately, there are no such market rate in Sweden prior to the 1980's. For this reason, the series that is most available from the historical sources is the official discount rate (*diskontot*) which was set by the Riksbank from November 1856 to June 2002. The discount rate was an important market rate in the sense that banking law stipulated that commercial banks had to follow it when setting their own borrowing and lending rates. At times, a small markup was allowed but its size varied notably.

In 1983, the National Debt Office started floating treasury bills (*statsskuldsväxlar*, abbreviated SSVX) at different maturities. Therefore this project uses the 30-day SSVX is used as the risk-free market interest rate of return from January 1983 onwards collected from the databases of the Swedish Riksbank.

3.2 Long-term government bond yield, 1887–2006

Monthly observations on long-term government bond yields are available since December 1918. Frennberg and Hansson (1992) collected end-of-month prices on government *consols*, i.e., bonds with no fixed date of maturity and computed flat yields as the coupon rate divided by each month's quoted bond price. Between January 1928 and December 1949, however, the authors used the monthly government bond yields published in the Statistical Yearbook of the Swedish Riksbank. Between January 1950 and December 1985, the authors computed yields to maturity on government bonds with approximately 10 years to maturity from the year books of the Riksbank and the Swedish National Debt Office (*Riksgäldskontoret*). From January 1986 onwards, the series from the statistical databases of the Riksbank has been used.

Yearly data on Swedish long-term government bond yields are available back to 1887, published in *Svensk sparbankstidskrift* (1934, p. 825–826) as “yearly averages” with no

⁶ Specifically, data was reported as annual dividend yields in Möller (1962) for 1919–1959, in the Swedish Riksbank's Statistical Yearbooks for 1960–1972 and the financial chronicle *Veckans Affärer* thereafter.

⁷ For the years 1995–2005 this calculation was carried out by Hossein Asgharian and Björn Hansson at Lund University and for 2006 by myself using data supplied by Mikael Petersson at Nyhetsbyrån Direkt.

more detailed descriptions. Between 1914 and 1918, annual yields published in Möller (1962, p. 246) are used and since 1919 annual averages of the monthly yields described above are used.

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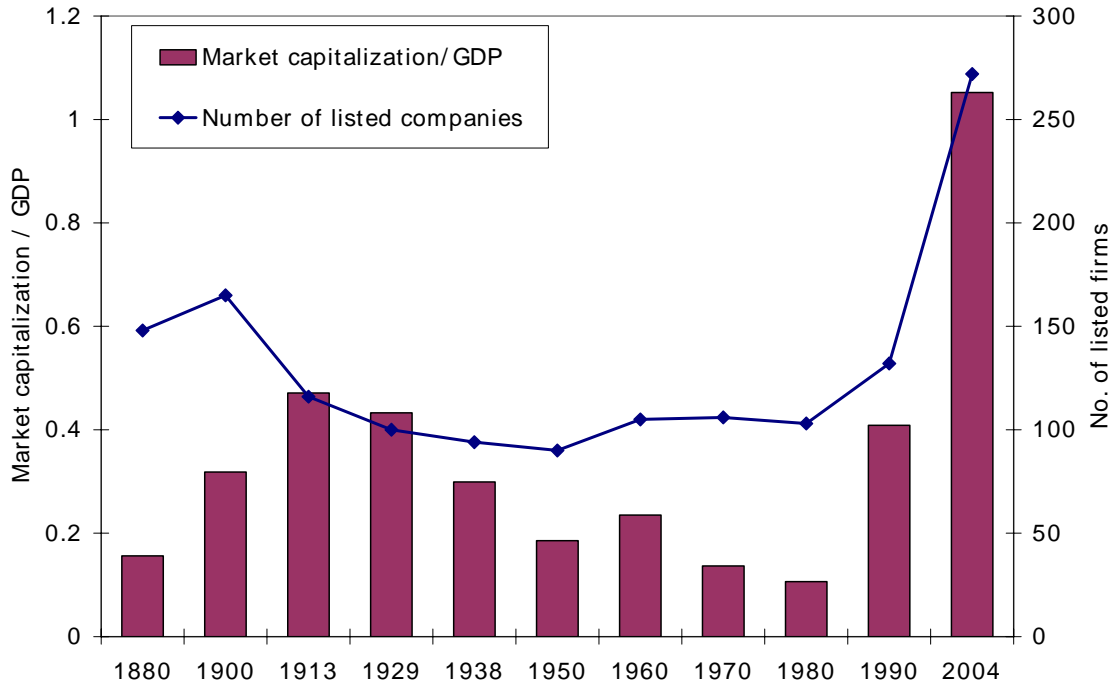
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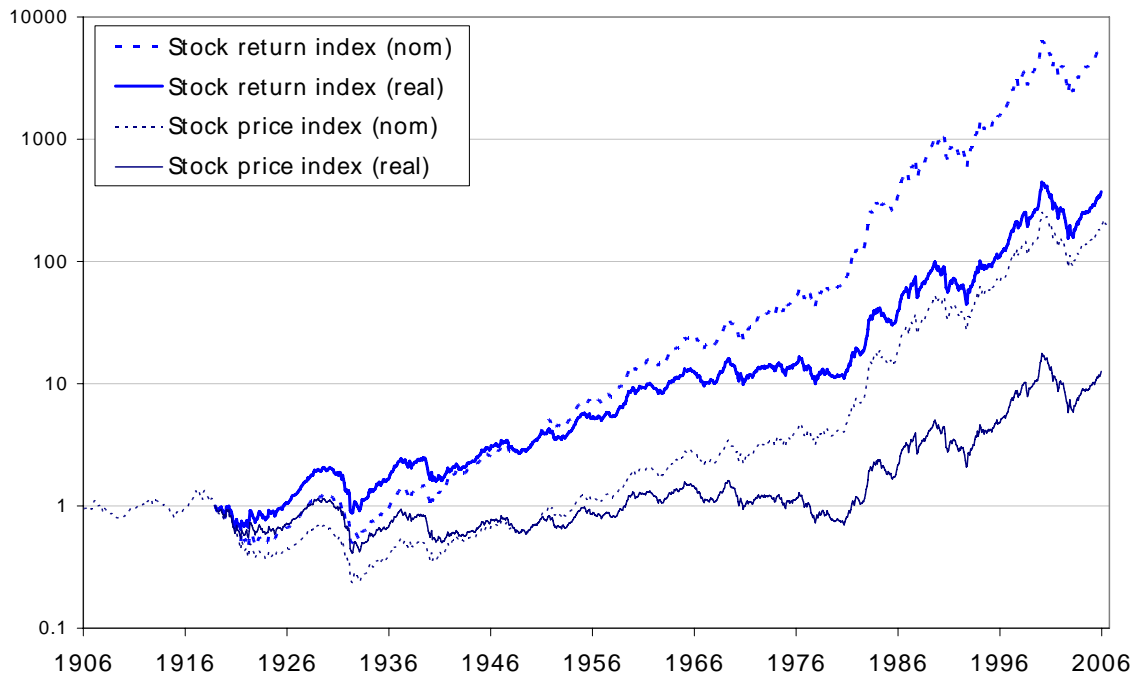
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Figure 1: Market capitalization/GDP and number of listed firms at the Stockholm Stock Exchange, 1880–2004.



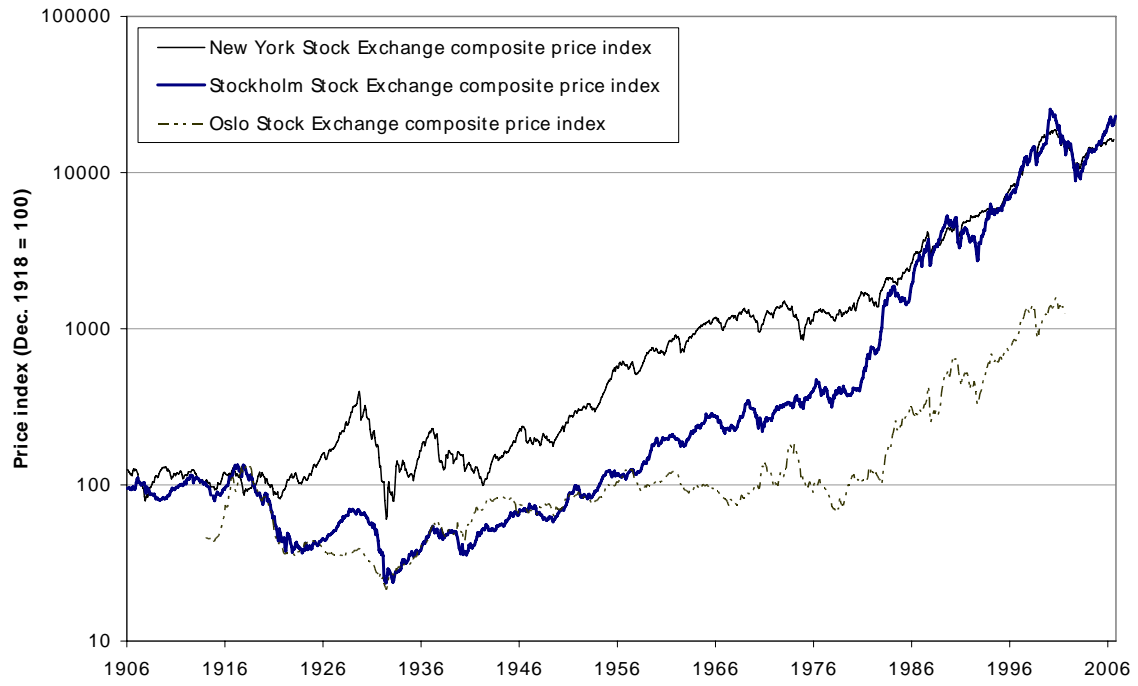
Source: Own calculations based on price lists and fact books of the Stockholm Stock Exchange and official data on equity capital of public firms (see further the documentation underlying Rajan and Zingales, 2003).

Figure 2: Monthly nominal and real Swedish stock prices and returns, 1906-2006 (1918:12 = 1)



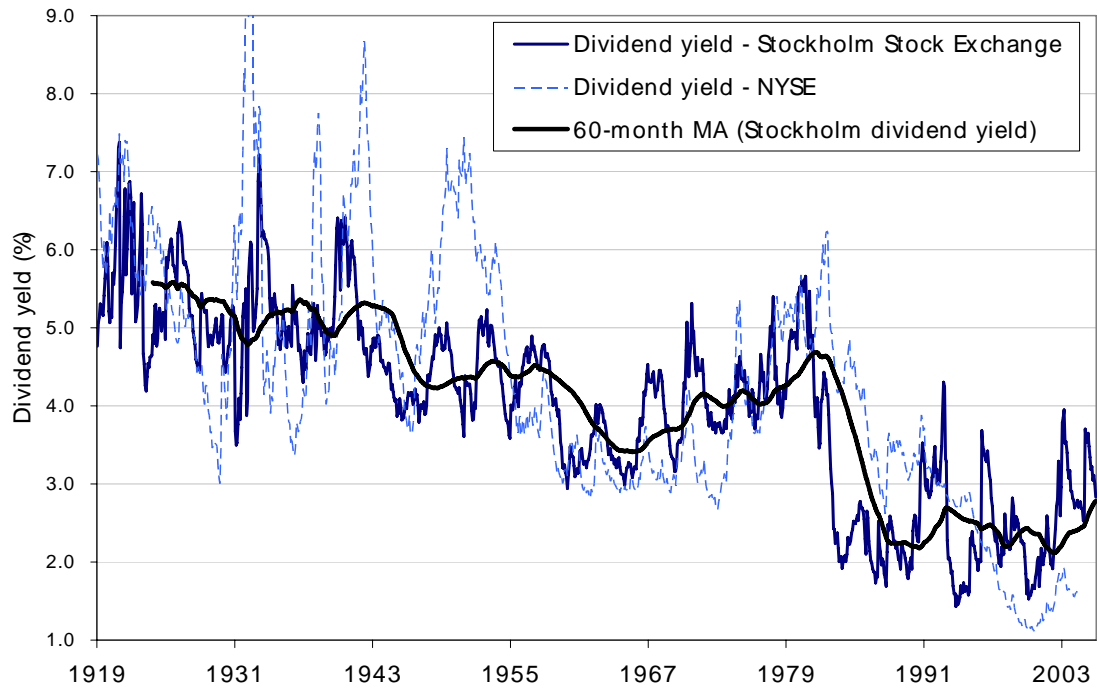
Source: Appendix tables XX.

Figure 3: Stock prices in Stockholm, Oslo and New York, 1906–2006 (1918:12 = 1)



Source: Stockholm: Appendix table AX, Oslo: Klovland (2003, table X) and New York: Shiller (2006).

Figure 4: Dividend yields on the Stockholm and New York stock exchanges, 1919–2005 (monthly)



Source: Appendix table AX and Shiller (2006, XX).