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A historical perspective on interest rates in Denmark 1875-2003

Abstract

The paper paints a broad picture of the interest-rate development in Denmark since 1875. Three different short-term interest-rate series (the official discount rate, private banks' average deposit rate, and the market rate of discount/money market rate) and two different long-term interest-rate series (government bond yield and yield on mortgage-credit bonds) are constructed. The "stylised facts" of the development in real interest rates and inflation expectations in Denmark are presented, and comparisons are made with the development in Germany, the UK, the USA, Norway and Sweden.

Key words: History of interest rates; Danish interest rates.

JEL Classification: E43; N23; N24.

Resumé

I papiret belyses renteudviklingen i Danmark siden 1875. Der konstrueres tre forskellige tidsrækker for den korte rente (den officielle diskontosats, pengeinstitutternes gennemsnitlige indlånsrente og den private vekseldiskonto/pengemarkedsrenten) og to forskellige tidsrækker for den lange rente (statsobligationsrenten og realkreditobligationsrenten). De "stiliserede fakta" for udviklingen i realrenter og inflationsforventningerne i Danmark præsenteres, og der sammenlignes med udviklingen i Tyskland, England, USA, Norge samt Sverige.

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1. Introduction

The existence of financial markets and financial instruments facilitates an efficient allocation of savings from economic agents with a savings surplus to economic agents with savings deficits. Although legal regulations and other institutional factors to a certain and time-varying degree has influenced the allocation process, nominal and real interest rates has always played a crucial role for both real investments and financial portfolio decisions.

This paper paints a broad picture of the interest-rate development in Denmark since the introduction of the krone as the Danish currency unit in 1875. Some "stylised facts" of the development in real interest rates and inflation expectations are presented, and comparisons are made with Germany, the UK, the USA, Norway and Sweden.[2]

The structure of the paper is as follows: Section 2 considers some issues related to comparability of interest rates across time and between countries and outlines the main characteristics of the data set on interest rates constructed in the paper. Section 3 presents the development in Danish interest rates and inflation during the different exchange-rate regimes that have prevailed since 1875. Finally, section 4 explores the development in different measures of real interest rates and looks at inflation expectations, while section 5 summarises some of the main findings. Most of the background data behind this paper is listed in appendix 1, while appendix 2 outlines the sources and compilation methods in details.

2. Historical interest-rate data – some methodological notes[3]

In general interest rates depend on the characteristics of the underlying financial assets from which the interest rates are derived. The level of interest rates thus depends on the maturity of the underlying asset and its cash-flow profile, the level of credit risks associated with the

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[2] For other long-span studies on the interest-rate development in Denmark, one may refer to Andersen, P. N. (ed.), *Laanerenten i Danmark. En teoretisk og historisk undersøgelse med særligt henblik paa renteudviklingen i Danmark*, Copenhagen: Nordisk Livsforsikrings-Aktieselskab og Nordisk Ulykkesforsikrings-Aktieselskab 1947; Christiansen, J. & Lystbæk, B., Afkast og risiko på aktier og obligationer 1915-1993, *Finans/Invest*, No. 3. 1994, 10-13; Møller, M. & Topp, N.-H., Er renten historisk lav? – eller har vi for mange samtidshistorikere?, *Tidsskrift for Landøkonomi*, 2003, 326-335; Nielsen, S. & Risager, O., Stock Return and Bond Yields in Denmark 1922-1999, *Scandinavian Economic History Review*, Vol. 49(1), 2001, 63-82; Oldam, J. W., Danmarks høje renteniveau: En særlig tradition ?, *Erhvervshistorisk årbog*, 1963, 119-159; Parum, C., Historisk afkast af aktier og obligationer i Danmark, *Finans/Invest*, No. 3, 1999, 4-13; Parum, C., Estimation of realkreditobligationsafkast i Danmark i perioden 1925-1998, *Finans/Invest*, No. 7, 1999, 12-15; Pedersen, J., Forholdet mellem renten af laan med kort og lang løbetid i perioden 1855-1930, *Økonomi og Politik*, Vol. 4, 1930, 268-282; and Sørensen, B. G., Konverteringsbølgen, *Samfundsøkonomen*, No. 5, 1995, 32-40.

For broad studies on the international development in interest rates covering the periods since 1875, one may refer to e.g. Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996; and Bordo, M. D. & Jonung, L., The history of monetary regimes – some lessons for Sweden and the EMU, *Swedish Economic Policy Review*, Vol. 4, 1997, 285-358.

[3] For a thorough description of many of the problems related to compilation of historical interest-rate series one may refer to Officer, L. H., *What Was the Interest Rate Then? A Data Study*, monograph, Economic History Services, 2003, EH.Net, web-page: http://www.eh.net/hmit/interest_rate/intguide.htm.

debtor, the degree of tradability and liquidity of the asset, and the tax treatment of the cash flows from the asset. Furthermore, more specific details in the contract related to the underlying asset (e.g. call provisions or provisions on collateral) might influence the interest rate. Finally, recorded interest rates depend on which side of the market they are quoted (bid, offer or mid prices) and the day-count convention used for the quotation.

Even for shorter time-span - like three or four decades - it is not an easy task to find data on representative interest rates that are fully comparable across time and among countries. The choice of data for an exercise covering a time span of more than 125 years is to an even higher degree determined by data availability, leaving consistency to be an important but secondary concern. This introduces certain degrees of measurement errors, and the analysis presented in this paper can only be considered as a crude review on the broad trends in short-term and long-term interest rates since 1875.

The first year in the period covered – 1875 – was the year when the krone was introduced as the Danish currency unit. Furthermore, the last part of the 19th century was the period where national financial markets in Denmark were developed.[4] Before this period segmentation of the regional financial markets prevented differences in interest rates from being arbitraged away.

Another aspect in relation to the interpretation of historical interest rate data concerns the extent to which the interest rates are market based. Regarding interest rate conditions in Denmark since 1875 two things should be noted:

- An act of 1 May 1933 introduced maximum interest rates on deposits with banks and savings banks. These provisions were removed again in July 1935. During the period 1935-1973 savings banks and the commercial banks had an internal agreement regarding maximum interest rates on deposits.[5]
- Until 1942[6] there were some legal provisions regarding maximum interest rates on loans secured by real property. However, loans raised through mortgage-credit institutes were exempted from these provisions.[7]

For Denmark three different short-term interest-rate series (the official discount rate, private banks' average deposit rate, and the market rate of discount/money market rate) and two different long-term interest-rate series (government bond yield and yield on mortgage-credit

[4] Cf. e.g. Hansen, P. H. & Johansen, H. C., *Det danske finansielle system ca. 1850-1992*, Det nye pengesamfunnet. Research on Banking, Capital and Society, Report No. 53, Oslo: Norges Forskningsråd 1994.
[5] Cf. Hoffmeyer, E., *Strukturændringer på penge- og kapitalmarkedet. Et studie i anledning af sparekassernes 150 års jubilæum*, Copenhagen: Sparevirkes Forlag 1960; and Mikkelsen, R., *Dansk pengehistorie 1960-1990*, Copenhagen: Danmarks Nationalbank 1993.
[6] Act of 3 July 1942.
[7] Cf. Hansen, S. Aa. & Svendsen, K. E., *Dansk pengehistorie 1700-1914*, Copenhagen: Danmarks Nationalbank 1968; and Hoffmeyer, E. & Olsen, E., *Dansk pengehistorie 1914-1960*, Copenhagen: Danmarks Nationalbank 1968.

bonds) have been constructed, cf. appendix 1. Table 1 gives an overview of the main characteristics of the series.

Short-term and long-term interest-rate series for five selected countries – Germany, the UK, the USA, Norway and Sweden - are also listed in appendix 1, cf. table 2 for an overview of the main characteristics of these series. The five countries have been among Denmark's most important trading partners in the period since 1875, cf. table 3.a and 3.b. Furthermore, the five countries have also been some of the most important countries in relation to Denmark's exchange-rate policy since 1875[8]:

- During the Classical Gold Standard period 1875-1913 Denmark participated in the Scandinavian Currency Union together with Sweden and (from 1877) Norway.
- The USA and the UK were two of the leading countries in the pre-1914 Classical Gold Standard and the inter-war Gold Exchange Standard.
- After the breakdown of the inter-war Gold Exchange Standard the Danish krone was pegged to the British pound during most of the 1930s.
- The USA was the anchor country of the Bretton Woods system 1946-1971 in which the Danish krone participated during the whole period.
- Finally, Germany has been the anchor country within the European Currency Co-operation since 1972.

All the interest-rate data used in this paper are annual averages. In some cases, interpolations have been necessary in order to splice old and new data series into comparable time series, cf. appendix 2 for a detailed description of sources and compilation methods.

The paper does not cover the importance of tax deductibility in relation to measurement of the real interest rate development.[9]

3. Development of nominal interest rates and inflation in Denmark since 1875 – An overview

Chart 1a and 1b show the development in nominal interest rates in Denmark since the introduction of the krone as the Danish currency unit in 1875. Inflation rates in Denmark and five other countries are shown in Chart 2a-f. The degree of correlation between the five different nominal Danish interest-rate series is shown in Chart 3a-d, whereas Chart 4a-f graph the development in the term structure of interest rates in Denmark and abroad. Finally, Chart 5a-e and 6a-e show the short-term and long-term interest-rate spreads between Denmark and

[8] For a short and fact-oriented chronology of the Danish exchange-rate policy since 1875, cf. Abildgren, K., A chronology of Denmark's exchange-rate policy 1875-2003, *Danmarks Nationalbank Working Paper*, No. 12, April 2004.

[9] An analysis of the development in Danish real interest rates before and after tax during the period 1953-1984 is found in Chapter V in Det Økonomiske Råd. Formandskabet, *Dansk pengepolitik under forvandling - En strukturrapport udarbejdet efter anmodning fra folketingets politisk-økonomiske udvalg*, Copenhagen: Akademisk Forlag 1985. The period 1960-2000 is covered by Pedersen, E. H., Development in and Measurement of the Real Interest Rate, *Danmarks Nationalbank Monetary Review*, 3rd Quarter, 2001, 71-90.

other countries. A range of summary descriptive statistics broken down by sub-periods - determined by the Danish exchange-rate policy - are presented in Table 4.

During the Classical Gold Standard period 1875-1913 Denmark participated in the Scandinavian Currency Union based on gold together with Sweden and (from 1877) Norway. During this period all of Denmark's other main trading partners participated in the international fixed-exchange-rate Gold Standard system as well. The period seen as one was characterised by an unchanged price level in Denmark, and interest-rate spreads between Denmark and other countries were fairly stable. The Danish government bond yield reached a post-1875 all time low of 3.43 per cent per annum in 1895.

The period 1914-1945 saw rather frequent changes in the monetary regime. World War I de facto terminated the Scandinavian Currency Union and the international Classical Gold Standard. During the 1920s Denmark and its main trading partners gradually returned to the Gold Standard, but the system collapsed again after a few years when the UK went off gold in September 1931. Denmark left the Gold Standard later within the same month, and in 1932 a comprehensive exchange-control system was introduced. Apart from a major Danish devaluation in 1933, the Danish krone was pegged rather closely to the British pound most of the remaining period until the outbreak of World War II. The average Danish inflation rate in the period 1914-1945 was 3.8 per cent, and inflation rates were highly volatile with 10 years of deflation during the period 1921-1933 and a post-1875 all time high rate of inflation at 24.4 per cent per annum in 1940. However, compared with the Classical Gold Standard period the nominal interest-rate level was only slightly higher and fairly stable.

In the period 1946-1971 Denmark participated in the Bretton Woods fixed-exchange-rate system established under the auspices of the International Monetary Fund. The US dollar was the anchor currency of the system. In the late 1940s the UK was still Denmark's largest trading partner and the devaluation of the British pound by 30.5 per cent in September 1949 was followed fully by Denmark. During the 1950s and 1960s Denmark's trade pattern gradually changed towards higher export shares to Central Europe, and the devaluation of the British pound in November 1967 by 14.3 per cent vis-à-vis the US dollar was only followed partly by Denmark (7.9 per cent). During the Bretton Woods period some capital-account transactions (mainly in relation to short-term commercial credits, financial loans and non-financial direct investments) were liberalised but most portfolio investments to and from Denmark still required permission from the Danish monetary authorities. In the Bretton Woods period seen as a whole the average Danish inflation level was only slightly higher than in the period 1914-1945, but during the 1960s there was a sustained upward trend in inflation rates as well as in nominal interest rates.

After the breakdown of the Bretton Woods system in the beginning of the 1970s, the Danish exchange-rate policy became part of the European exchange-rate co-operation, first within the "Currency Snake" founded in 1972 and subsequently from 1979 within the European Exchange Rate Mechanism (ERM). The post-1971 period also saw a gradual process with deregulation of the remaining Danish restrictions on capital-account transactions – fully completed in 1988. The oil price shocks in the 1970s and frequent devaluations of the krone during the late 1970s and the beginning of the 1980s caused a continuation of the upward trend in inflation and a widening of the long-term interest spread between Denmark and its main trading partners. Danish government bond yields reached a post-1875 all time high of 22.11 per cent in 1982. The government debt increased rapidly, and a fear that Denmark was on the verge to "state bankruptcy" began to rise. In the beginning of the 1980s the yield on long Danish government bonds exceeded the yield on long Danish mortgage-credit bonds for the first time since the period around World War I, cf. Chart 1b. Even though a careful interpretation has to be applied[10] this highlights the extent of the crisis in the Danish economy at the beginning of the 1980s.

In September 1982 the incoming Danish government announced the abolishment of devaluation as an economic-policy instrument. The Deutsche Mark was revalued several times within the ERM in the period 1982-1987, including vis-à-vis the krone, but not on the initiative of Denmark. The last realignments of the central parity for Danish kroner vis-à-vis Deutsche Mark within ERM occurred at the beginning of 1987. Since then Denmark pursued a "hard" peg against the D-mark and later the euro, despite the breakdown of the narrow band in the ERM in 1993 and major devaluations by some of Denmark's main trading partners. The Danish fixed-exchange-rate policy and the international decline of inflation rates during the 1990s caused a marked downward trend in both inflation and nominal interest rates in Denmark. The long-term interest spread between Denmark and Germany decreased rapidly from more than 13 per cent in 1982 to less than 1 per cent in 1991 and 0.21 per cent in 2003. The period since 1987 has seen an average inflation level in Denmark of 2.6 per cent, and inflation volatility has been very low. In 2003 the Danish short-term interest rate reached a post-1875 all time low while long-term government bond yields still were above the average level during the Classical Gold Standard.

[10] Due to the different characteristics of the government bonds and the mortgage-credit bonds from which the yields in Chart 1b have been derived.

4. Real interest rates and financial market inflation expectations

A "classical" proposition in the theory of finance - the Fisher equation - states that the nominal interest rate approximately equals the sum of the expected inflation and the *ex ante* real interest rate.[11] Other factors such as premiums for interest-rate risk, illiquidity, tax treatment *etc* might also influence the nominal interest rate. However, it may still be useful to review the information regarding the expected inflation and the *ex ante* real interest rate that can be derived from the nominal interest rates using the simple Fisher equation.

Neither the expected inflation nor the *ex ante* real interest rate is directly observable.[12] In order to derive the *ex ante* real interest rate from the nominal interest rate one therefore needs to make some assumptions regarding inflation expectations.

Chart 7a-f and Chart 8a-f show three different indicators for the real-interest-rate development in Denmark and five other countries in the period 1875-2003:

- The "real short-term interest rate (SE)" is measured as the difference between the contemporaneous short-term nominal interest rate and the contemporaneous rate of consumer price inflation. This corresponds to an *ex ante* short-term real interest rate under the assumption of "static expectations" (SE) regarding future short-term inflation development.
- The "real long-term interest rate (SE)" is measured as the difference between the contemporaneous nominal long-term interest rate and the contemporaneous rate of consumer price inflation. This corresponds to an *ex ante* long-term real interest rate under the assumption of "static expectations" regarding the future long-term inflation development.
- The "real long-term interest rate (PF)" is measured as the difference between the contemporaneous long-term interest rate and the annual average consumer price inflation 7 years ahead.[13] This corresponds to an *ex ante* long-term real interest rate under the assumption of "perfect foresight" (PF) (or "rational expectations") regarding the future long-term inflation development.

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[11] The idea behind this relationship – a distinction between a nominal and a real interest rate - can at least be traced back to the works of William Douglas around 1740, cf. Humphrey, T. M., The Early History of the Real/Nominal Interest Rate Relationship, *Federal Reserve Bank of Richmond Economic Review*, May/June, 1983, 2-19. In its "modern" form the proposition is mainly associated with Fisher, I., *Appreciation and Interest*, New York: MacMillan 1896.

[12] At least not for a time span covering the whole period sine 1875. For shorter historical time-periods one may try to measure inflation expectations more directly from the yield on inflation-index-linked bonds. However, in the case of Denmark such an approach is complicated by a rather illiquid marked for index-linked bonds. Furthermore, special tax provisions may distort the results, cf. e.g. Topp, J., Indicators of the Market's Interest-Rate and Inflation Expectations in Denmark, *Danmarks Nationalbank Monetary Review*, May, 1996, 46-58.

Another approach could be to try to utilise information regarding price expectations from consumer surveys, cf. Christensen, A. M., Households' Inflation Expectations, *Danmarks Nationalbank Monetary Review*, November, 1996, 57-64. However, in Denmark such surveys cover only the period since the middle of the 1970s.

An alternative approach could be to use "independent" (i.e. non-governmental) inflation forecasts from macroeconomic projections as a measure of the expected inflation. In Denmark such forecasts are available from Danish Economic Council since the beginning of the 1960s, cf. Det Økonomiske Råd. Formandskabet, *Råd og realiteter 1962-1987*, Copenhagen: Det Økonomiske Råd 1987.

[13] The horizon of 7 years has been chosen because it roughly corresponds to the Macaulay Duration of a 10-year bullet bond at an interest rate level (6.36 per cent per annum) equal to the average annual yield on Danish government bonds for the period 1875-2003, cf. table 4.

For reason of comparison Chart 8a-f also include the annual average "real GDP growth 7 years ahead". This measure can also be considered as a proxy for the expected real long-term interest rate under the assumption of "perfect foresight" (or "rational expectations") regarding future economic growth.[14]

All the three measures for the *ex ante* real interest rate in Denmark show an average around 3 per cent per annum for the period since 1875 seen as a whole. The average real GDP growth 7 years ahead has also been around this level. However, the volatility in the *ex ante* real-interest-rate figures is much higher than the volatility in the average real GDP growth 7 years ahead. Furthermore, it is worth noting that the "real long-term interest rate (PF)" was consistently lower than the "real GDP growth 7 years ahead" during the 1960s and until the mid-1970s. In the period since the mid-1970s and until the mid-1990s the "real long-term interest rate (PF)" has been significant above the "real GDP growth 7 years ahead".

Taken at face value the "real long-term interest rate (PF)" indicates a rather high level of real interest rates during the 1980s and the first half of the 1990. However, as an alternative to derive indicators for the *ex ante* real interest rate from the nominal interest rate one can try to derive proxies for the expected inflation from the nominal long-term interest rate by deducting a measure for the expected real long-term interest rate.[15] Chart 9a-f show the results regarding the expected inflation rate for Denmark and five other countries in the period 1875-1996 using the real growth in GDP 7 years ahead as a measure for the expected real long-term interest rate. Chart 9a-f also show the actual annual average 7 years ahead inflation.

According to such calculations financial market inflation expectations in Denmark have roughly been correct for the period 1875-1996 as a whole. On average the actual inflation was 3.4 per cent per annum while the average expected inflation rate was 3.6 per cent per annum. However, given the chosen proxy for the expected inflation the large fluctuations in inflation during World War I and the inter-war period were not expected – in fact, inflation expectations remained quite stable in the period 1910-1930 despite large fluctuations in the actual inflation rate. During the 1960s and the first half of the 1970s inflation expectations underestimated the actual inflation 7 years ahead. Since the mid-1970s inflation expectations in Denmark have persistently overestimated the actual inflation 7 years ahead. Similar high degrees of persistence in financial market inflation expectations are also found for the 5 other

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[14] The underlying argument is the "Golden Rule" within Neoclassical Growth Theory according to which the steady state real interest rate equals the annual growth rate of real output, cf. e.g. Mankiw, N. G., *Macroeconomics*, New York: Worth Publishers 1992; or Barro, R. J. & Sala-i-Martin, X., *Economic Growth*, Second Edition, London: MIT Press 2004.

[15] For recent international comparative studies with Denmark included using such an approach in an historical context, see Bordo, M. & Dewald, W. G., Bond Market Inflation Expectations in Industrial Countries: Historical Perspectives, *NBER Working Paper*, No. 8582, November 2001; and Dewald, W. G., Bond Market Inflation

countries shown in Chart 9b-f. This could indicate the presence of a very long learning process in the formation of inflation expectations.

5. Summary of main findings

The aim of this paper has been to paint a broad picture of the interest-rate development in Denmark in the period 1875-2003.

Some of the most visible "stylised facts" of the development in Danish interest rates seem to be the following:

- In the period 1875-1945 the average short-term and long-term nominal interest-rate level was between 4 and 5 per cent per annum. A persistent upward trend in nominal interest rates during the 1960s and 1970s was followed by a persistent downward trend during the 1980s and 1990s. During the last five years (1999-2003) the average short-term and long-term nominal interest-rate levels have again been around 4-5 per cent per annum.
- Traditional measures of the *ex ante* real interest rate (nominal interest rate less inflation) show average short-term and long-term real interest rates in Denmark around 3 per cent per annum for the period since 1875. Furthermore, such calculations indicate a rather high real-interest-rate level during the 1980s and the first half of the 1990s.
- Alternatively, one may try to derive a proxy for the expected inflation from the nominal long-term interest rate by deducting a measure for the expected real long-term interest rate (*in casu* the real growth in GDP 7 years ahead). Such calculations show that financial market inflation expectations in Denmark on average have been correct for the period since 1875 seen as a whole. However, there seems to be a rather high degree of persistence in the expected inflation rate. This could indicate the presence of a very long learning process in the formation of inflation expectations.

Expectations and Longer-Term Trends in Broad Monetary Growth and Inflation in Industrial Countries 1880-2001, *ECB Working Paper*, No. 253, September 2003.

Appendix 1: Data

Table A.1: Danish interest rates 1875-2003, per cent per annum

Year	Official discount rate	Private banks' average deposit rate	Market rate of discount/ Money market rate	Government bond yield	Yield on mortgage-credit bonds
1875	5.22	4.00	5.38	4.33	4.60
1876	5.26	4.02	5.60	4.38	4.90
1877	5.38	4.09	5.62	4.50	5.00
1878	4.41	3.98	5.13	4.50	5.00
1879	3.62	3.71	4.00	4.30	4.60
1880	3.39	3.67	3.48	4.13	4.40
1881	3.12	3.59	3.57	4.08	4.60
1882	4.08	3.72	4.35	4.08	4.30
1883	4.25	3.83	4.67	4.05	4.40
1884	4.07	3.82	4.53	4.00	4.40
1885	3.85	3.80	4.34	4.00	4.40
1886	3.39	3.67	4.05	3.85	4.10
1887	3.00	3.41	3.50	3.60	3.80
1888	3.00	3.29	3.34	3.55	3.70
1889	3.16	3.36	3.57	3.53	3.70
1890	3.73	3.53	4.11	3.60	3.80
1891	4.00	3.65	4.39	3.75	3.90
1892	3.68	3.55	4.28	3.73	4.00
1893	3.68	3.47	4.08	3.70	3.90
1894	3.53	3.50	4.00	3.58	3.80
1895	3.50	3.31	3.92	3.43	3.60
1896	3.52	3.33	3.86	3.50	3.60
1897	4.41	3.49	4.62	3.50	3.70
1898	4.28	3.52	4.58	3.50	3.70
1899	5.40	3.77	5.67	3.65	4.20
1900	5.87	4.14	6.22	3.78	4.40
1901	5.33	4.21	5.75	3.60	4.50
1902	4.05	3.90	4.46	3.55	4.30
1903	4.31	3.80	4.54	3.50	4.30
1904	4.50	3.79	4.79	3.60	4.40
1905	4.29	3.81	4.55	3.55	4.20
1906	5.22	4.08	5.45	3.58	4.30
1907	6.18	4.30	6.42	3.63	4.40
1908	6.14	4.36	6.78	3.70	4.50
1909	4.94	4.11	5.34	3.68	4.30
1910	5.00	4.07	5.35	3.70	4.40
1911	4.62	3.97	4.99	3.75	4.30
1912	5.06	4.03	5.38	3.93	4.40
1913	5.75	4.18	5.98	4.20	4.60
1914	5.52	4.28	5.97	4.25	4.70
1915	5.27	4.25	5.98	5.20	5.00
1916	5.00	4.14	5.28	4.90	4.90
1917	5.00	4.20	4.77	4.88	4.90
1918	5.00	4.32	5.47	4.90	5.00
1919	5.61	4.38	6.11	5.20	5.20
1920	6.71	4.70	7.31	6.30	5.80
1921	6.35	4.68	6.20	5.53	5.50
1922	5.16	4.14	5.64	4.90	5.10
1923	5.67	4.19	6.11	5.00	5.30
1924	6.96	4.47	6.39	5.30	5.70
1925	6.49	4.46	6.39	5.28	5.80
1926	5.24	4.38	5.33	5.25	5.70
1927	5.00	4.45	4.94	5.10	5.60
1928	5.00	4.42	4.92	4.93	5.30
1929	5.13	4.46	5.15	5.10	5.30
1930	4.19	4.22	4.73	4.65	4.80
1931	4.22	4.16	4.60	4.75	5.20
1932	4.50	4.26	5.25	5.00	5.40
1933	3.17	3.49	4.53	4.13	4.60
1934	2.50	3.22	3.87	3.95	4.30
1935	2.86	3.43	3.68	4.28	4.80
1936	3.56	3.62	4.31	4.38	4.80
1937	4.00	3.62	4.58	4.55	5.00
1938	4.00	3.62	4.55	4.28	4.80
1939	4.08	3.65	4.64	4.63	5.00
1940	4.79	3.76	4.81	4.93	5.10
1941	4.00	3.44	4.00	4.20	4.40
1942	4.00	3.13	4.00	4.05	4.20
1943	4.00	2.96	4.00	4.38	4.40
1944	4.00	2.61	4.00	3.98	4.10

Table A.1 (continued): Danish interest rates 1875-2003, per cent per annum

Year	Official discount rate	Private banks' average deposit rate	Market rate of discount/ Money market rate	Government bond yield	Yield on mortgage-credit bonds
1945	4.00	2.27	4.00	3.75	4.00
1946	3.52	2.26	3.52	3.55	3.90
1947	3.50	2.32	3.50	3.65	3.80
1948	3.50	2.39	3.50	4.10	4.20
1949	3.50	2.46	3.50	4.43	4.50
1950	4.07	2.68	4.08	4.53	4.60
1951	5.00	2.94	5.00	5.13	5.40
1952	5.00	3.14	5.00	5.28	5.60
1953	4.86	3.17	4.88	5.10	5.50
1954	5.02	3.29	5.00	5.28	5.80
1955	5.50	3.63	5.79	5.55	6.30
1956	5.50	3.66	6.00	5.68	6.40
1957	5.50	3.69	6.00	5.75	6.50
1958	4.96	3.61	5.65	5.23	5.60
1959	4.64	3.36	5.15	5.40	5.80
1960	5.47	3.89	5.96	6.10	6.56
1961	6.11	4.58	6.63	6.68	7.74
1962	6.50	4.74	7.00	7.24	7.91
1963	6.25	4.38	6.81	7.11	7.95
1964	6.06	4.83	6.54	7.23	8.70
1965	6.50	5.04	7.00	8.49	9.94
1966	6.50	5.06	7.00	8.98	10.17
1967	6.53	5.45	7.04	9.21	10.32
1968	6.66	4.98	7.17	9.03	9.57
1969	8.03	6.31	8.50	9.69	10.29
1970	9.00	6.83	9.50	11.07	12.02
1971	7.70	5.91	8.19	10.50	11.75
1972	7.28	5.57	7.77	10.44	11.88
1973	7.50	6.39	8.10	11.83	13.21
1974	9.94	8.79	13.34	14.13	16.54
1975	8.12	7.32	6.47	12.39	13.49
1976	8.82	8.32	10.28	14.19	15.60
1977	9.17	9.42	14.48	15.71	16.38
1978	8.57	8.62	15.42	15.48	17.33
1979	9.12	8.47	12.63	16.57	17.61
1980	12.28	11.45	16.93	20.38	19.78
1981	11.00	10.85	14.84	19.55	20.11
1982	10.91	10.97	16.92	22.11	21.24
1983	8.06	9.02	12.81	14.55	14.97
1984	7.00	8.62	11.77	14.12	14.78
1985	7.00	8.34	10.33	11.33	12.03
1986	7.00	7.08	9.23	10.20	10.77
1987	7.00	7.62	10.11	11.29	12.55
1988	7.00	7.02	8.53	9.87	11.26
1989	7.00	7.00	9.59	9.70	10.16
1990	8.03	7.90	10.89	10.63	10.98
1991	9.50	7.20	9.70	9.27	10.09
1992	9.50	7.50	11.04	8.99	10.14
1993	8.69	6.50	10.41	7.28	8.16
1994	5.21	3.50	6.13	7.85	8.39
1995	5.36	3.90	6.07	8.27	9.09
1996	3.46	2.80	3.87	7.19	7.84
1997	3.31	2.70	3.66	6.26	7.20
1998	3.80	3.10	4.15	5.03	6.27
1999	2.95	2.40	3.31	4.94	6.60
2000	4.02	3.20	4.91	5.66	7.33
2001	4.29	3.30	4.62	5.09	7.05
2002	3.22	2.55	3.48	5.05	6.69
2003	2.26	1.83	2.38	4.31	5.11

Table A.2: German interest rates 1875-2003, per cent per annum

Year	Short-term interest rate	Long-term interest rate	Year	Short-term interest rate	Long-term interest rate
1875	3.42	4.09	1945	3.50	4.55
1876	3.04	4.12	1946	3.50	4.55
1877	3.17	4.20	1947	3.50	4.55
1878	3.07	4.18	1948	4.25	5.87
1879	2.60	4.09	1949	4.77	5.88
1880	3.04	4.00	1950	4.92	6.44
1881	3.50	3.94	1951	7.08	6.99
1882	3.89	3.94	1952	6.39	6.54
1883	3.08	3.92	1953	4.34	6.71
1884	2.90	3.88	1954	3.75	6.97
1885	2.85	3.84	1955	4.20	6.70
1886	2.16	3.77	1956	6.15	6.90
1887	2.30	3.76	1957	4.95	7.50
1888	2.11	3.71	1958	3.60	6.80
1889	2.63	3.70	1959	3.22	5.77
1890	3.78	3.75	1960	5.10	6.40
1891	3.02	3.77	1961	3.59	5.90
1892	1.80	3.48	1962	3.42	5.90
1893	3.17	3.48	1963	3.41	6.05
1894	1.74	3.31	1964	4.09	6.23
1895	2.01	3.03	1965	5.14	7.04
1896	3.04	3.02	1966	6.63	8.12
1897	3.08	3.07	1967	4.27	6.96
1898	3.55	3.14	1968	3.79	6.45
1899	4.45	3.31	1969	5.79	6.84
1900	4.41	3.46	1970	9.42	8.33
1901	3.06	3.36	1971	7.15	7.99
1902	2.19	3.25	1972	5.61	7.87
1903	3.01	3.28	1973	12.14	9.33
1904	3.14	3.33	1974	9.43	10.38
1905	2.85	3.33	1975	4.58	8.48
1906	4.04	3.42	1976	4.08	7.80
1907	5.12	3.56	1977	3.98	6.16
1908	3.52	3.60	1978	3.48	5.73
1909	2.87	3.50	1979	6.25	7.42
1910	3.54	3.56	1980	8.73	8.50
1911	3.54	3.59	1981	11.89	10.38
1912	4.22	3.71	1982	8.52	8.95
1913	4.98	3.89	1983	5.43	7.89
1914	2.84	4.86	1984	5.71	7.78
1915	3.89	4.86	1985	5.34	6.87
1916	4.62	4.90	1986	4.64	5.88
1917	4.63	4.91	1987	4.06	6.14
1918	4.63	4.91	1988	4.33	6.49
1919	3.19	6.00	1989	7.09	6.89
1920	3.59	6.14	1990	8.51	8.67
1921	3.49	6.25	1991	9.31	8.43
1922	5.91	5.95	1992	9.38	7.77
1923	1,359.66	1,359.66	1993	7.13	6.45
1924	25.13	11.01	1994	5.22	6.85
1925	7.62	9.49	1995	4.38	6.82
1926	4.92	7.75	1996	3.20	6.22
1927	5.49	6.97	1997	3.24	5.66
1928	6.53	7.00	1998	3.46	4.57
1929	6.87	7.01	1999	2.88	4.51
1930	4.43	7.21	2000	4.33	5.27
1931	6.78	12.47	2001	4.20	4.81
1932	4.95	8.17	2002	3.25	4.79
1933	3.88	6.62	2003	2.27	4.10
1934	3.77	5.20			
1935	3.15	4.96			
1936	2.96	4.94			
1937	2.91	4.88			
1938	2.88	4.61			
1939	2.77	4.61			
1940	2.36	3.92			
1941	2.18	3.69			
1942	2.13	3.57			
1943	2.13	3.56			
1944	2.13	3.56			

Table A.3: UK interest rates 1875-2003, per cent per annum

Year	Short-term interest rate	Long-term interest rate	Year	Short-term interest rate	Long-term interest rate
1875	3.14	3.20	1945	0.95	2.92
1876	2.26	3.16	1946	0.53	2.60
1877	2.62	3.15	1947	0.56	2.76
1878	3.59	3.15	1948	0.51	3.42
1879	2.14	3.08	1949	0.52	3.52
1880	2.53	3.05	1950	0.51	3.64
1881	3.05	3.00	1951	0.58	4.28
1882	3.55	2.99	1952	2.15	4.90
1883	3.22	2.97	1953	2.31	4.58
1884	2.57	2.97	1954	1.80	4.19
1885	2.40	3.02	1955	3.71	4.96
1886	2.33	2.98	1956	4.93	5.80
1887	2.65	2.95	1957	4.80	6.13
1888	2.53	2.97	1958	4.56	6.12
1889	2.85	2.81	1959	3.37	5.83
1890	3.88	2.67	1960	4.88	6.41
1891	2.77	2.70	1961	5.13	6.92
1892	1.76	2.65	1962	4.18	6.54
1893	2.32	2.61	1963	3.66	6.07
1894	1.18	2.52	1964	4.61	6.62
1895	0.96	2.39	1965	5.91	7.20
1896	1.56	2.28	1966	6.10	7.58
1897	1.92	2.25	1967	5.82	7.44
1898	2.62	2.28	1968	7.09	8.19
1899	3.15	2.36	1969	7.64	9.68
1900	3.70	2.54	1970	7.02	9.86
1901	3.17	2.67	1971	5.58	9.54
1902	2.97	2.66	1972	5.51	9.54
1903	3.40	2.75	1973	9.29	11.35
1904	2.68	2.83	1974	11.37	15.41
1905	2.63	2.78	1975	10.18	15.03
1906	4.04	2.83	1976	11.16	15.07
1907	4.46	2.97	1977	7.66	13.37
1908	2.26	2.90	1978	8.51	13.11
1909	2.26	2.98	1979	13.00	13.63
1910	3.18	3.08	1980	15.12	14.43
1911	2.92	3.15	1981	12.99	15.38
1912	3.63	3.28	1982	11.38	13.52
1913	4.37	3.39	1983	9.59	11.45
1914	2.93	3.46	1984	9.30	11.06
1915	3.64	3.82	1985	11.60	11.14
1916	5.20	4.31	1986	10.34	10.50
1917	4.77	4.58	1987	9.23	9.89
1918	3.58	4.40	1988	9.80	9.90
1919	3.95	4.62	1989	13.28	10.33
1920	6.38	5.32	1990	14.09	11.86
1921	5.19	5.21	1991	10.82	10.28
1922	2.63	4.43	1992	8.94	9.30
1923	2.71	4.31	1993	5.21	7.66
1924	3.44	4.39	1994	5.15	8.19
1925	4.14	4.43	1995	6.33	8.34
1926	4.46	4.55	1996	5.78	7.95
1927	4.24	4.56	1997	6.48	7.14
1928	4.16	4.47	1998	6.82	5.61
1929	5.26	4.60	1999	5.04	5.04
1930	2.56	4.46	2000	5.80	5.34
1931	3.61	4.53	2001	4.77	4.96
1932	1.87	3.76	2002	3.86	4.92
1933	0.69	3.38	2003	3.55	4.53
1934	0.82	3.08			
1935	0.58	2.89			
1936	0.60	2.94			
1937	0.59	3.28			
1938	0.63	3.38			
1939	1.22	3.72			
1940	1.04	3.40			
1941	1.03	3.13			
1942	1.03	3.03			
1943	1.03	3.10			
1944	1.03	3.14			

Table A.4: US interest rates 1875-2003, per cent per annum

Year	Short-term interest rate	Long-term interest rate	Year	Short-term interest rate	Long-term interest rate
1875	5.44	6.50	1945	0.75	2.37
1876	5.13	6.12	1946	0.81	2.19
1877	5.01	6.06	1947	1.03	2.25
1878	4.82	5.89	1948	1.44	2.44
1879	5.14	5.42	1949	1.48	2.31
1880	5.23	5.04	1950	1.45	2.32
1881	5.36	4.63	1951	2.16	2.57
1882	5.64	4.68	1952	2.33	2.68
1883	5.62	4.67	1953	2.52	2.92
1884	5.21	4.59	1954	1.58	2.54
1885	4.05	4.33	1955	2.18	2.82
1886	4.77	3.99	1956	3.31	3.18
1887	5.73	4.09	1957	3.81	3.65
1888	4.91	4.03	1958	2.46	3.32
1889	4.85	3.87	1959	3.97	4.33
1890	5.62	3.99	1960	3.85	4.12
1891	5.46	4.15	1961	2.97	3.88
1892	4.10	3.97	1962	3.26	3.95
1893	6.78	4.09	1963	3.55	4.00
1894	3.04	3.85	1964	3.97	4.19
1895	2.83	3.71	1965	4.38	4.28
1896	5.82	3.78	1966	5.55	4.92
1897	3.50	3.55	1967	5.10	5.07
1898	3.83	3.47	1968	5.90	5.65
1899	4.15	3.29	1969	7.83	6.67
1900	4.38	3.33	1970	7.72	7.35
1901	4.28	3.27	1971	5.11	6.16
1902	4.09	3.28	1972	4.69	6.21
1903	5.44	3.47	1973	8.15	6.84
1904	4.21	3.42	1974	9.87	7.56
1905	4.40	3.33	1975	6.33	7.99
1906	5.68	3.44	1976	5.24	7.61
1907	6.34	3.71	1977	5.54	7.42
1908	4.37	3.66	1978	7.94	8.41
1909	3.98	3.51	1979	10.97	9.44
1910	5.02	3.62	1980	12.66	11.46
1911	4.02	3.63	1981	15.32	13.91
1912	4.75	3.67	1982	11.89	13.00
1913	5.58	3.88	1983	8.87	11.11
1914	4.89	3.88	1984	10.10	12.44
1915	3.50	4.06	1985	7.95	10.62
1916	3.43	3.93	1986	6.50	7.73
1917	4.73	4.23	1987	6.81	8.56
1918	5.86	4.67	1988	7.66	9.04
1919	5.40	4.73	1989	8.99	8.67
1920	7.38	5.32	1990	8.06	8.73
1921	6.53	5.09	1991	5.87	8.02
1922	4.41	4.30	1992	3.75	7.12
1923	4.98	4.36	1993	3.22	5.94
1924	3.90	4.06	1994	4.66	7.20
1925	3.99	3.86	1995	5.93	6.69
1926	4.23	3.68	1996	5.41	6.54
1927	4.02	3.34	1997	5.57	6.44
1928	4.81	3.33	1998	5.34	5.32
1929	5.78	3.60	1999	5.18	5.73
1930	3.56	3.29	2000	6.31	6.12
1931	2.63	3.34	2001	3.61	5.06
1932	2.72	3.68	2002	1.69	4.64
1933	1.66	3.31	2003	1.11	4.04
1934	0.89	3.12			
1935	0.75	2.79			
1936	0.75	2.69			
1937	0.94	2.74			
1938	0.81	2.61			
1939	0.59	2.41			
1940	0.56	2.26			
1941	0.54	2.05			
1942	0.66	2.46			
1943	0.69	2.47			
1944	0.73	2.48			

Table A.5: Norwegian interest rates 1875-2003, per cent per annum

Year	Short-term interest rate	Long-term interest rate	Year	Short-term interest rate	Long-term interest rate
1875	6.25	4.70	1945	3.00	3.42
1876	5.64	5.00	1946	2.50	2.96
1877	6.00	5.00	1947	2.50	2.50
1878	6.17	5.20	1948	2.50	2.49
1879	4.96	4.90	1949	2.50	2.50
1880	4.17	4.60	1950	2.50	2.58
1881	3.98	4.60	1951	2.50	2.74
1882	4.79	4.60	1952	2.50	2.74
1883	4.50	4.60	1953	2.50	2.72
1884	4.50	4.30	1954	2.50	2.69
1885	4.50	4.10	1955	3.37	2.99
1886	4.50	4.00	1956	3.50	4.31
1887	3.99	3.80	1957	3.50	4.57
1888	3.50	3.70	1958	3.50	4.76
1889	3.36	3.60	1959	3.50	4.61
1890	3.64	3.70	1960	3.50	4.58
1891	4.88	3.90	1961	3.50	4.64
1892	5.37	4.00	1962	3.50	4.95
1893	5.00	4.00	1963	3.50	4.96
1894	4.54	3.80	1964	3.50	4.94
1895	3.84	3.70	1965	3.50	4.99
1896	4.00	3.70	1966	3.50	5.00
1897	4.64	3.80	1967	3.50	5.00
1898	4.30	3.80	1968	3.50	4.94
1899	5.96	4.10	1969	3.83	5.12
1900	6.50	4.40	1970	4.50	6.29
1901	5.67	4.30	1971	4.50	6.40
1902	4.58	4.10	1972	4.58	6.27
1903	5.21	4.00	1973	6.69	6.19
1904	4.90	4.00	1974	7.91	7.10
1905	4.86	4.00	1975	7.31	7.29
1906	5.18	4.00	1976	7.12	7.25
1907	5.22	4.10	1977	9.52	7.39
1908	5.34	4.20	1978	9.05	8.45
1909	4.54	4.20	1979	8.08	8.59
1910	4.50	4.20	1980	10.85	10.27
1911	4.63	4.30	1981	12.04	12.31
1912	5.39	4.50	1982	13.60	13.20
1913	5.50	4.60	1983	11.96	12.86
1914	5.11	4.80	1984	12.36	12.16
1915	5.22	6.60	1985	11.98	12.58
1916	5.06	6.60	1986	13.84	13.47
1917	5.33	5.40	1987	14.35	13.49
1918	6.00	5.90	1988	13.24	13.07
1919	5.69	6.20	1989	11.10	10.97
1920	6.52	7.40	1990	11.26	10.76
1921	6.75	5.90	1991	10.30	10.06
1922	5.53	4.90	1992	11.18	9.90
1923	5.81	5.20	1993	6.98	7.08
1924	6.95	5.80	1994	5.61	7.48
1925	5.85	5.60	1995	5.25	7.44
1926	5.38	5.30	1996	4.69	6.82
1927	4.58	5.20	1997	3.53	5.90
1928	5.53	5.40	1998	5.57	5.39
1929	5.57	5.40	1999	6.27	5.52
1930	4.53	5.20	2000	6.53	6.23
1931	4.65	5.01	2001	7.02	6.24
1932	4.69	5.02	2002	6.70	6.39
1933	3.70	4.95	2003	3.87	5.05
1934	3.50	4.67			
1935	3.50	4.44			
1936	3.50	4.52			
1937	4.00	4.46			
1938	3.50	4.33			
1939	3.81	4.58			
1940	3.57	5.39			
1941	3.00	3.67			
1942	3.00	3.54			
1943	3.00	3.52			
1944	3.00	3.45			

Table A.6: Swedish interest rates 1875-2003, per cent per annum

Year	Short-term interest rate	Long-term interest rate	Year	Short-term interest rate	Long-term interest rate
1875	5.50	4.76	1945	2.55	3.04
1876	5.30	4.87	1946	2.50	3.01
1877	5.48	4.89	1947	2.50	3.02
1878	5.83	4.90	1948	2.50	3.08
1879	5.46	4.70	1949	2.50	3.02
1880	4.33	4.50	1950	2.54	3.11
1881	4.00	4.40	1951	3.00	3.23
1882	4.46	4.35	1952	3.00	3.28
1883	4.75	4.30	1953	2.97	3.27
1884	4.49	4.25	1954	2.75	3.24
1885	4.50	4.20	1955	3.45	3.70
1886	4.10	4.15	1956	3.78	3.75
1887	4.00	4.10	1957	4.47	4.33
1888	3.56	4.05	1958	4.67	4.33
1889	3.56	4.00	1959	4.50	4.28
1890	4.48	3.95	1960	4.98	5.19
1891	4.90	3.90	1961	5.00	5.33
1892	4.75	3.90	1962	4.43	4.99
1893	4.21	3.80	1963	3.90	4.93
1894	4.00	3.90	1964	4.86	5.64
1895	4.00	3.90	1965	5.98	6.18
1896	3.78	3.90	1966	6.18	6.57
1897	4.59	3.90	1967	4.80	6.06
1898	4.88	4.00	1968	5.90	6.31
1899	5.89	4.20	1969	7.04	6.98
1900	5.87	4.10	1970	8.44	7.39
1901	5.46	4.00	1971	5.85	7.23
1902	4.51	4.00	1972	3.75	7.29
1903	4.50	4.10	1973	2.79	7.39
1904	4.61	4.00	1974	6.85	7.79
1905	4.73	4.00	1975	7.29	8.79
1906	5.20	4.00	1976	6.50	9.28
1907	6.10	4.20	1977	9.42	9.74
1908	5.88	4.20	1978	6.63	10.09
1909	4.69	4.10	1979	6.79	10.47
1910	4.63	4.30	1980	11.58	11.74
1911	4.57	4.30	1981	12.54	13.49
1912	4.81	4.30	1982	13.22	13.04
1913	5.50	4.40	1983	12.34	12.30
1914	5.24	4.30	1984	11.93	12.28
1915	5.51	4.57	1985	14.17	13.09
1916	5.24	4.37	1986	9.83	10.26
1917	5.68	4.30	1987	9.52	11.68
1918	6.93	4.63	1988	9.95	11.35
1919	6.38	4.50	1989	11.26	11.17
1920	6.93	4.60	1990	13.24	13.19
1921	6.49	4.70	1991	11.38	10.79
1922	4.85	4.82	1992	12.32	10.05
1923	4.64	4.86	1993	8.13	8.52
1924	5.50	4.90	1994	7.35	9.58
1925	5.17	4.83	1995	8.59	10.28
1926	4.50	4.68	1996	5.83	8.04
1927	4.15	4.58	1997	4.25	6.61
1928	4.01	4.59	1998	4.20	5.00
1929	4.74	4.56	1999	3.18	4.99
1930	3.72	4.18	2000	3.93	5.36
1931	4.16	4.22	2001	3.98	5.10
1932	4.39	4.32	2002	4.11	5.29
1933	3.17	4.02	2003	3.07	4.63
1934	2.50	3.47			
1935	2.50	3.19			
1936	2.50	3.12			
1937	2.50	3.04			
1938	2.50	2.34			
1939	2.52	2.90			
1940	3.31	3.91			
1941	3.21	3.89			
1942	3.00	3.37			
1943	3.00	3.36			
1944	3.00	3.36			

Table A.7: Annual growth in real GDP in selected countries 1875-2003, per cent per annum

Year	Denmark	Germany	UK	USA	Norway	Sweden
1875	1.8	0.6	2.4	5.1	3.0	-4.4
1876	2.0	-0.5	1.0	1.3	2.9	6.5
1877	-2.8	-0.6	1.0	3.0	0.4	-3.3
1878	4.0	4.7	0.4	4.2	-3.0	-0.6
1879	3.3	-2.4	-0.4	12.6	1.3	-1.7
1880	2.3	-0.8	4.7	11.9	3.1	4.8
1881	0.9	2.5	3.5	3.5	0.8	0.2
1882	3.7	1.6	2.9	6.2	-0.4	4.1
1883	3.3	5.5	0.7	2.3	-0.4	1.0
1884	0.5	2.5	0.2	2.0	2.0	2.7
1885	0.7	2.4	-0.5	0.6	1.2	-0.4
1886	4.1	0.7	1.6	3.1	0.6	-0.4
1887	3.4	4.0	4.0	4.6	1.2	0.4
1888	0.8	4.1	4.5	-0.5	4.4	2.7
1889	1.3	2.8	5.4	6.2	3.5	5.2
1890	6.0	3.2	0.5	1.5	2.7	1.4
1891	1.9	-0.2	0.0	4.3	0.9	1.2
1892	2.5	4.1	-2.4	9.7	2.2	2.1
1893	1.9	4.9	0.0	-4.8	2.7	0.2
1894	2.1	2.4	6.7	-2.9	0.3	2.0
1895	5.6	4.8	3.2	12.1	1.0	5.0
1896	3.7	3.5	4.2	-2.0	3.1	5.8
1897	2.4	2.9	1.3	9.5	5.0	3.6
1898	1.6	4.3	4.9	2.1	0.3	2.2
1899	4.3	3.6	4.1	9.1	2.8	2.3
1900	3.4	4.3	-0.7	2.7	1.7	3.6
1901	4.2	-2.3	0.0	11.3	2.7	-1.1
1902	2.4	2.4	2.6	1.0	2.1	-0.1
1903	5.9	5.6	-1.1	4.9	-0.4	7.4
1904	2.2	4.0	0.6	-1.3	-0.1	1.0
1905	1.7	2.1	3.0	7.4	1.2	1.1
1906	2.8	3.0	3.4	11.5	3.6	6.5
1907	3.7	4.4	1.9	1.5	3.8	2.2
1908	3.2	1.7	-4.1	-8.2	3.2	-0.2
1909	3.8	2.0	2.3	12.2	2.7	-0.7
1910	3.0	3.6	3.1	1.0	3.5	6.0
1911	5.3	3.4	2.9	3.3	3.1	2.5
1912	0.0	4.4	1.5	4.7	4.5	2.8
1913	3.7	4.5	3.8	4.0	5.6	1.7
1914	6.3	-14.8	1.0	-7.7	2.2	-0.9
1915	-6.9	-5.0	8.0	2.8	4.3	0.0
1916	4.2	1.0	2.2	13.8	3.2	-1.3
1917	-5.9	0.1	0.9	-2.5	-9.1	-12.3
1918	-3.3	0.2	0.6	9.0	-3.7	-1.5
1919	12.9	-11.8	-10.9	0.9	16.9	5.8
1920	4.7	8.7	-6.0	-0.9	6.3	5.8
1921	-2.9	11.3	-8.1	-2.3	-8.3	-3.7
1922	10.1	8.8	5.2	5.5	11.7	9.4
1923	10.5	-16.9	3.2	13.2	2.2	5.3
1924	0.3	17.1	4.1	3.1	-0.5	3.1
1925	-2.3	11.2	4.9	2.3	6.2	3.7
1926	5.9	-4.1	-3.7	6.5	2.2	5.6
1927	1.9	18.6	8.0	1.0	3.8	3.1
1928	3.4	2.3	1.2	1.1	3.3	4.7
1929	6.7	1.2	2.9	6.1	9.3	6.1
1930	6.0	-6.1	-0.7	-8.9	7.4	2.1
1931	1.1	-10.2	-5.1	-7.7	-7.8	-3.6
1932	-2.6	-9.3	0.8	-13.2	6.7	-2.7
1933	3.2	10.5	2.9	-2.1	2.4	1.9
1934	3.0	7.7	6.6	7.7	3.2	7.6
1935	2.3	9.1	3.9	7.6	4.3	6.4
1936	2.5	10.5	4.5	14.2	6.1	5.8
1937	2.4	6.0	3.5	4.3	3.6	4.7
1938	2.4	7.7	1.2	-4.0	2.5	1.7
1939	4.8	9.4	1.0	8.0	4.8	6.9
1940	-14.0	0.7	10.0	7.7	-8.9	-3.0
1941	-9.9	6.3	9.1	18.2	2.4	1.7
1942	2.3	1.3	2.5	20.0	-3.9	6.1
1943	11.1	2.0	2.2	19.9	-2.0	4.4
1944	10.4	2.6	-3.9	8.4	-5.2	3.4

Table A.7 (continued): Annual growth in real GDP in selected countries 1875-2003, per cent per annum

Year	Denmark	Germany	UK	USA	Norway	Sweden
1945	-7.5	-28.9	-4.4	-4.0	12.1	2.7
1946	15.6	-40.6	-4.3	-20.6	10.7	11.0
1947	5.6	12.3	-1.5	-1.5	11.5	2.5
1948	3.3	18.4	3.2	3.8	8.0	3.1
1949	6.1	16.5	3.7	0.4	2.0	3.7
1950	5.8	19.4	3.2	8.7	5.5	5.3
1951	2.4	8.6	3.0	9.8	4.6	4.0
1952	1.0	10.4	-0.2	4.3	3.6	1.4
1953	5.7	8.8	3.9	3.7	4.6	2.8
1954	3.3	7.7	4.1	-0.7	5.0	4.2
1955	1.6	12.0	3.6	5.6	1.9	2.9
1956	0.8	7.6	1.2	2.0	5.2	3.8
1957	5.6	5.9	1.6	1.9	2.9	4.5
1958	2.6	4.3	-0.2	-0.5	-0.9	0.5
1959	7.8	7.8	4.0	5.5	5.1	3.1
1960	6.2	8.7	5.8	2.0	5.7	5.3
1961	7.9	4.5	2.6	2.1	6.2	5.7
1962	6.2	4.6	1.2	6.2	2.8	4.2
1963	2.1	2.8	4.6	4.3	3.8	5.4
1964	9.3	6.7	5.6	5.9	5.0	6.8
1965	5.3	5.4	2.5	6.3	5.5	3.8
1966	2.4	2.8	1.9	6.6	3.8	2.1
1967	4.0	-0.3	2.4	2.5	6.2	3.4
1968	4.8	5.5	3.9	4.8	2.4	3.8
1969	6.6	7.4	2.3	2.9	4.4	4.9
1970	2.4	5.1	2.2	0.3	2.0	6.5
1971	3.0	3.0	2.2	3.4	4.5	0.9
1972	4.9	4.3	3.5	5.4	5.3	2.6
1973	3.6	4.9	7.3	5.6	4.1	4.2
1974	-0.4	0.3	-1.5	-0.5	5.2	3.3
1975	-2.1	-1.4	-0.9	-0.5	4.2	2.4
1976	6.2	5.3	2.8	5.6	6.7	0.0
1977	1.6	2.8	2.5	4.6	3.5	-1.5
1978	2.2	3.0	3.3	5.5	4.5	2.3
1979	4.1	4.1	2.8	3.2	4.5	3.8
1980	0.4	1.1	-2.1	-0.2	4.9	1.5
1981	-1.6	0.1	-1.4	2.4	1.0	0.0
1982	2.9	-0.9	1.8	-2.0	0.1	1.4
1983	1.8	1.8	3.7	4.3	3.5	1.4
1984	3.2	2.8	2.5	7.4	5.9	4.2
1985	3.3	2.0	3.9	3.8	5.2	2.7
1986	3.5	2.3	4.1	3.3	3.5	2.6
1987	0.4	1.5	4.3	3.4	2.0	3.2
1988	0.5	3.7	5.1	4.3	-0.1	2.5
1989	0.5	3.6	2.2	3.5	0.5	3.0
1990	1.4	5.7	0.8	1.8	2.0	0.6
1991	0.9	4.5	-1.4	-0.4	3.9	-0.6
1992	0.4	2.3	0.3	3.0	2.8	-1.8
1993	0.1	-1.1	2.5	2.6	2.8	-2.4
1994	4.9	2.3	4.6	4.1	5.4	4.3
1995	3.1	1.7	2.9	2.6	4.2	4.1
1996	2.3	1.1	2.6	3.6	5.7	1.7
1997	2.9	1.1	3.4	4.5	4.6	2.2
1998	2.4	1.7	3.1	4.2	2.6	3.6
1999	3.0	1.9	2.8	4.4	2.1	4.6
2000	3.4	3.1	3.8	3.7	2.8	4.3
2001	1.7	1.0	2.1	0.5	2.7	0.9
2002	0.9	0.2	1.6	2.2	1.4	2.1
2003	0.4	-0.1	2.2	3.1	0.3	1.6

Appendix 2: Data sources and calculation methods[16]

Denmark

Official discount rate - Denmark

Sources:

Various issues of: Danmarks Nationalbank, *Financial Statistics*; Danmarks Nationalbank, *Monetary Review*; and Danmarks Nationalbank, *Report and Accounts*. Other sources: Mikkelsen, R., *Dansk pengehistorie 1960-1990*, Copenhagen: Danmarks Nationalbank 1993; and Mordhorst, K., *Dansk pengehistorie. Bilag*, Copenhagen: Danmarks Nationalbank 1968.

Comments:

(1) Annual averages of the discount rate of the Nationalbank (the central bank of Denmark). (2) For the period 1875-1910 the Nationalbank quoted two discount rates. For this period the lower of the two rates have been selected.

Private banks' average deposit rate - Denmark

Sources:

Various issues of: Danmarks Nationalbank, *Financial Statistics*; Danmarks Nationalbank, *Monetary Review*; and Statistics Denmark, *Statistical Yearbook*. Other sources: Andersen, P. N. (edt.), *Laanerenten i Danmark. En teoretisk og historisk undersøgelse med særligt henblik paa renteudviklingen i Danmark*, Copenhagen: Nordisk Livsforsikrings-Aktieselskab og Nordisk Ulykkesforsikrings-Aktieselskab 1947; Hoffmeyer, E., *Strukturændringer på penge- og kapitalmarkedet. Et studie i anledning af sparekassernes 150 års jubilæum*, Copenhagen: Sparevirke Forlag 1960; Johansen, H. C., *Danish historical statistics 1814-1980*, Copenhagen: Gyldendal 1985; Mikkelsen, R., *Dansk pengehistorie 1960-1990*, Copenhagen: Danmarks Nationalbank 1993; and Winding, P., *Tavlehefte til Det Danske Kapitalmarked*, Copenhagen: Bikuben 1958.

Comments:

(1) Annual averages. (2) 1875-1922 and 1945-1948: Interpolated from a weighted average of deposit interest rates for major commercial banks and all savings banks. The weights used are deposits in all savings banks and all commercial banks by the end of the accounting year. (3)

[16] The data on consumer price inflation for the period 1876-2002 are listed and documented in Abildgren, K., Nominal and real effective krone rate indices for Denmark 1875-2002, *Danmarks Nationalbank Working Paper*,

1923-1944 and 1949-1959: Interpolated from weighted average deposit interest rates for all commercial banks and all savings banks. The weights used are deposits in all savings banks and commercial banks by the end of the accounting year. (4) Since 1960: Average deposits interest rates covering all savings banks and commercial banks.

Market rate of discount/money market rate - Denmark

Sources:

Various issues of: Danmarks Nationalbank, *Financial Statistics*; Danmarks Nationalbank, *Monetary Review*; Danmarks Nationalbank, *Report and Accounts*; and IMF, *International Financial Statistics*. Other sources: Andersen, P. N. (edt.), *Laanerenten i Danmark. En teoretisk og historisk undersøgelse med særligt henblik paa renteudviklingen i Danmark*, Copenhagen: Nordisk Livsforsikrings-Aktieselskab og Nordisk Ulykkesforsikrings-Aktieselskab 1947; and Danmarks Nationalbank's website (www.nationalbanken.dk).

Comments:

(1) Annual averages. (2) 1875-1923: Handelsbanken's rate of discount for commercial bills of exchange. (3) 1924-1940: Interpolated from principal commercial banks' rate of discount for commercial bills of exchange. (4) 1941-1949: Interpolated from Danmarks Nationalbank's loan rate. (5) 1950-1972: Principal commercial banks' rate of discount for commercial bills of exchange. (6) Since 1973: 3-month uncollateralised inter-bank interest rate.

Danish government bond yield

Sources:

Various issues of: Danmarks Nationalbank, *Monetary Review*; and Danmarks Nationalbank, *Report and Accounts*. Other sources: Danmarks Nationalbank's website (www.nationalbanken.dk); and Statistics Denmark, *Kreditmarkedsstatistik*, Statistiske Undersøgelser No. 24, Copenhagen: Statistics Denmark 1969.

Comments:

(1) Annual averages. (2) 1875-1985: Yield to maturity on long central government bonds. (3) Since 1986: Yield to maturity on 10-year central government bonds.

No. 13, April 2004. The data on consumer price inflation in 1875 and 2003 is based on the sources listed in Abildgren, *op. cit*.

Yield on mortgage-credit bonds - Denmark

Sources:

Various issues of: Danmarks Nationalbank, *Financial Statistics*; and Danmarks Nationalbank, *Report and Accounts*. Other sources: Danmarks Nationalbank's website (www.nationalbanken.dk); and Hoffmeyer, E., *Strukturændringer på penge- og kapitalmarkedet. Et studie i anledning af sparekassernes 150 års jubilæum*, Copenhagen: Sparevirkes Forlag 1960.

Comments:

(1) Annual averages. (2) 1875-1959: Average yield to maturity on long callable mortgage-credit bonds. (3) 1960-1972: Yield to maturity on 30-year callable mortgage-credit bonds. (4) Since 1973: Yield to maturity on 20-year callable mortgage-credit bonds.

Annual growth in real GDP in Denmark

Sources:

Other sources: Hansen, S. Aa., *Økonomisk vækst i Danmark. Bind II: 1914-1983*, Third Edition, Copenhagen: Akademisk Forlag 1983; Statistics Denmark, *50-year review*, Copenhagen: Statistics Denmark 1995; and Statistics Denmark, *StatBank Denmark*, Statistics Denmark's website (www.dst.dk).

Comments:

(1) Since 1922: Including the northern part of the old Duchy of Schleswig. (2) Since 1967: Annual growth in real gross value added.

Germany

Short-term German interest rate

Sources:

Various issues of: Danmarks Nationalbank, *Financial Statistics*. Other sources: Danmarks Nationalbank's website (www.nationalbanken.dk); Deutsche Bundesbank, *Deutsches Geld- und Bankwesen in Zahlen 1876-1975*, Frankfurt: Fritz Knapp GmbH 1976; Deutsche Bundesbank (edt.), *Fifty Years of the Deutsche Mark*, Oxford: Oxford University Press 1999; Holtfrerich, C.-L., *Die deutsche Inflation 1914-1923: Ursachen und Folgen in internationaler Perspektiv*, Berlin: Walter de Grynter 1980; Pedersen, N. L., *FINDAN. Finansiel sektor til ADAM*, Arbejdsnotat nr. 25, Copenhagen: Statistics Denmark 1989; and Homer, S. & Sylla,

R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996.

Comments:

(1) Annual averages. (2) 1875-1922 and 1925-1944: Open market rate of discount. (3) 1923: Call money rate. (4) 1924: 1-month money market rate. (5) 1945-1948: Official discount rate. (6) 1949-1998: 3-month uncollateralised money market rate. (7) Since 1999: 3-month uncollateralised money market rate in the euro-area.

Long-term German interest rate

Sources:

Various issues of: Danmarks Nationalbank, *Monetary Review*; and IMF, *International Financial Statistics*. Other sources: Danmarks Nationalbank website (www.nationalbanken.dk); Deutsche Bundesbank, *Deutsches Geld- und Bankwesen in Zahlen 1876-1975*, Frankfurt: Fritz Knapp GmbH 1976; Deutsche Bundesbank (edt.), *Fifty Years of the Deutsche Mark*, Oxford: Oxford University Press 1999; Holtfrerich, C.-L., *Die deutsche Inflation 1914-1923: Ursachen und Folgen in internationaler Perspektiv*, Berlin: Walter de Grynter 1980; Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996; and Statistics Denmark, *50-year review*, 2nd Edition, Copenhagen: Statistics Denmark 2001.

Comments:

(1) Annual averages. (2) 1875-1908, 1927-1944 and 1956-1985: Yields on long government bonds. (3) For the years 1922-1923 no long bond yields are available in the cited sources. The observations used for 1922-1923 are call money rates.[17] (4) 1909-1921, 1924-1926 and 1945-1955 interpolated from the development in non-government German interest rates. (5) Since 1986: Yield to maturity on 10-year central government bonds.

Annual growth in real GDP in Germany

Sources:

Various issues of: OECD, *Economic Outlook*. Other sources: Maddison, A., *Monitoring the world economy 1820-1992*, Paris: OECD 1995.

[17] Considering the high inflation rates in 1923 a short interest rate seems to be a reasonable proxy for a long interest rate for these years due to the fact that the Macaulay duration of a 10-year bullet bond is very low at high interest-rate levels.

Comments:

(1) Including the former East Germany from 1992.

United Kingdom

Short-term UK interest rate

Sources:

Various issues of: IMF, *International Financial Statistics*. Other sources: Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996; and Mitchell, B. R., *British Historical Statistics*, Cambridge: Cambridge University Press 1988.

Comments:

(1) Annual averages. (2) 1875-1947: 3-month open market rate of discount. (3) Since 1948: 3-month Treasury Bill rate.

Long-term UK interest rate

Sources:

Various issues of: Danmarks Nationalbank, *Monetary Review*; and IMF, *International Financial Statistics*. Other sources: Danmarks Nationalbank website (www.nationalbanken.dk); and Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996.

Comments:

(1) Annual averages. (2) 1875-1947: Yield on central government consols. (3) 1948-1985 interpolated from the development in yield on long central government bonds. (4) Since 1986: Yield to maturity on 10-year central government bonds.

Annual growth in real GDP in the UK

Sources:

Various issues of: OECD, *Economic Outlook*. Other sources: Maddison, A., *Monitoring the world economy 1820-1992*, Paris: OECD 1995.

United States

Short-term US interest rate

Sources:

Various issues of: IMF, *International Financial Statistics*. Other sources: Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996.

Comments:

(1) Annual averages. (2) 1875-1936: 2-3 month prime commercial paper interest rates. (3) 1937-1975: 4-6 month prime commercial paper interest rates. (4) Since 1976: 3 month prime commercial paper interest rates.

Long-term US interest rate

Sources:

Various issues of: Danmarks Nationalbank, *Monetary Review*; and IMF, *International Financial Statistics*. Other sources: Danmarks Nationalbank website (www.nationalbanken.dk); Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996; and United States Bureau of the Census, *The Statistical History of the United States. From Colonial Times to the Present*, New York: Basic Books 1976.

Comments:

(1) Annual averages. (2) Before 1919 long-term US central government bonds were often not outstanding, and government and municipal bonds normally included tax exemptions etc.[18] Therefore, the yields stated for the period 1875-1918 are interpolated from the development in the yield on long-term high-grade railroad bonds. (3) 1919-1954: Yields on long central government bonds. (4) Since 1955: Yield to maturity on 10-year central government bonds.

Annual growth in real GDP in the USA

Sources:

Various issues of: OECD, *Economic Outlook*. Other sources: Maddison, A., *Monitoring the world economy 1820-1992*, Paris: OECD 1995.

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[18] Cf. page 335 in Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996.

Norway

Short-term Norwegian interest rate

Sources:

Various issues of: IMF, *International Financial Statistics*. Other sources: Danmarks Nationalbank website (www.nationalbanken.dk); Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996; Oldam, J. W., Danmarks høje renteniveau: En særlig tradition ?, *Erhvervshistorisk årbog*, 1963, 119-159; and Norges Bank, *Norges Bank's discount rate*, Norges Bank's website (www.norges-bank.no), 2003.

Comments:

(1) Annual averages. (2) 1875-1971: Official discount rate. (3) 1972-1986: Interpolated from call money rates. (4) Since 1987: 3-month uncollateralised money market interest rate.

Long-term Norwegian interest rate

Sources:

Various issues of: IMF, *International Financial Statistics*. Other sources: Danmarks Nationalbank website (www.nationalbanken.dk); Holter, J. P., Historisk rentestatistikk 1820-1999, *Norges Bank Penger og Kreditt*, No. 4, 2000; and Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996.

Comments:

(1) Annual averages. (2) 1875-1930: Yield to maturity on bonds issued by the Mortgage Bank (in Norwegian: Hypotekbank). (3) 1931-1986: Yield to maturity on long central government bonds. (4) Since 1987: Yield to maturity on 10-year central government bonds.

Annual growth in real GDP in Norway

Sources:

Various issues of: OECD, *Economic Outlook*. Other sources: Maddison, A., *Monitoring the world economy 1820-1992*, Paris: OECD 1995.

Sweden

Short-term Swedish interest rate

Sources:

Various issues of: IMF, *International Financial Statistics*. Other sources: Danmarks Nationalbank website (www.nationalbanken.dk); Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996; and Oldam, J. W., Danmarks høje renteniveau: En særlig tradition ?, *Erhvervshistorisk årbog*, 1963, 119-159.

Comments:

(1) Annual averages. (2) 1875-1962: Official discount rate. (3) 1963-1986: 3-months Treasury bill rate. (4) Since 1987: 3-month uncollateralised money market interest rate.

Long-term Swedish interest rate

Sources:

Various issues of: IMF, *International Financial Statistics*. Other sources: Bordo, M. & Jonung, L., *Monetary Regimes, Inflation and Monetary Reform*, chapter 9 in D. Vaz & K. Velupillai (eds.), *Inflation, Institutions and Information: Essays in Honor of Axel Leijonhufvud*, London: Macmillan 1996; Danmarks Nationalbank website (www.nationalbanken.dk); Garcia-Iglesias, C., Interest Rate Risk Premium and Monetary Union in the European Periphery: New Lessons from the Gold Standard, *Scandinavian Economic History Review*, Vol. 50(2), 2002, 31-54; Hildebrand, K.-G., Nilsson, S. A. & öhngren, B. (eds.), *Kriser och krispolitik i Norden under mellankrigstiden. Nordiska historikermötet i Uppsala 1974. Mötesrapport*, Uppsala: Almqvist & Wiksell 1974; and Homer, S. & Sylla, R., *A History of Interest Rates*, Third Revised Edition, New York: Rutgers University Press 1996.

Comments:

(1) Annual averages. (2) 1875-1918: Interpolated from interest rates on new issues of long-term government bonds and outstanding issues of long-term government bonds. (3) 1919-1987: Yield to maturity on long central government bonds. (4) Since 1988: Yield to maturity on 10-year central government bonds.

Annual growth in real GDP in Sweden

Sources:

Various issues of: OECD, *Economic Outlook*. Other sources: Maddison, A., *Monitoring the world economy 1820-1992*, Paris: OECD 1995.

Tables and Charts

Table 1: Danish interest rates listed in appendix 1 – an overview

Data series	Concept
Official discount rate	The discount rate of the Nationalbank (the central bank of Denmark).
Private banks' average deposit rate	Weighted average deposits interest rates in savings banks and commercial banks.
Market rate of discount/money market rate	1875-1940 and 1950-1972: Commercial banks' rate of discount for commercial bills of exchange. 1941-1949: Danmarks Nationalbank's loan rate. Since 1973: 3-month uncollateralised inter-bank interest rate.
Government bond yield	1875-1985: Yield to maturity on long central government bonds. Since 1986: Yield to maturity on 10-year central government bonds.
Yield on mortgage-credit bonds	1875-1959: Average yield to maturity on long callable mortgage-credit bonds. 1960-1972: Yield to maturity on 30-year callable mortgage-credit bonds. Since 1973: Yield to maturity on 20-year callable mortgage-credit bonds.

Table 2: Foreign interest rates listed in appendix 1 – an overview

Country	Concept	
	Short-term	Long-term
Germany	1875-1944: Most of the years the open market rate of discount. 1945-1948: Official discount rate. Since 1949: 3-month uncollateralised money market rate.	1875-1985: Most of the years the yield on long government bonds. Since 1986: Yield to maturity on 10-year central government bonds.
United Kingdom	1875-1947: 3-month open market rate of discount. Since 1948: 3-month Treasury Bill rate.	1875-1947: Yield on central government consols. 1948-1985: Yield on long central government bonds. Since 1986: Yield to maturity on 10-year central government bonds.
United States	1875-1936: 2-3 month prime commercial paper interest rates. 1937-1975: 4-6 month prime commercial paper interest rates. Since 1976: 3 month prime commercial paper interest rates.	1875-1918: Yield on long-term high-grade railroad bonds 1919-1954: Yields on long central government bonds. Since 1955: Yield to maturity on 10-year central government bonds.
Norway	1875-1971: Official discount rate. 1972-1986: Call money rates. Since 1987: 3-month uncollateralised money market interest rate.	1875-1930: Yield to maturity on bonds issued by the Mortgage Bank. 1931-1986: Yield to maturity on long central government bonds. Since 1987: Yield to maturity on 10-year central government bonds.
Sweden	1875-1962: Official discount rate. 1963-1986: 3-months Treasury bill rate. Since 1987: 3-month uncollateralised money market interest rate.	1875-1987: Yield to maturity on long central government bonds. Since 1988: Yield to maturity on 10-year central government bonds.

Table 3.a: Danish exports of goods by country 1875-2001

	1875	1913	1927	1949	1967	1979	2001
	per cent						
Germany	29	25	22	7	13	18	20
UK, Ireland	42	62	60	44	24	15	11
Sweden	13	2	4	5	14	13	11
Norway	10	2	2	5	7	6	6
USA	0	1	1	3	7	5	7
France	0	1	1	5	3	5	5
Spain	0	0	0	1	1	1	2
Italy	0	0	0	2	4	5	3
Portugal	0	0	0	0	0	0	0
Belgium, Luxembourg	1	0	0	5	2	2	2
Netherlands	1	1	1	2	2	4	5
Japan	...	0	0	0	1	2	3
Finland	...	1	1	3	2	2	3
Switzerland	...	0	1	3	2	2	1
Other countries	4	5	6	15	18	19	20
Total	100	100	100	100	100	100	100

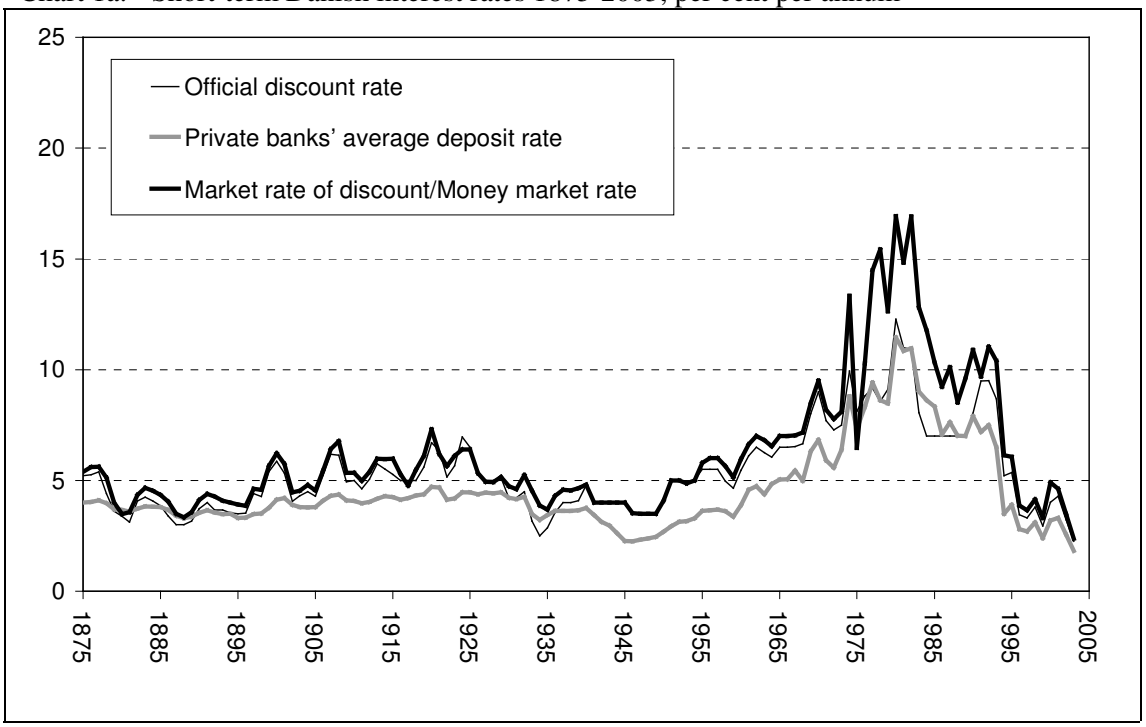
Source: Table 1 in Abildgren, K., A chronology of Denmark's exchange-rate policy 1875-2003, *Danmarks Nationalbank Working Paper*, No. 12, April, 2004.

Table 3.a: Danish imports of goods by country 1875-2001

	1875	1913	1927	1949	1967	1979	2001
	per cent						
Germany	37	38	31	3	20	20	22
UK, Ireland	28	16	13	32	14	12	9
Sweden	11	8	6	7	14	13	12
Norway	3	1	1	4	4	4	5
USA	1	10	15	16	9	5	4
France	2	2	4	5	4	5	6
Spain	0	0	0	1	0	1	2
Italy	0	0	1	2	4	3	4
Portugal	0	0	0	1	1	0	1
Belgium, Luxembourg	2	1	2	5	3	4	4
Netherlands	3	2	4	2	4	6	7
Japan	...	0	0	0	2	2	1
Finland	...	1	1	4	3	4	3
Switzerland	...	0	1	2	2	2	1
Other countries	12	18	21	16	17	19	20
Total	100	100	100	100	100	100	100

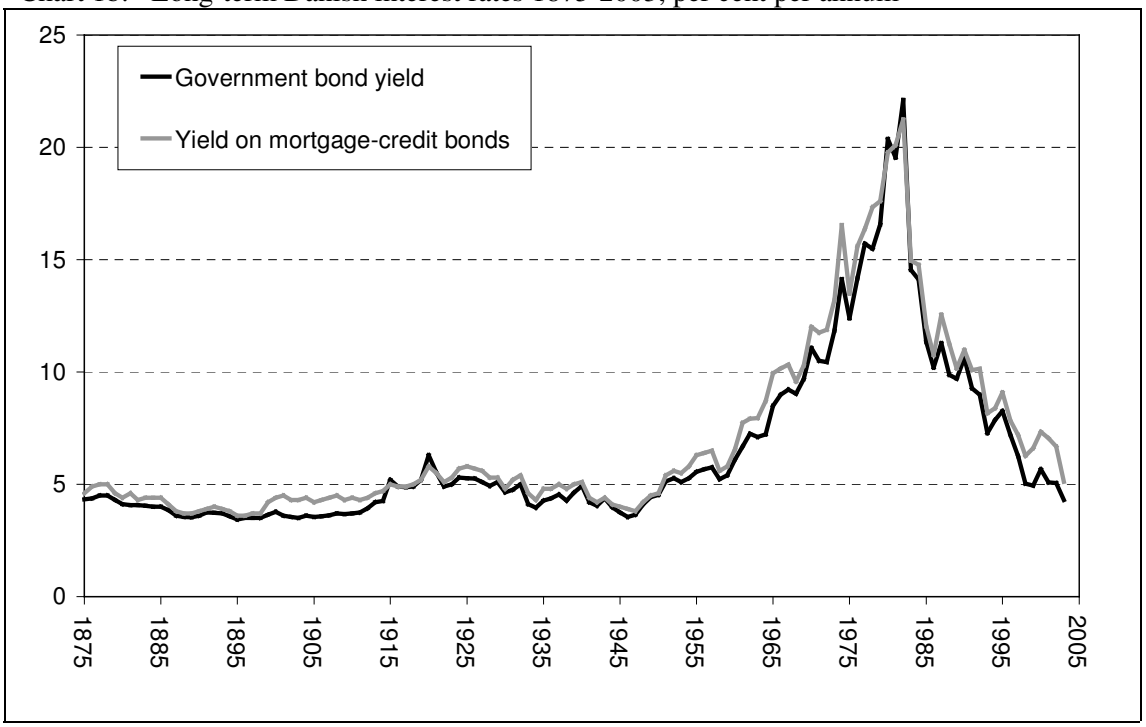
Source: Table 1 in Abildgren, K., A chronology of Denmark's exchange-rate policy 1875-2003, *Danmarks Nationalbank Working Paper*, No. 12, April, 2004.

Chart 1a: Short-term Danish interest rates 1875-2003, per cent per annum



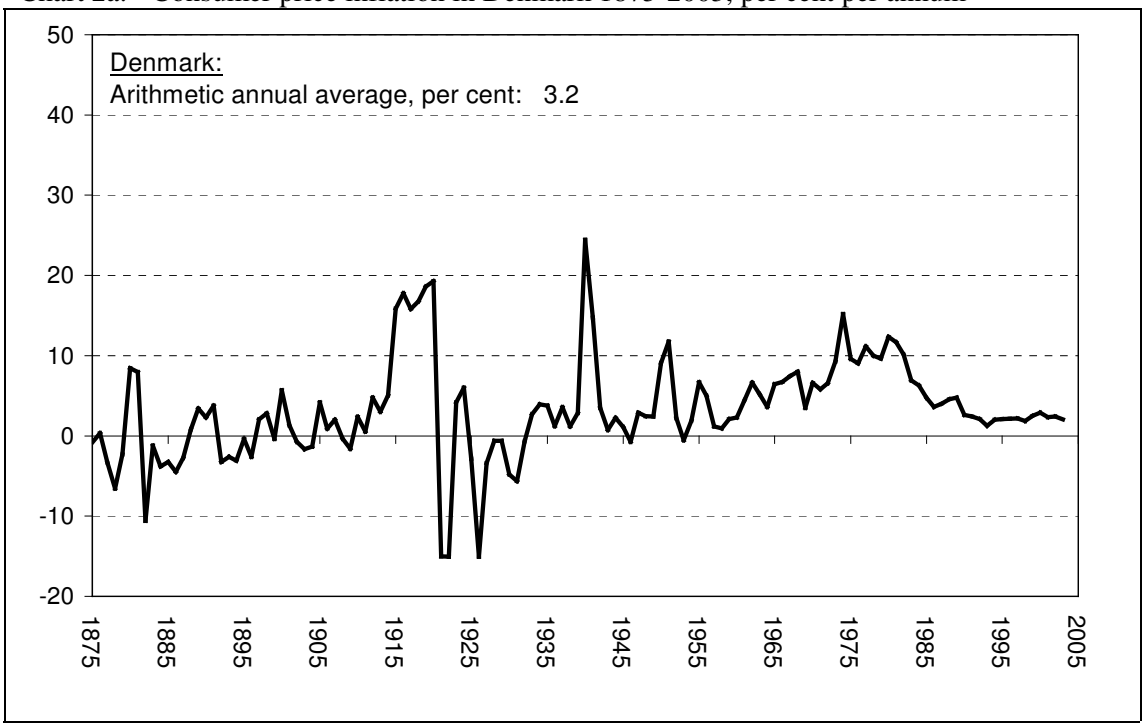
Sources: See appendix 2.

Chart 1b: Long-term Danish interest rates 1875-2003, per cent per annum



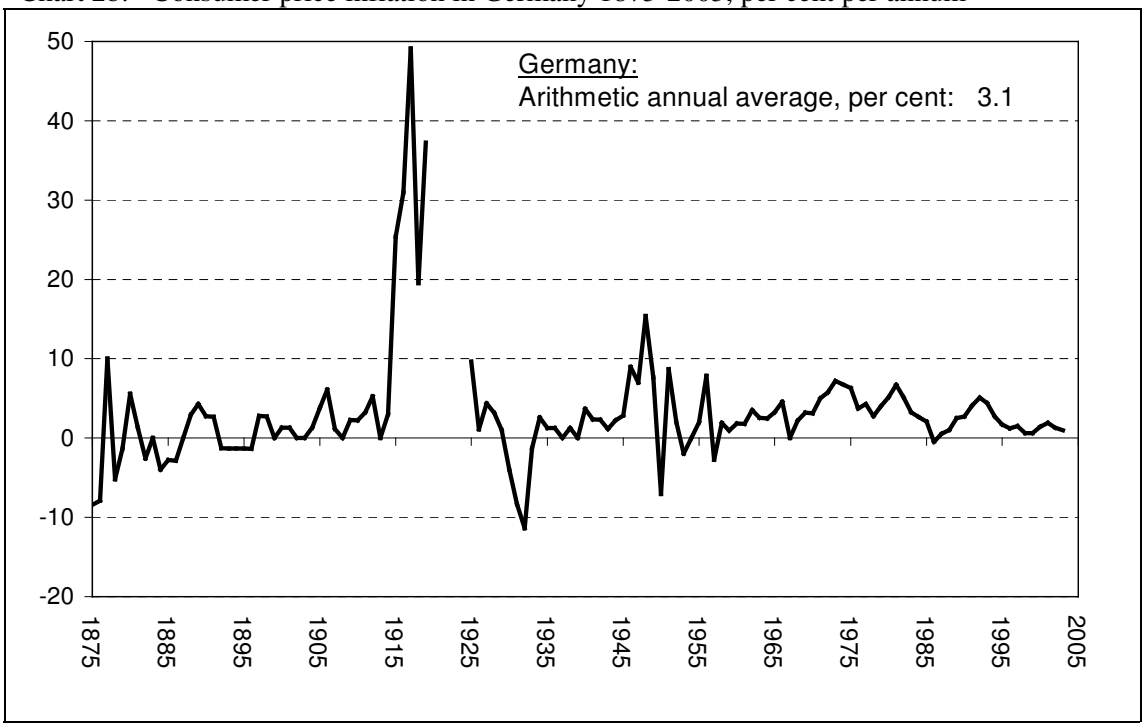
Sources: See appendix 2.

Chart 2a: Consumer price inflation in Denmark 1875-2003, per cent per annum



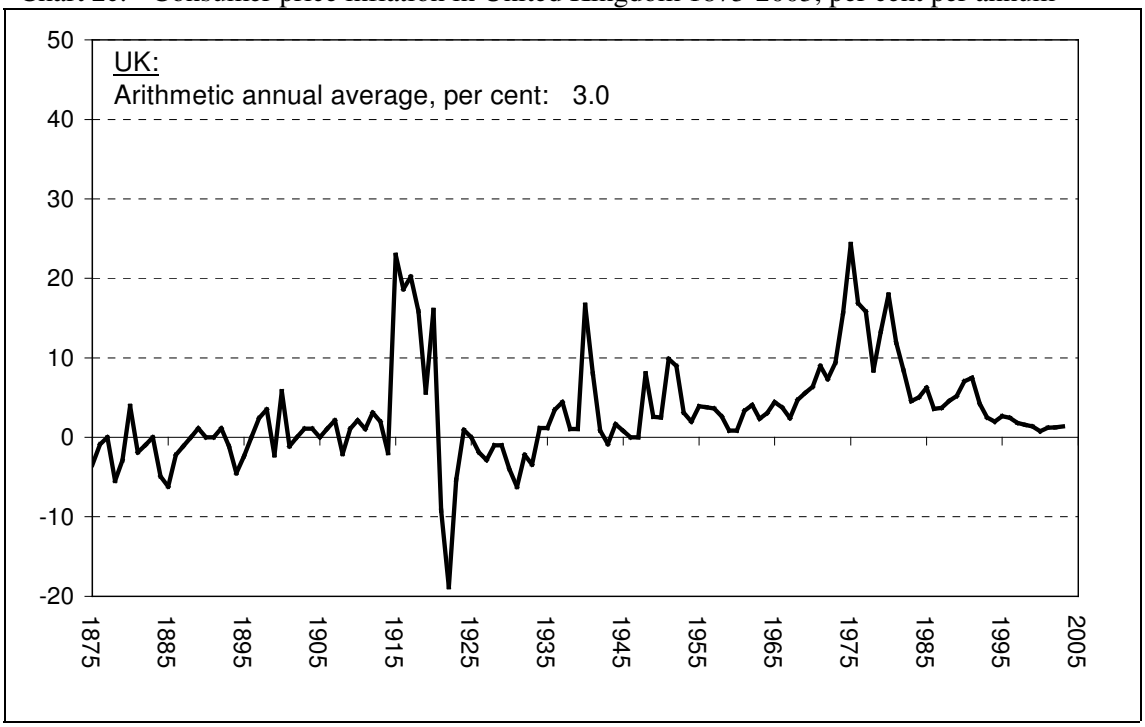
Sources: See appendix 2.

Chart 2b: Consumer price inflation in Germany 1875-2003, per cent per annum



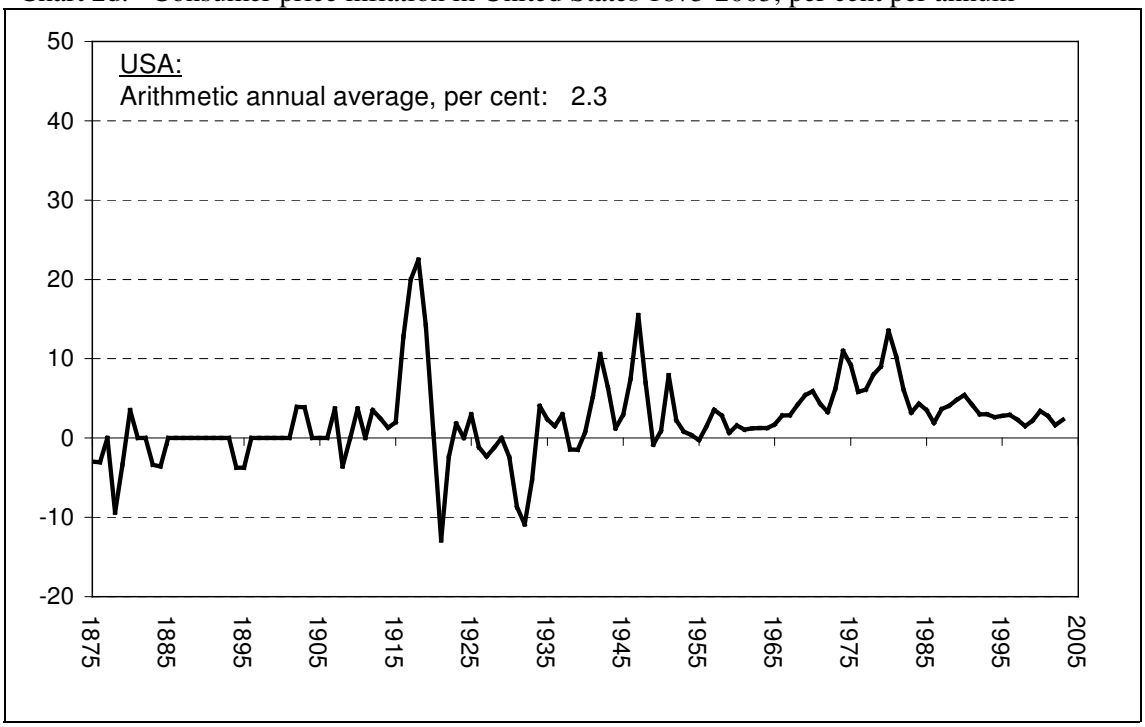
Note: The observations 1920-1924 (around the hyperinflation period) are omitted.
Sources: See appendix 2.

Chart 2c: Consumer price inflation in United Kingdom 1875-2003, per cent per annum



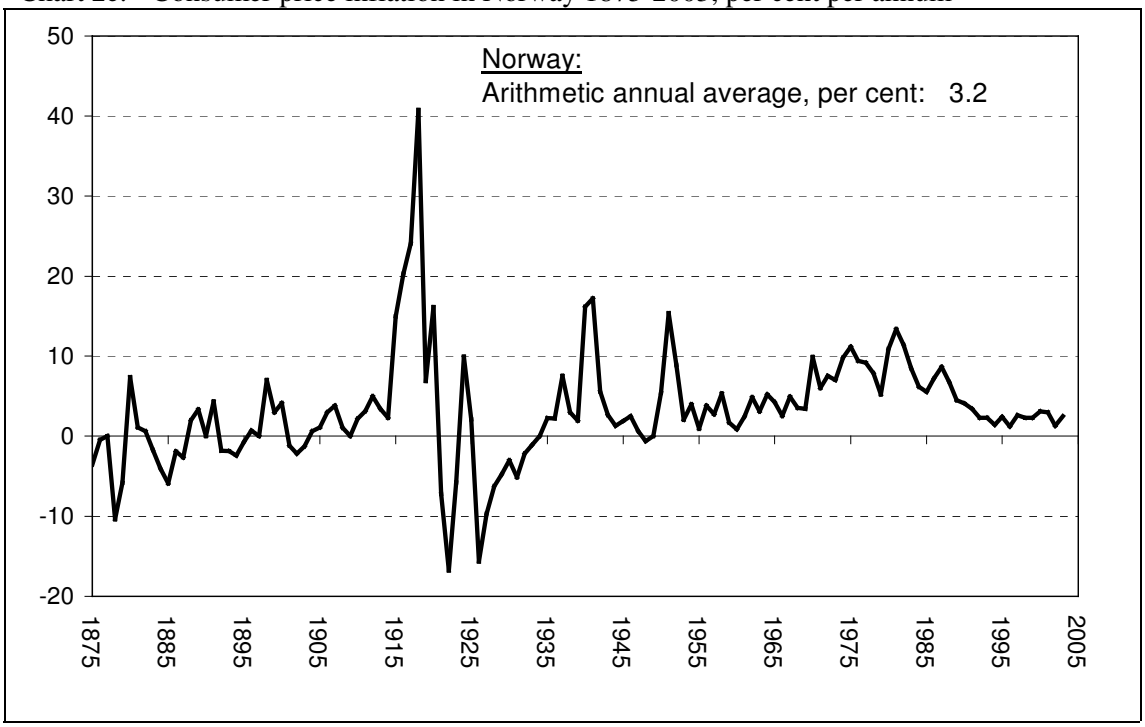
Sources: See appendix 2.

Chart 2d: Consumer price inflation in United States 1875-2003, per cent per annum



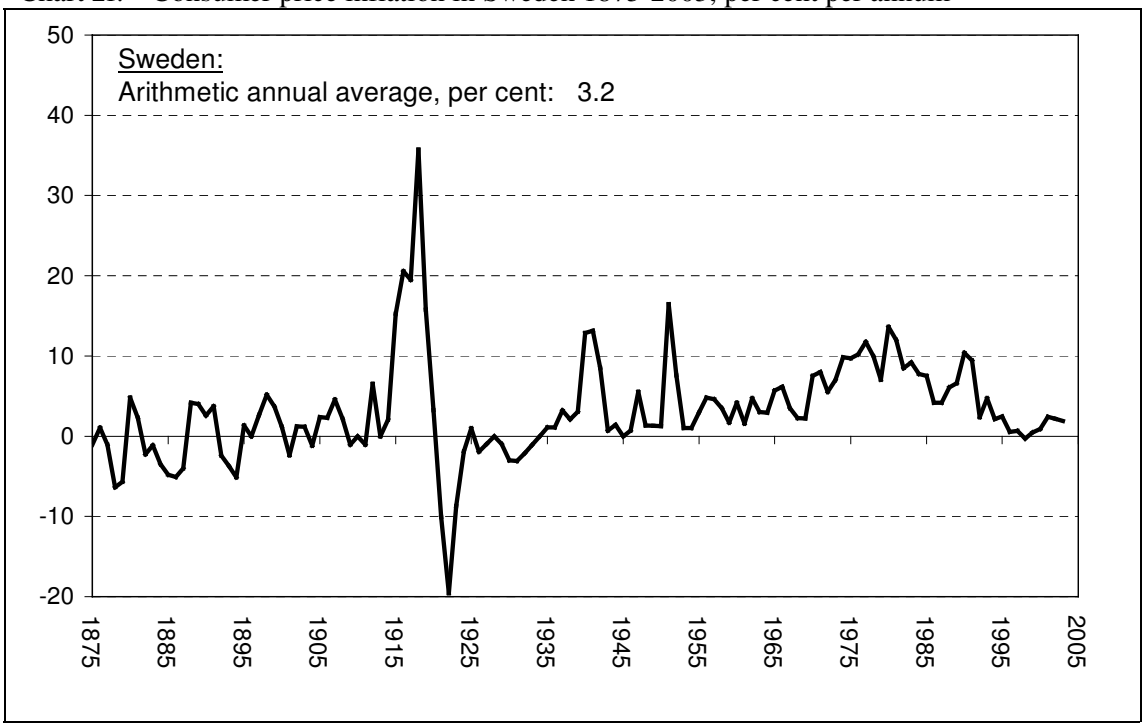
Sources: See appendix 2.

Chart 2e: Consumer price inflation in Norway 1875-2003, per cent per annum



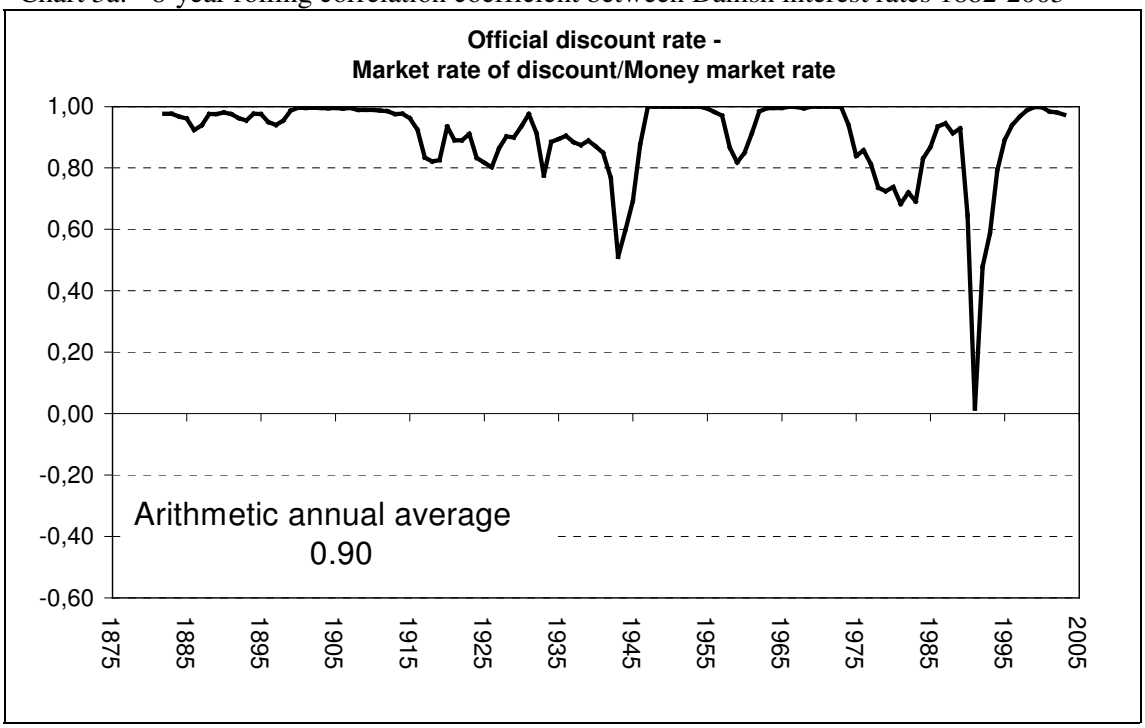
Sources: See appendix 2.

Chart 2f: Consumer price inflation in Sweden 1875-2003, per cent per annum



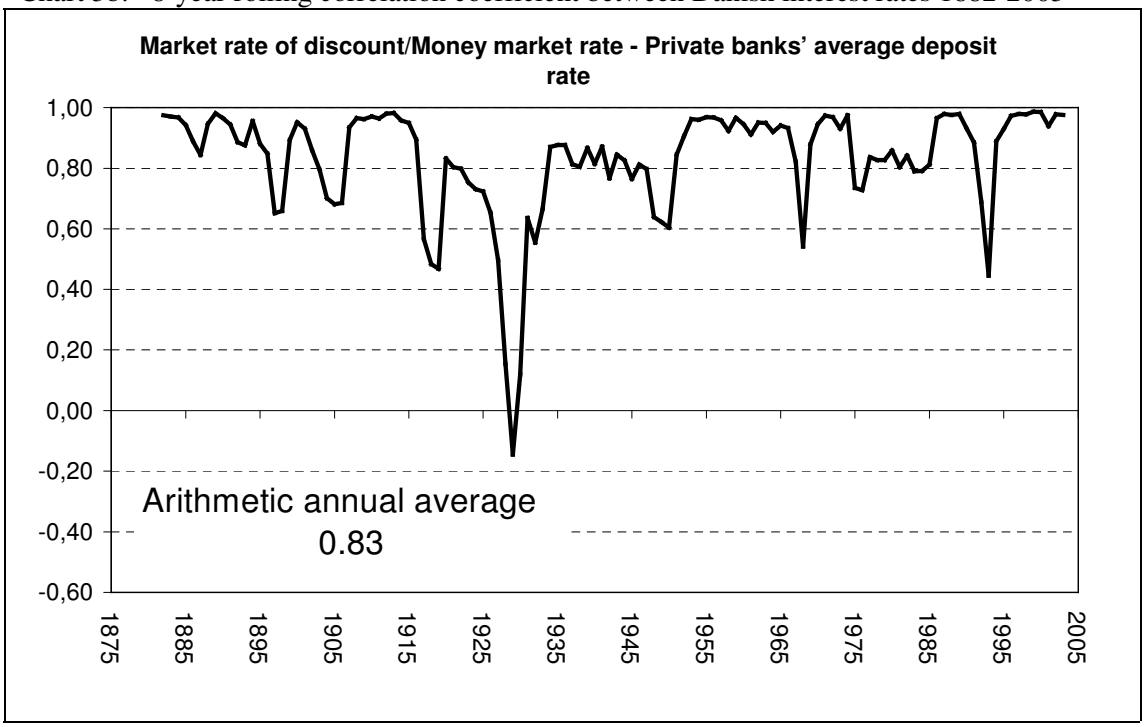
Sources: See appendix 2.

Chart 3a: 8-year rolling correlation coefficient between Danish interest rates 1882-2003



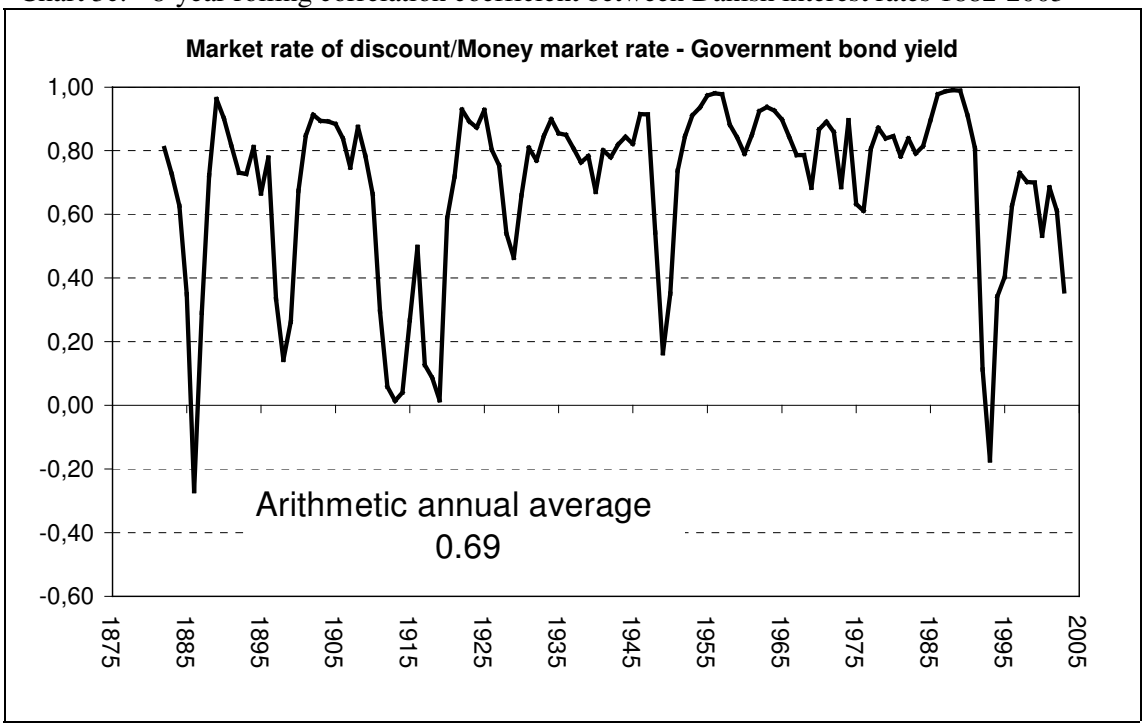
Sources: See appendix 2.

Chart 3b: 8-year rolling correlation coefficient between Danish interest rates 1882-2003



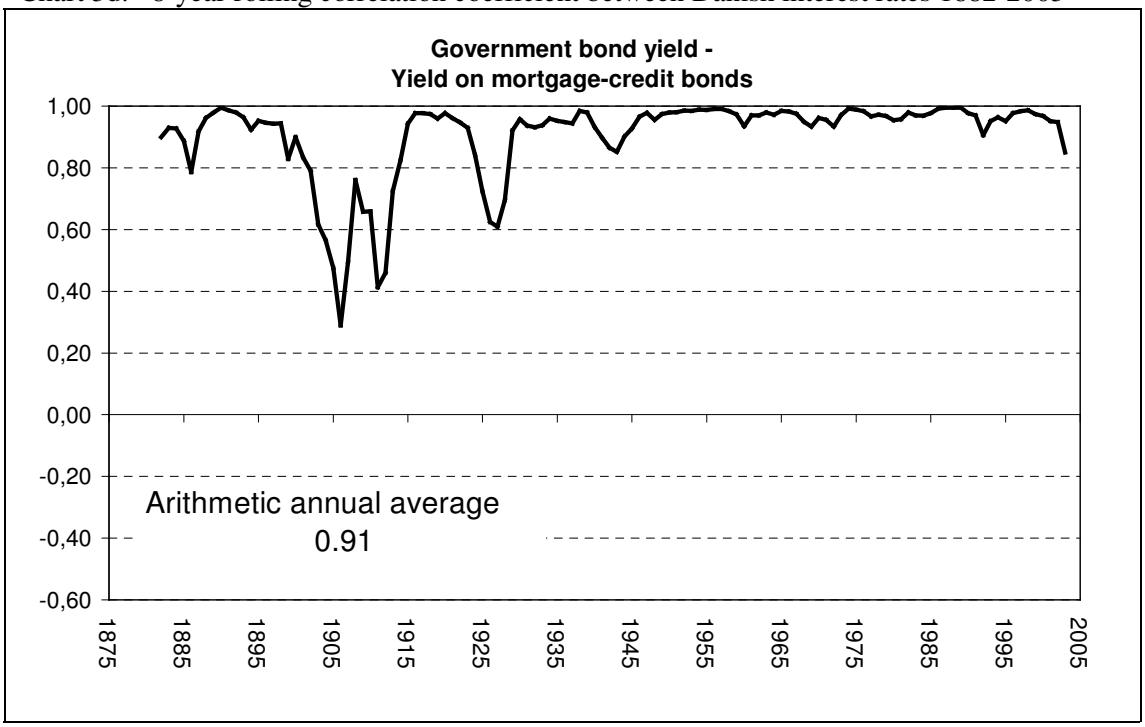
Sources: See appendix 2.

Chart 3c: 8-year rolling correlation coefficient between Danish interest rates 1882-2003



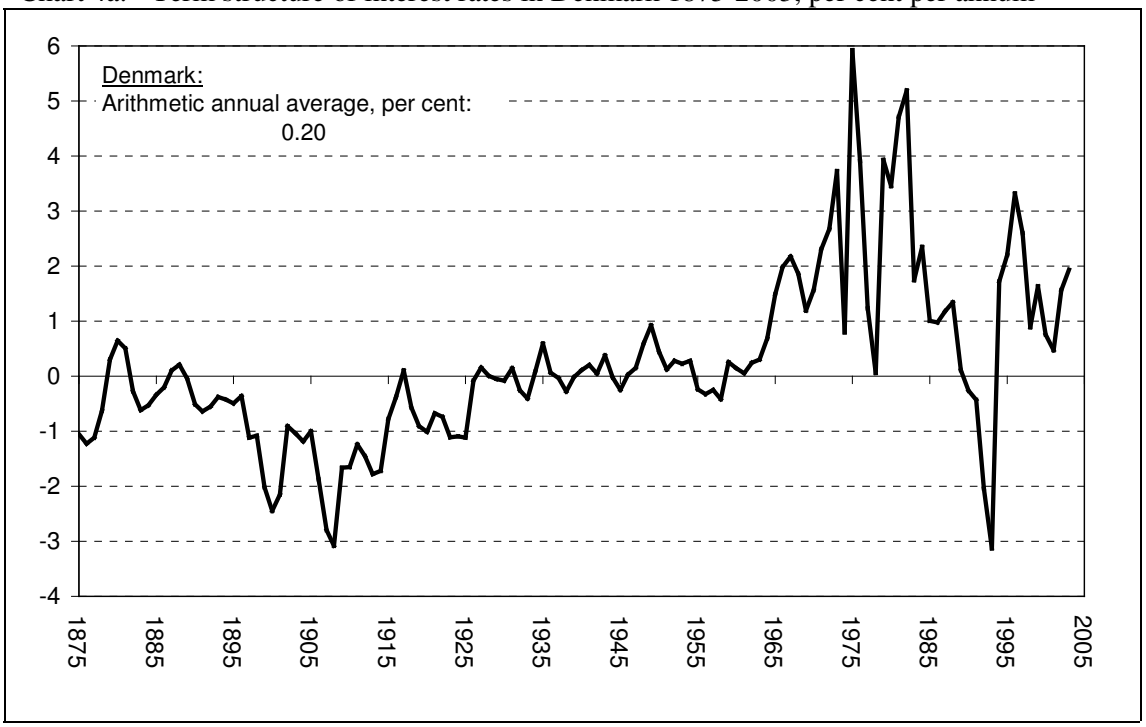
Sources: See appendix 2.

Chart 3d: 8-year rolling correlation coefficient between Danish interest rates 1882-2003



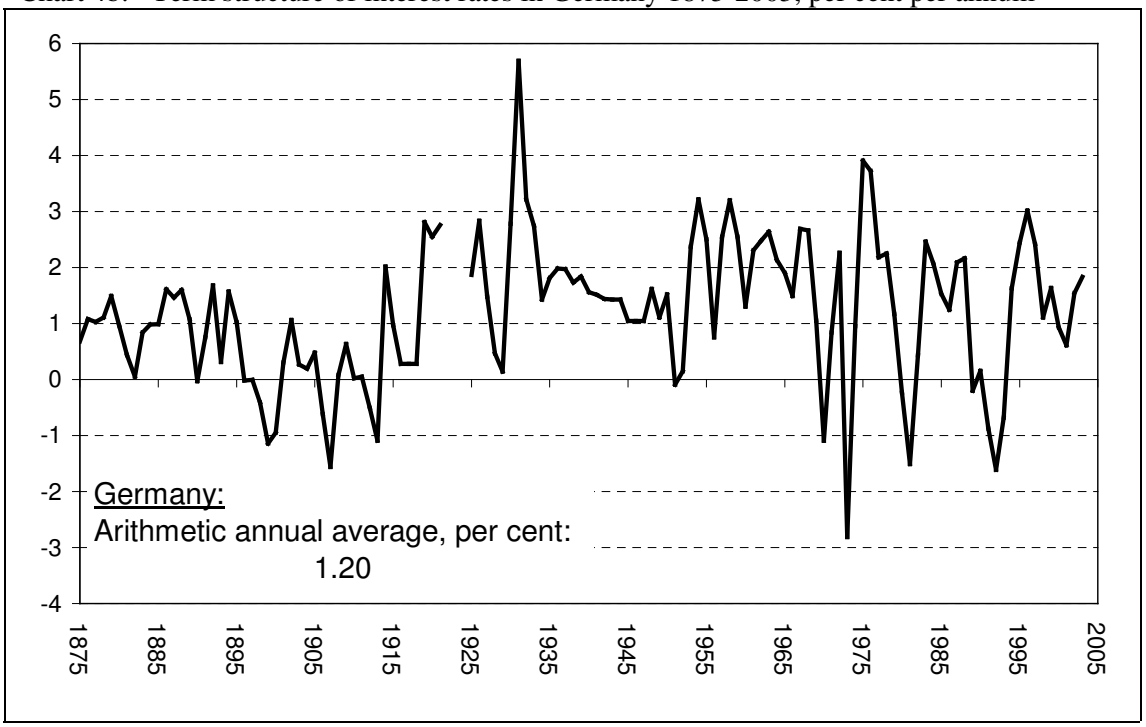
Sources: See appendix 2.

Chart 4a: Term structure of interest rates in Denmark 1875-2003, per cent per annum



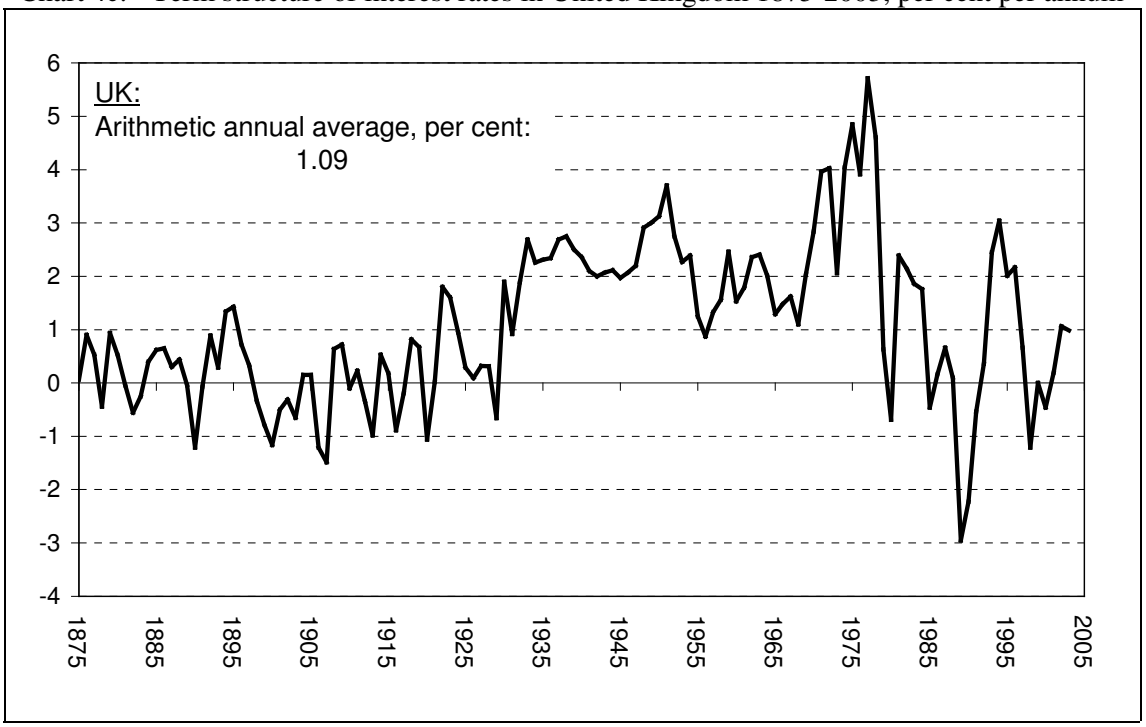
Note: The term structure of interest rates is measured as the spread between the government bond yield and the market rate of discount/money market rate.
Sources: See appendix 2.

Chart 4b: Term structure of interest rates in Germany 1875-2003, per cent per annum



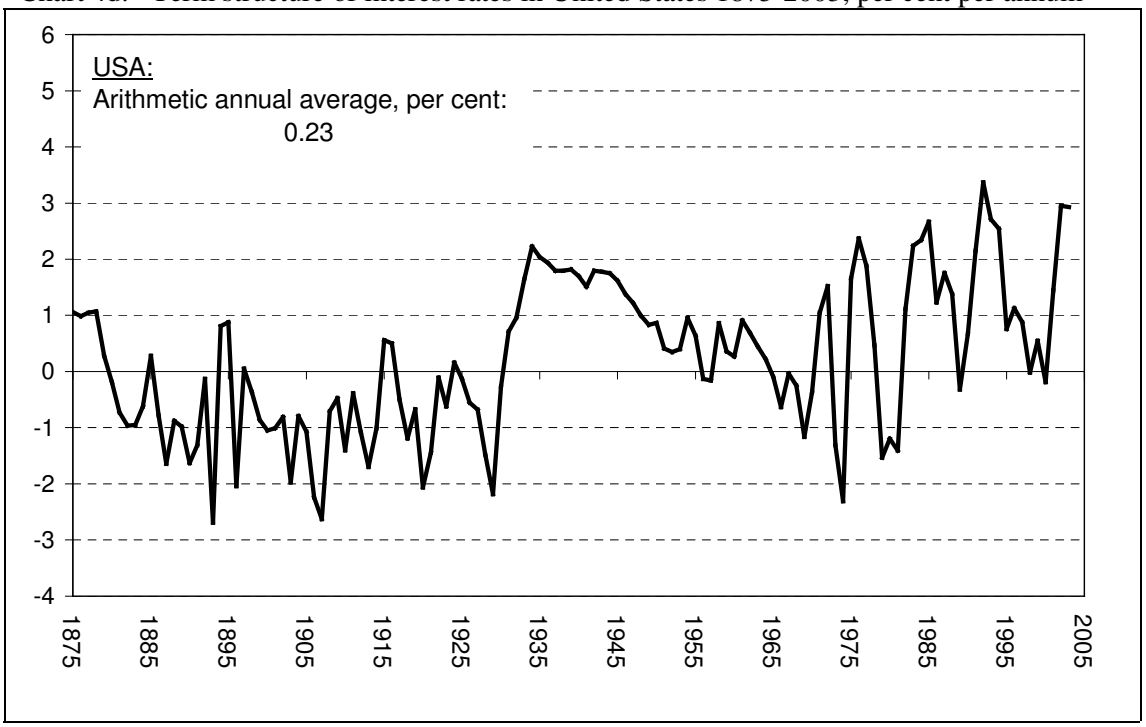
Notes: The term structure of interest rates is measured as the spread between the long-term and the short-term interest rate. The observations 1922-1924 (around the hyperinflation period) are omitted.
Sources: See appendix 2.

Chart 4c: Term structure of interest rates in United Kingdom 1875-2003, per cent per annum



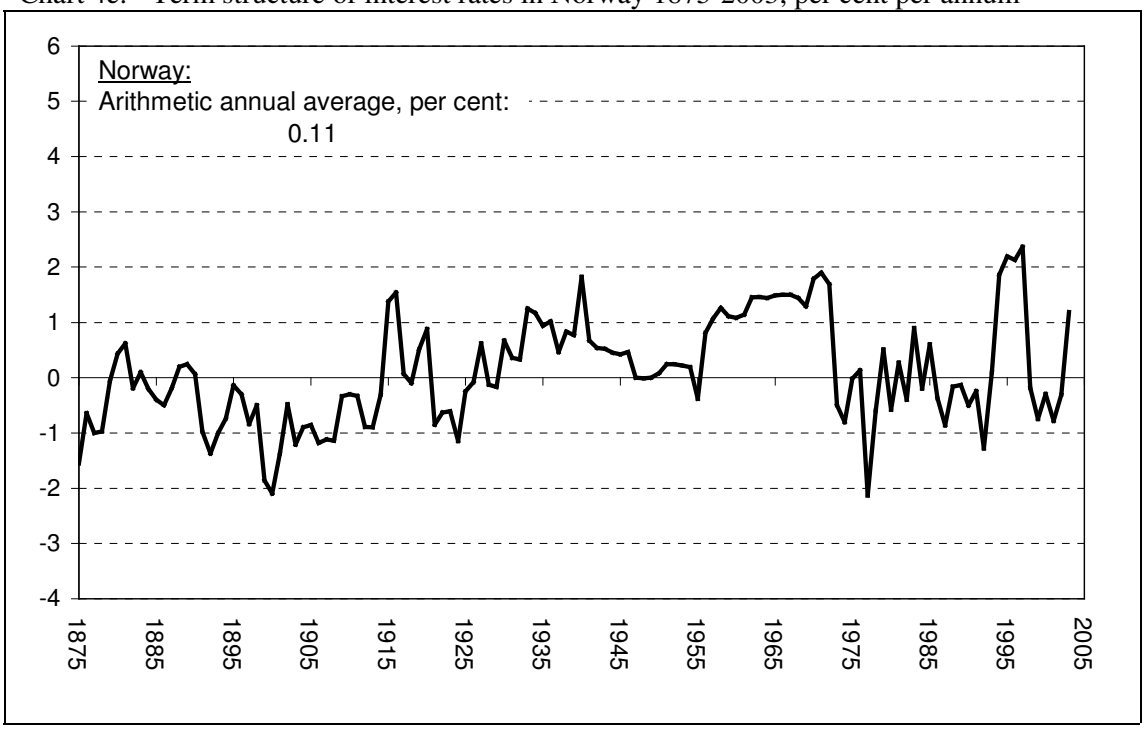
Note: The term structure of interest rates is measured as the spread between the long-term and the short-term interest rate.
Sources: See appendix 2.

Chart 4d: Term structure of interest rates in United States 1875-2003, per cent per annum



Note: The term structure of interest rates is measured as the spread between the long-term and the short-term interest rate.
Sources: See appendix 2.

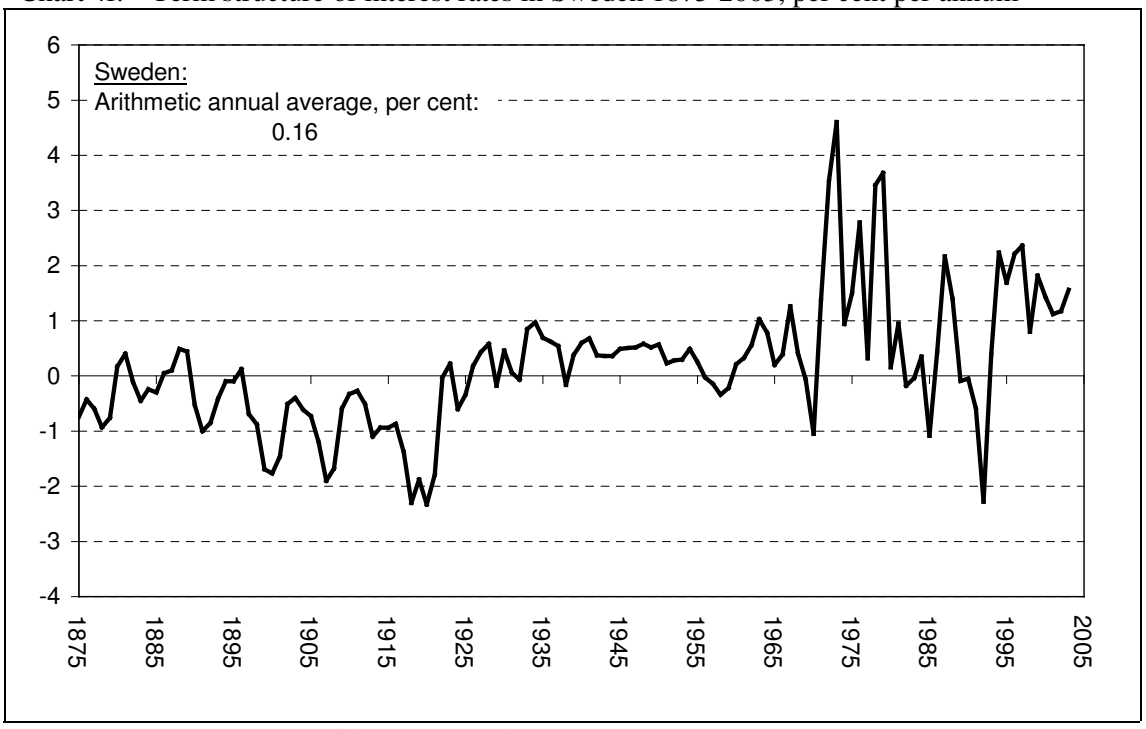
Chart 4e: Term structure of interest rates in Norway 1875-2003, per cent per annum



Note: The term structure of interest rates is measured as the spread between the long-term and the short-term interest rate.

Sources: See appendix 2.

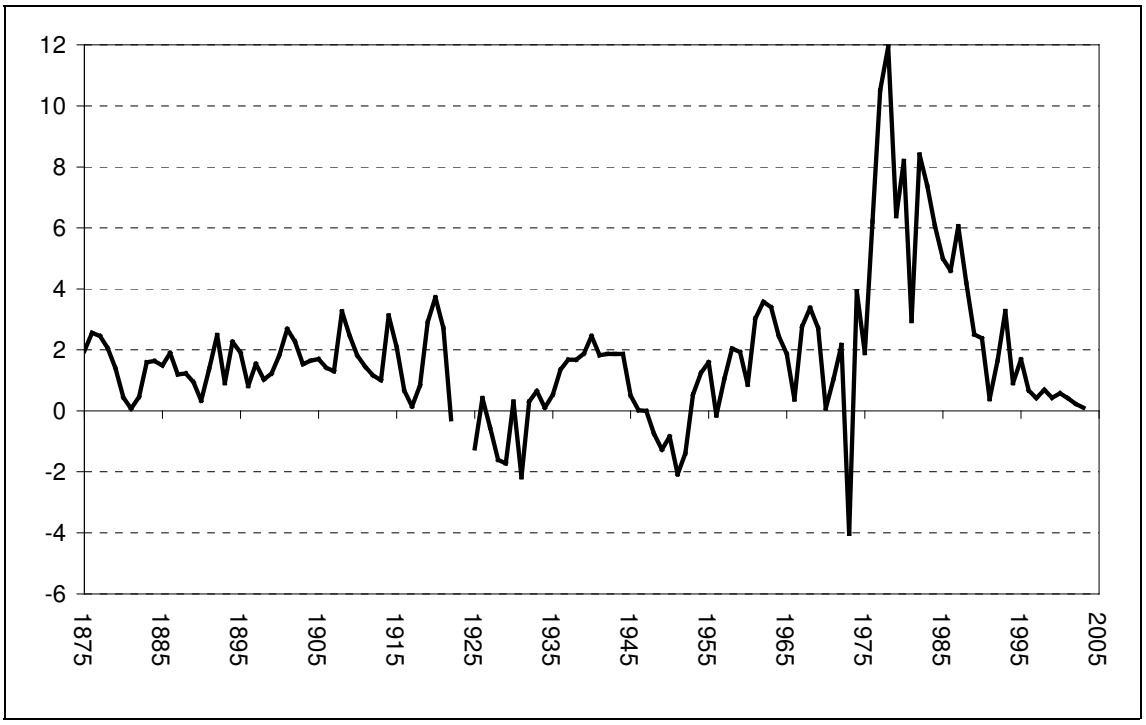
Chart 4f: Term structure of interest rates in Sweden 1875-2003, per cent per annum



Note: The term structure of interest rates is measured as the spread between the long-term and the short-term interest rate.

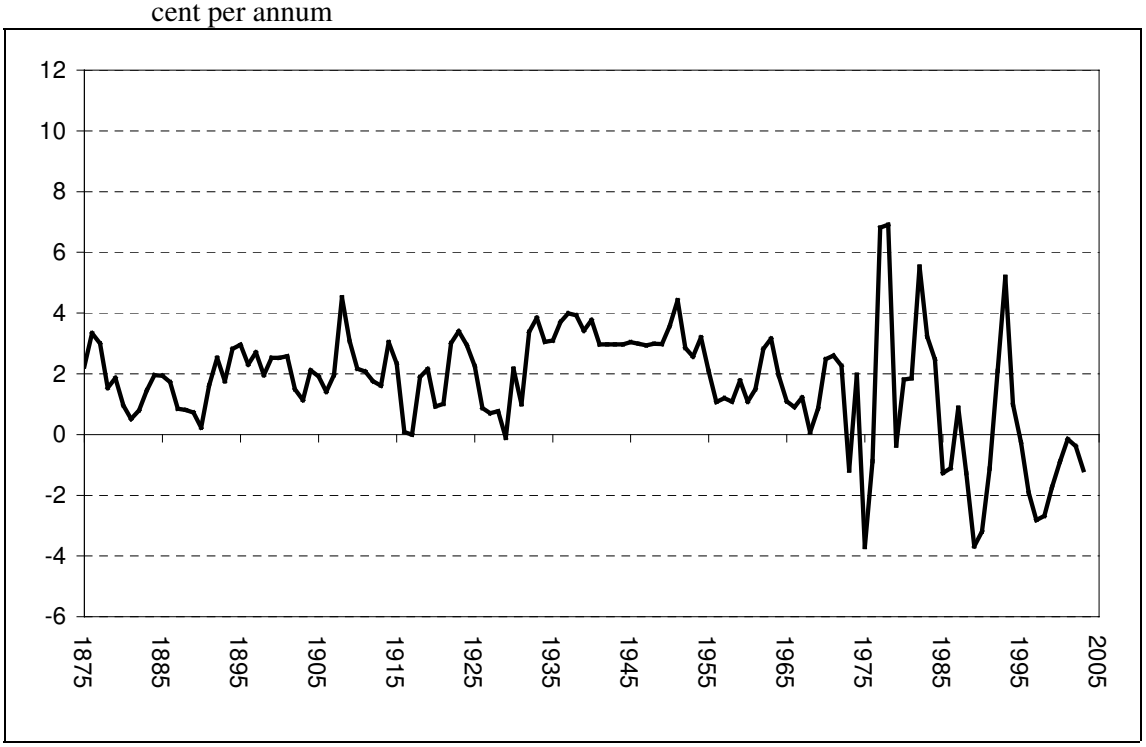
Sources: See appendix 2.

Chart 5a: Danish short-term interest rate spread vis-à-vis Germany 1875-2003, per cent per annum



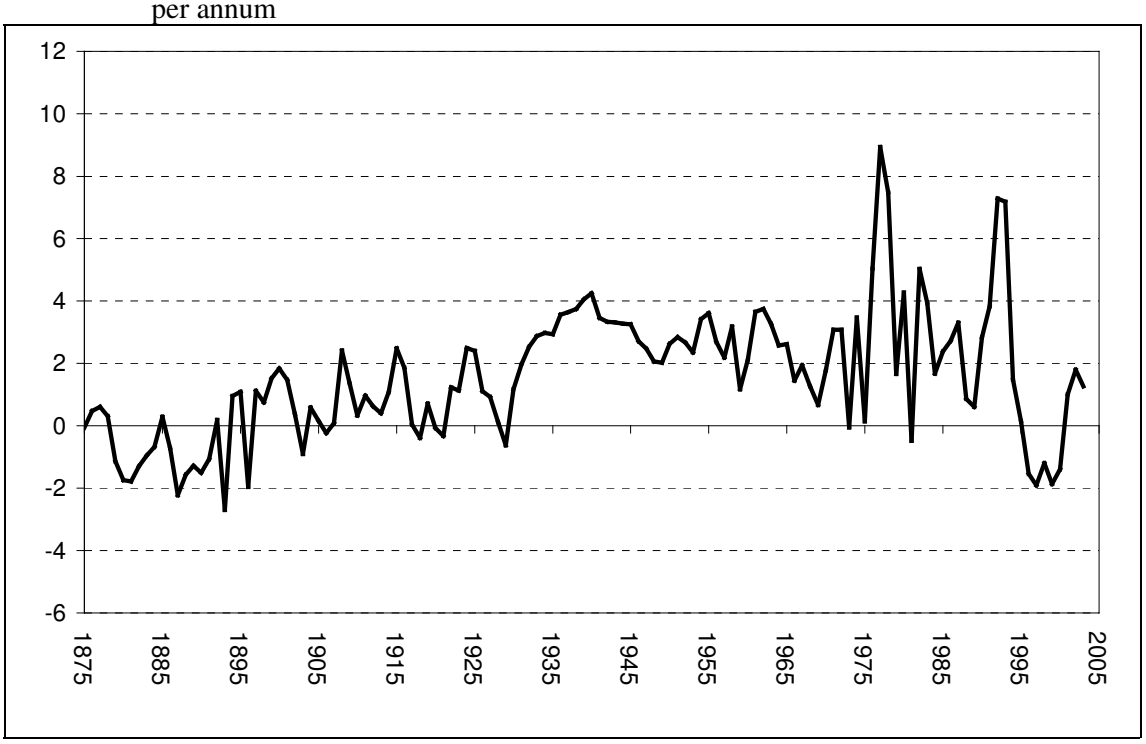
Notes: The short-term Danish interest rate is the market rate of discount/money market rate. The observations regarding 1923-1924 (around the hyperinflation period) are omitted.
Sources: See appendix 2.

Chart 5b: Danish short-term interest rate spread vis-à-vis United Kingdom 1875-2003, per cent per annum



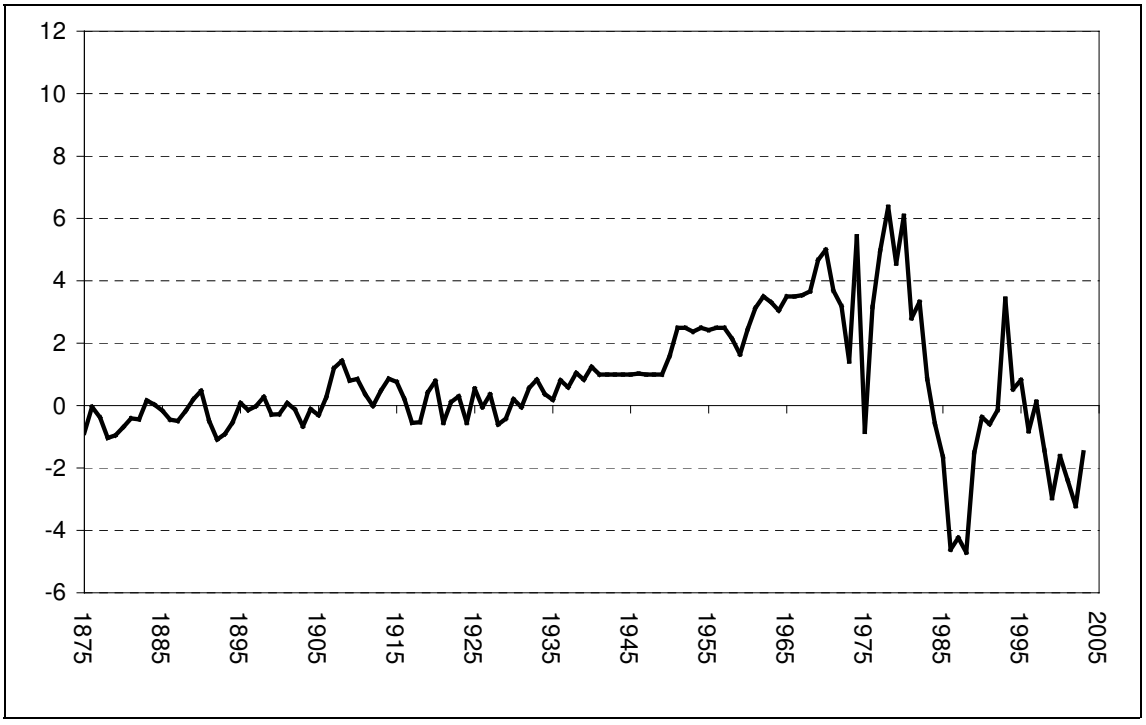
Notes: The short-term Danish interest rate is the market rate of discount/money market rate.
Sources: See appendix 2.

Chart 5c: Danish short-term interest rate spread vis-à-vis United States 1875-2003, per cent per annum



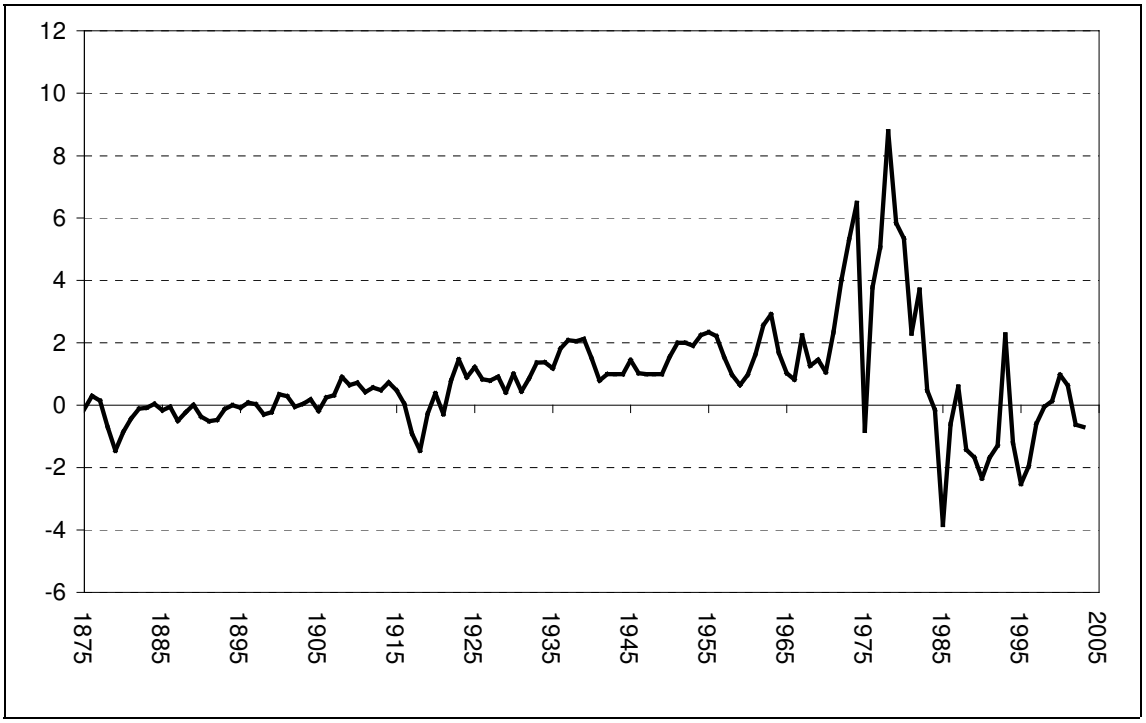
Notes: The short-term Danish interest rate is the market rate of discount/money market rate.
Sources: See appendix 2.

Chart 5d: Danish short-term interest rate spread vis-à-vis Norway 1875-2003, per cent per annum



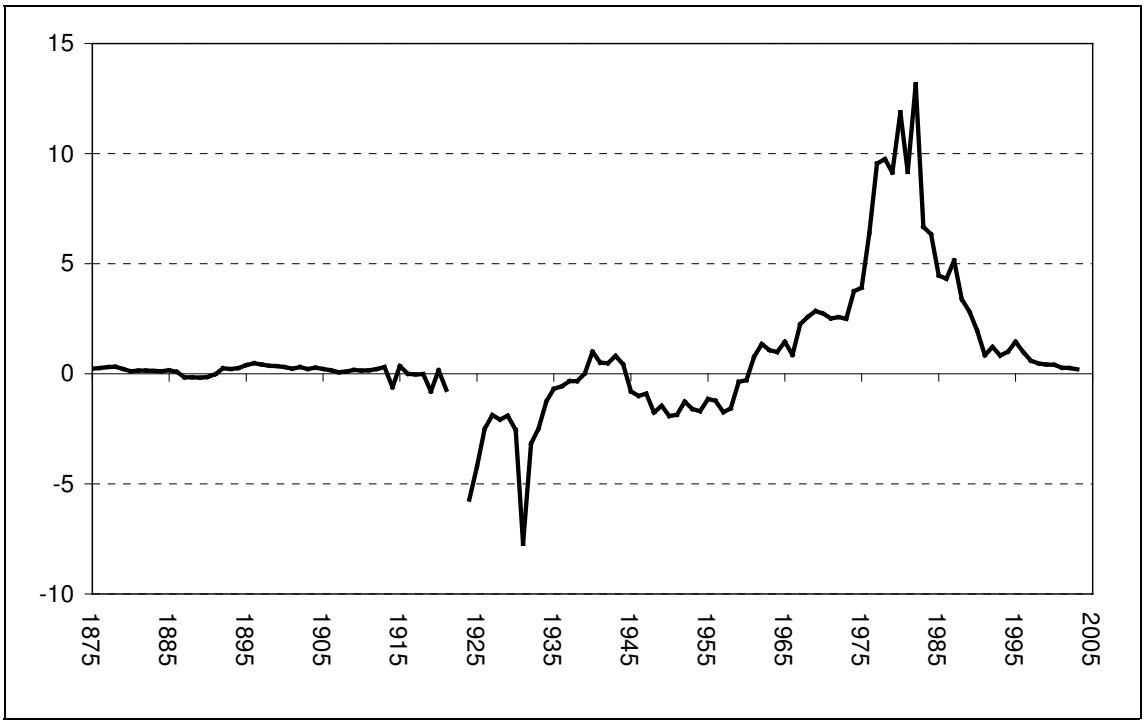
Notes: The short-term Danish interest rate is the market rate of discount/money market rate.
Sources: See appendix 2.

Chart 5e: Danish short-term interest rate spread vis-à-vis Sweden 1875-2003, per cent per annum



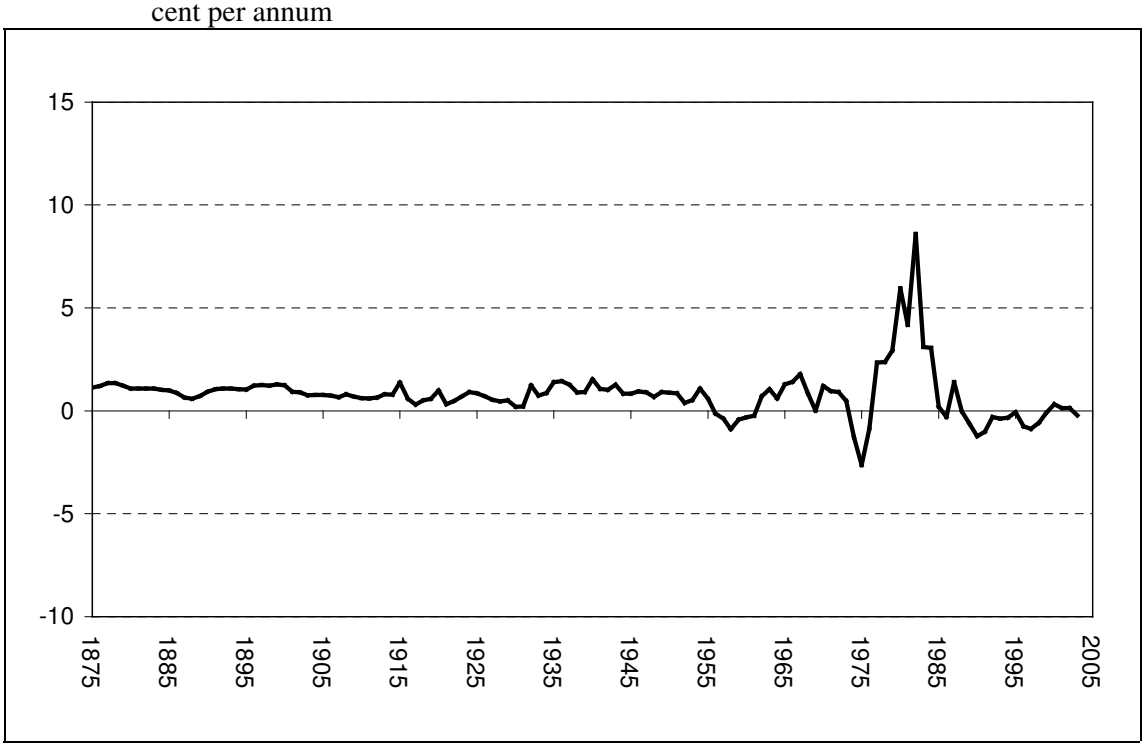
Notes: The short-term Danish interest rate is the market rate of discount/money market rate.
Sources: See appendix 2.

Chart 6a: Danish long-term interest rate spread vis-à-vis Germany 1875-2003, per cent per annum



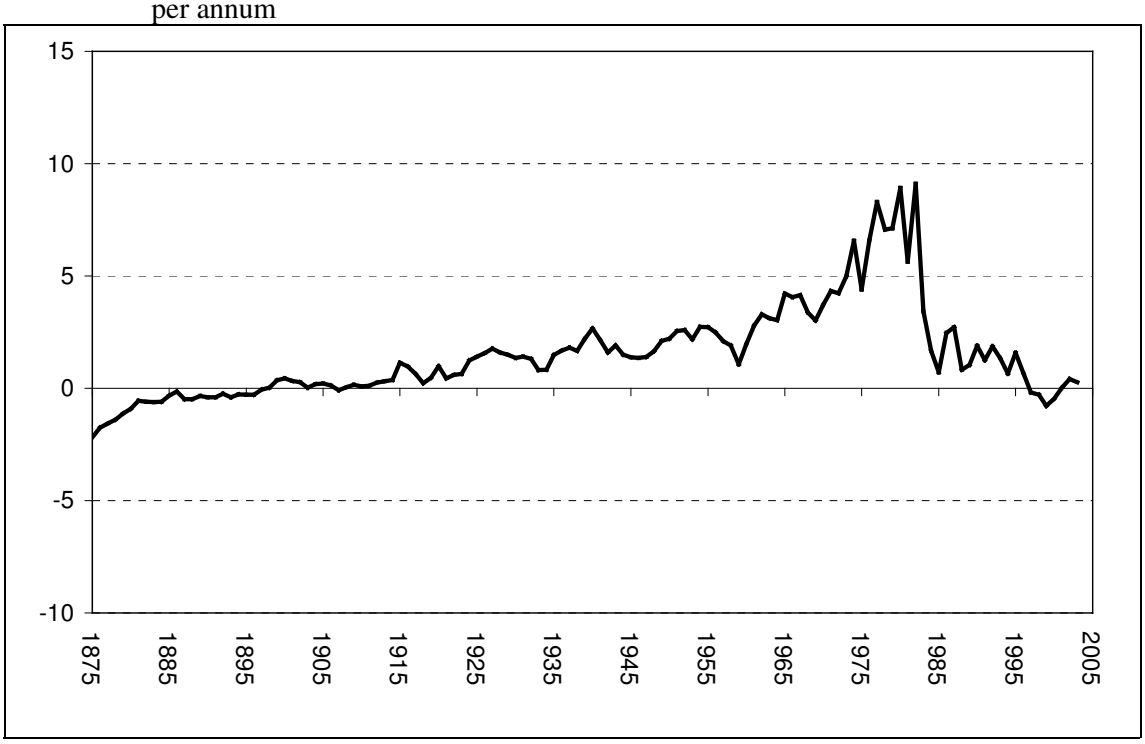
Notes: The long-term Danish interest rate is the government bond yield. The observations 1922-1923 (around the hyperinflation period) are omitted.
Sources: See appendix 2.

Chart 6b: Danish long-term interest rate spread vis-à-vis United Kingdom 1875-2003, per cent per annum



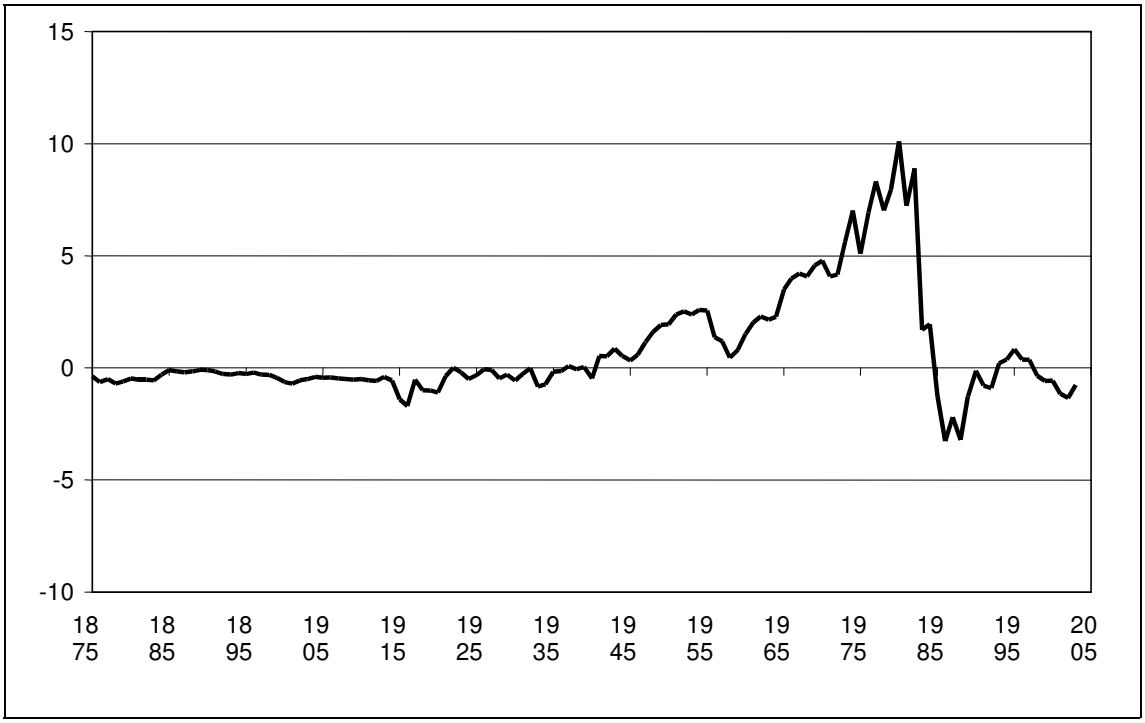
Notes: The long-term Danish interest rate is the government bond yield.
Sources: See appendix 2.

Chart 6c: Danish long-term interest rate spread vis-à-vis United States 1875-2003, per cent per annum



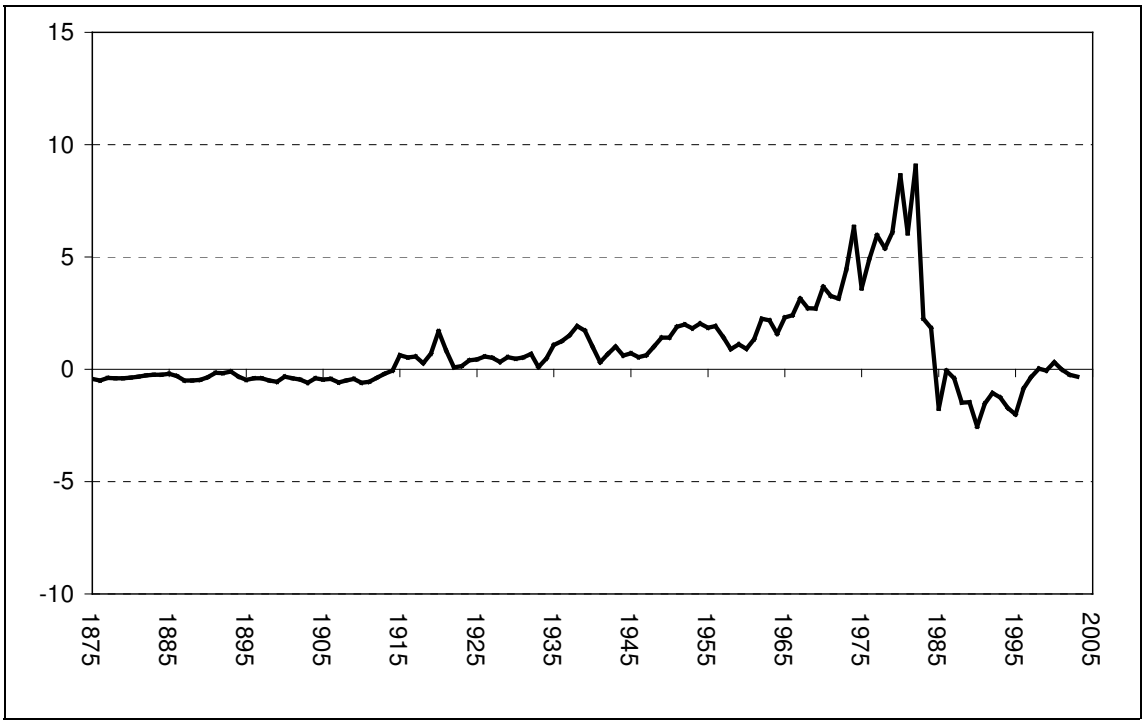
Notes: The long-term Danish interest rate is the government bond yield.
Sources: See appendix 2.

Chart 6d: Danish long-term interest rate spread vis-à-vis Norway 1875-2003, per cent per annum



Notes: The long-term Danish interest rate is the government bond yield.
Sources: See appendix 2.

Chart 6e: Danish long-term interest rate spread vis-à-vis Sweden 1875-2003, per cent per annum



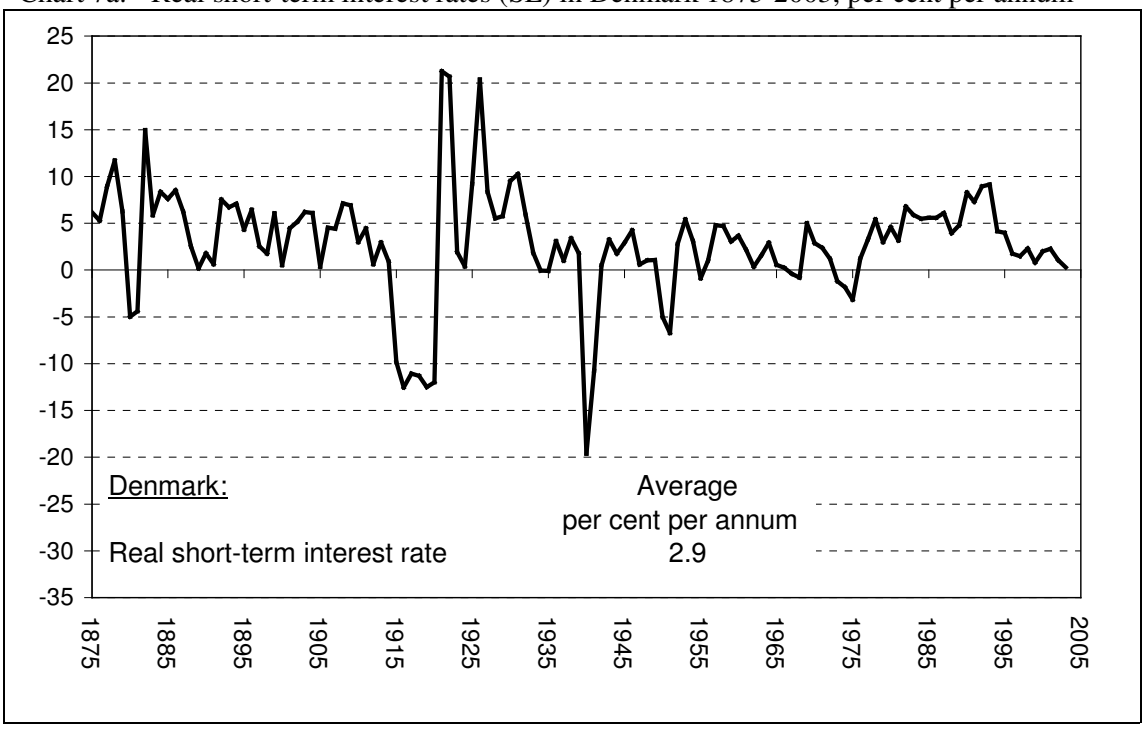
Notes: The long-term Danish interest rate is the government bond yield.
Sources: See appendix 2.

Table 4: Interest rates and inflation in Denmark 1875-2003 - Summary statistics

		Market rate of discount/ money market rate				Government bond yield				Term structure (a)	CPI inflation			
		Mean	Max	Min	Standard deviation	Mean	Max	Min	Standard deviation	Mean	Mean (b)	Max	Min	Standard deviation
		per cent per annum												
1875-1913	The Classical Gold Standard	4.73	6.78	3.34	0.87	3.81	4.50	3.43	0.31	-0.93	0.0	8.5	-10.6	3.8
1914-1945	World Wars and inter-war period	5.05	7.31	3.68	0.90	4.75	6.30	3.75	0.55	-0.29	3.8	24.4	-15.0	10.0
1946-1971	Bretton Woods	5.92	9.50	3.50	1.60	6.54	11.07	3.55	2.15	0.62	4.4	11.7	-0.7	3.0
1972-2003	European exchange-rate co-operation	9.19	16.93	2.38	4.20	10.93	22.11	4.31	4.74	1.74	5.6	15.2	1.3	3.9
	1972-1978 The Currency Snake	10.84	15.42	6.47	3.58	13.45	15.71	10.44	1.96	2.62	10.1	15.2	6.6	2.6
	1979-1998 ERM I	9.98	16.93	3.66	3.87	11.52	22.11	5.03	4.85	1.54	4.9	12.3	1.3	3.5
	1999-2003 ERM II	3.74	4.91	2.38	1.03	5.01	5.66	4.31	0.48	1.27	2.5	2.9	2.1	0.3
	1972-1986 The devaluation/"soft peg" period	12.09	16.93	6.47	3.32	14.87	22.11	10.20	3.58	2.78	9.1	15.2	3.6	3.0
	1987-2003 The unchanged parity/"hard peg" period	6.64	11.04	2.38	3.11	7.45	11.29	4.31	2.24	0.82	2.6	4.8	1.3	1.0
1875-2003	Total	6.16	16.93	2.38	2.90	6.36	22.11	3.43	3.78	0.20	3.2	24.4	-15.0	6.2

Notes:
(a) Spread between the government bond yield and the market rate of discount/money market rate.
(b) Arithmetic average.
Sources and data definitions: See appendix 2.

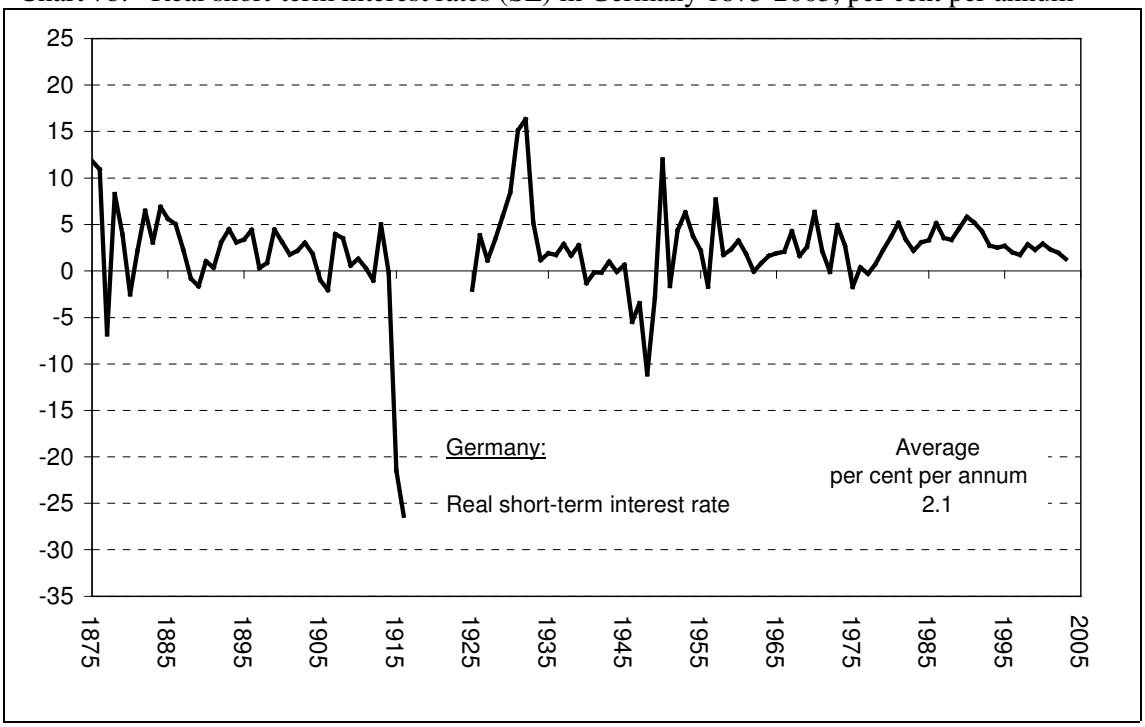
Chart 7a: Real short-term interest rates (SE) in Denmark 1875-2003, per cent per annum



Notes: The "real short-term interest rate (SE)" is measured as the difference between the contemporaneous short-term nominal interest rate and the contemporaneous rate of consumer price inflation. The short-term Danish interest rate is the market rate of discount/money market rate.

Sources: See appendix 2.

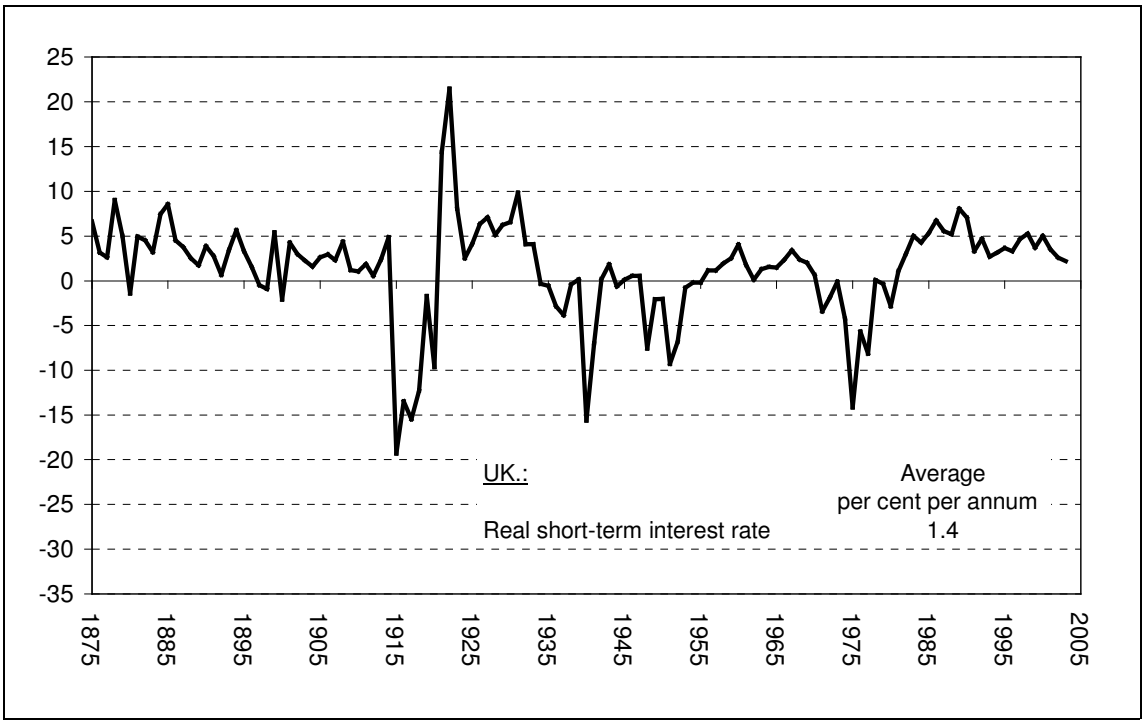
Chart 7b: Real short-term interest rates (SE) in Germany 1875-2003, per cent per annum



Notes: The "real short-term interest rate (SE)" is measured as the difference between the contemporaneous short-term nominal interest rate and the contemporaneous rate of consumer price inflation. The observations 1917-1924 (around the hyperinflation period) are omitted.

Sources: See appendix 2.

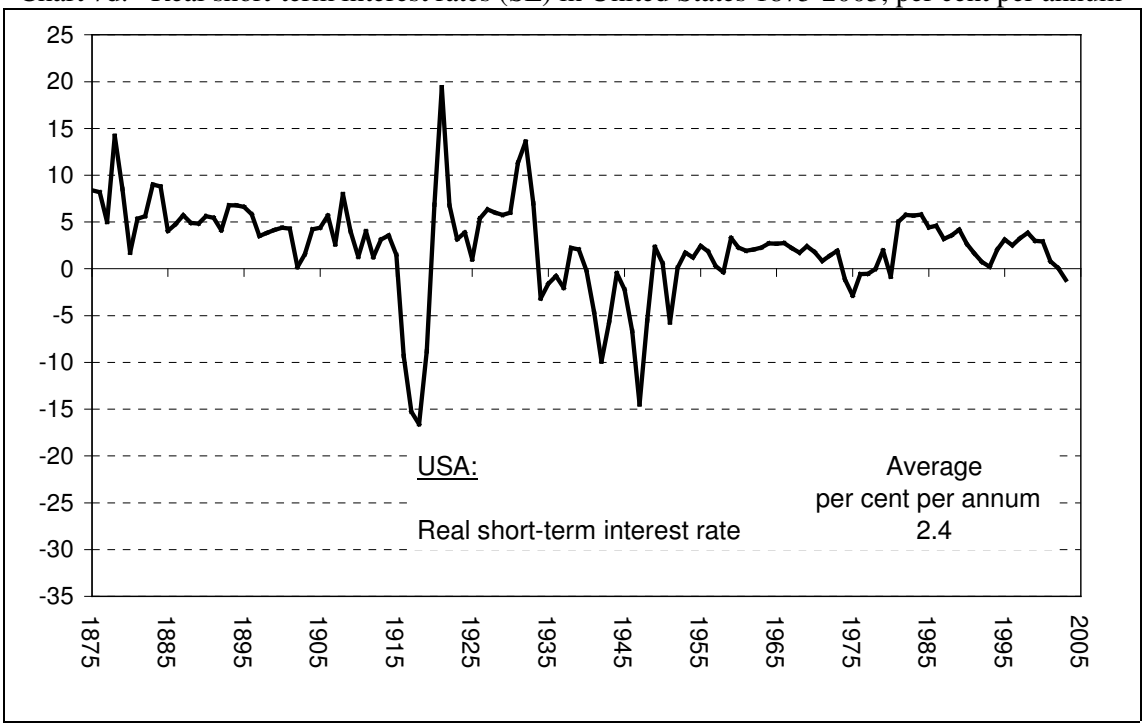
Chart 7c: Real short-term interest rates (SE) in United Kingdom 1875-2003, per cent per annum



Notes: The "real short-term interest rate (SE)" is measured as the difference between the contemporaneous short-term nominal interest rate and the contemporaneous rate of consumer price inflation.

Sources: See appendix 2.

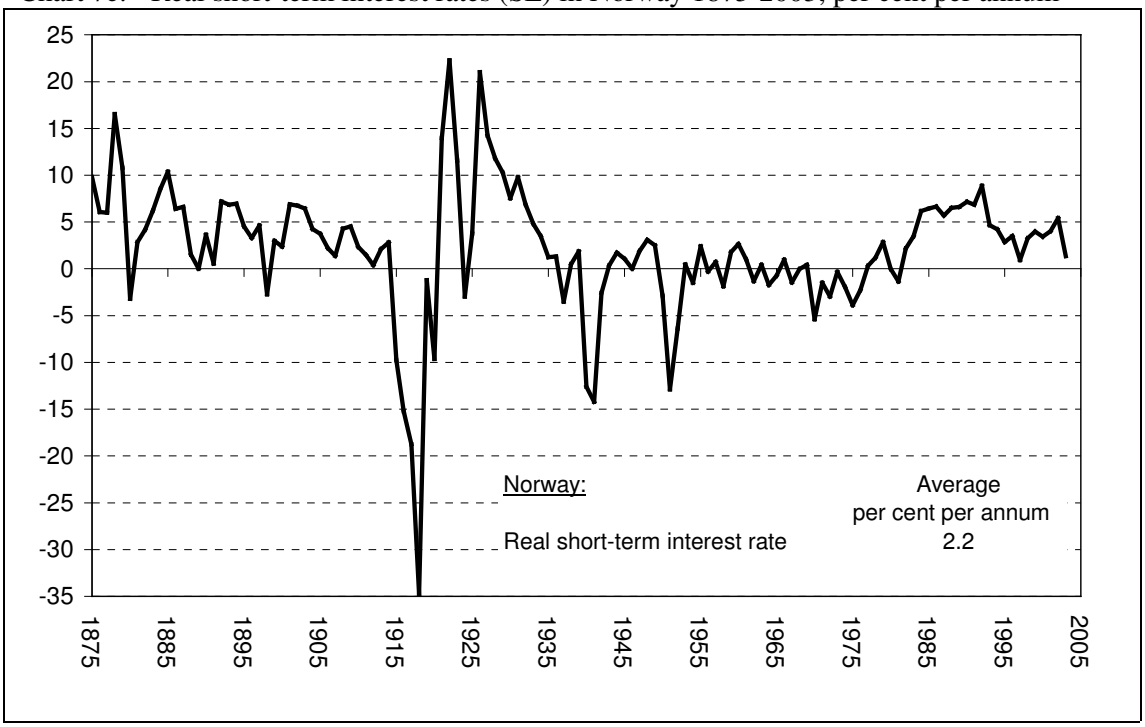
Chart 7d: Real short-term interest rates (SE) in United States 1875-2003, per cent per annum



Notes: The "real short-term interest rate (SE)" is measured as the difference between the contemporaneous short-term nominal interest rate and the contemporaneous rate of consumer price inflation.

Sources: See appendix 2.

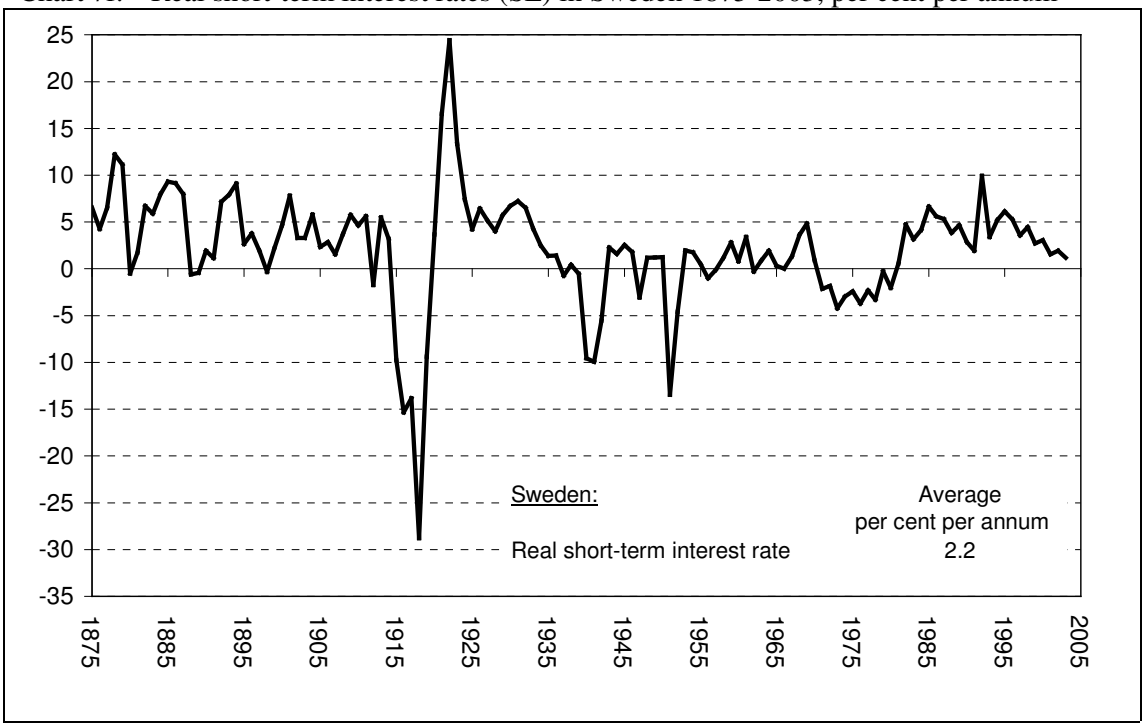
Chart 7e: Real short-term interest rates (SE) in Norway 1875-2003, per cent per annum



Notes: The "real short-term interest rate (SE)" is measured as the difference between the contemporaneous short-term nominal interest rate and the contemporaneous rate of consumer price inflation.

Sources: See appendix 2.

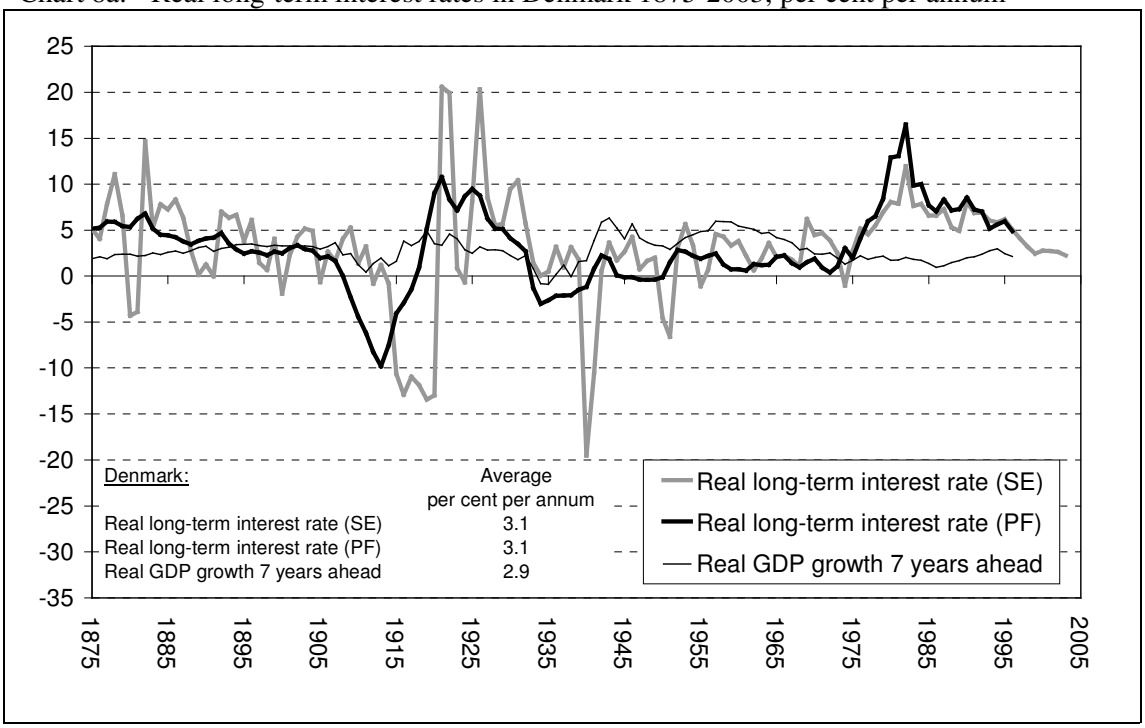
Chart 7f: Real short-term interest rates (SE) in Sweden 1875-2003, per cent per annum



Notes: The "real short-term interest rate (SE)" is measured as the difference between the contemporaneous short-term nominal interest rate and the contemporaneous rate of consumer price inflation.

Sources: See appendix 2.

Chart 8a: Real long-term interest rates in Denmark 1875-2003, per cent per annum

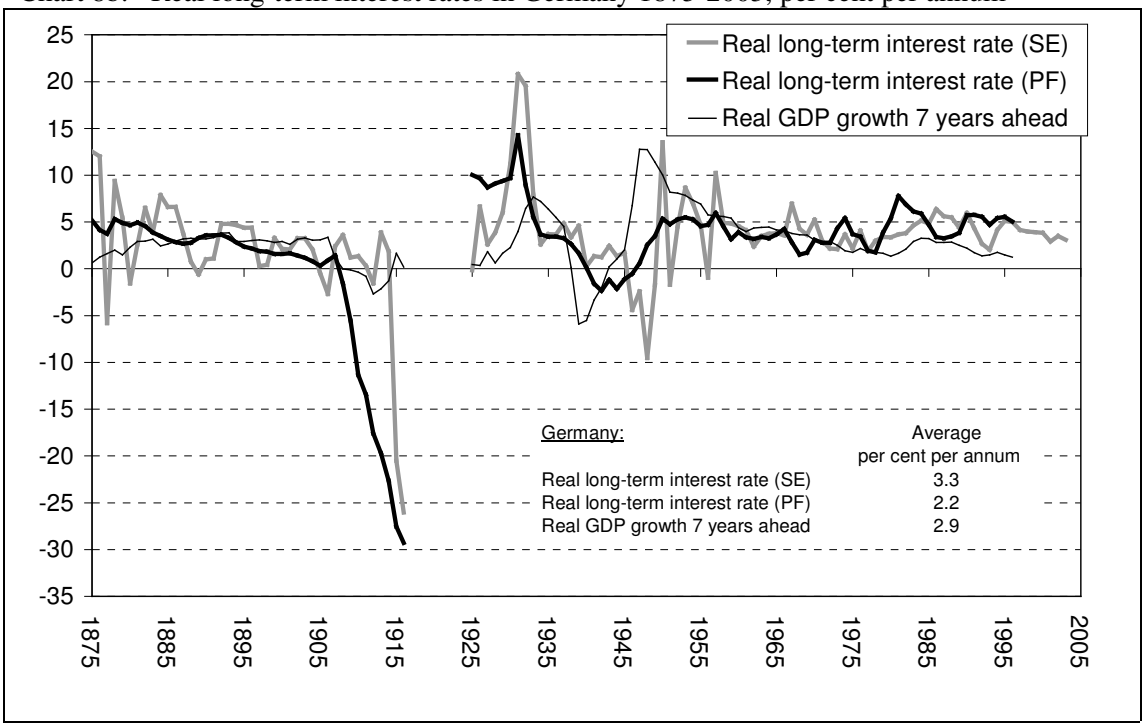


Notes: The "real long-term interest rate (SE)" is measured as the difference between the contemporaneous nominal long-term interest rate and the contemporaneous rate of consumer price inflation.

The "real long-term interest rate (PF)" is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average consumer price inflation 7 years ahead. Therefore, the last observation is 1996.

Sources: See appendix 2.

Chart 8b: Real long-term interest rates in Germany 1875-2003, per cent per annum



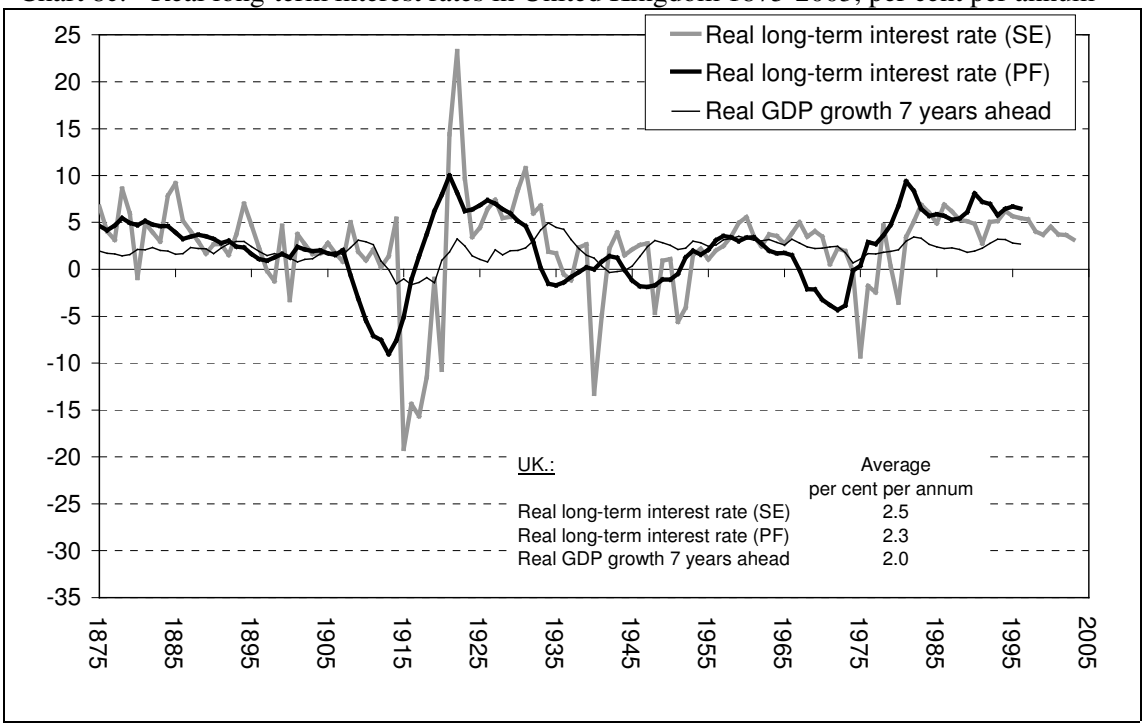
Notes: The "real long-term interest rate (SE)" is measured as the difference between the contemporaneous nominal long-term interest rate and the contemporaneous rate of consumer price inflation.

The "real long-term interest rate (PF)" is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average consumer price inflation 7 years ahead. Therefore, the last observation is 1996.

The observations for 1917-1924 (around the hyperinflation period) are omitted.

Sources: See appendix 2.

Chart 8c: Real long-term interest rates in United Kingdom 1875-2003, per cent per annum

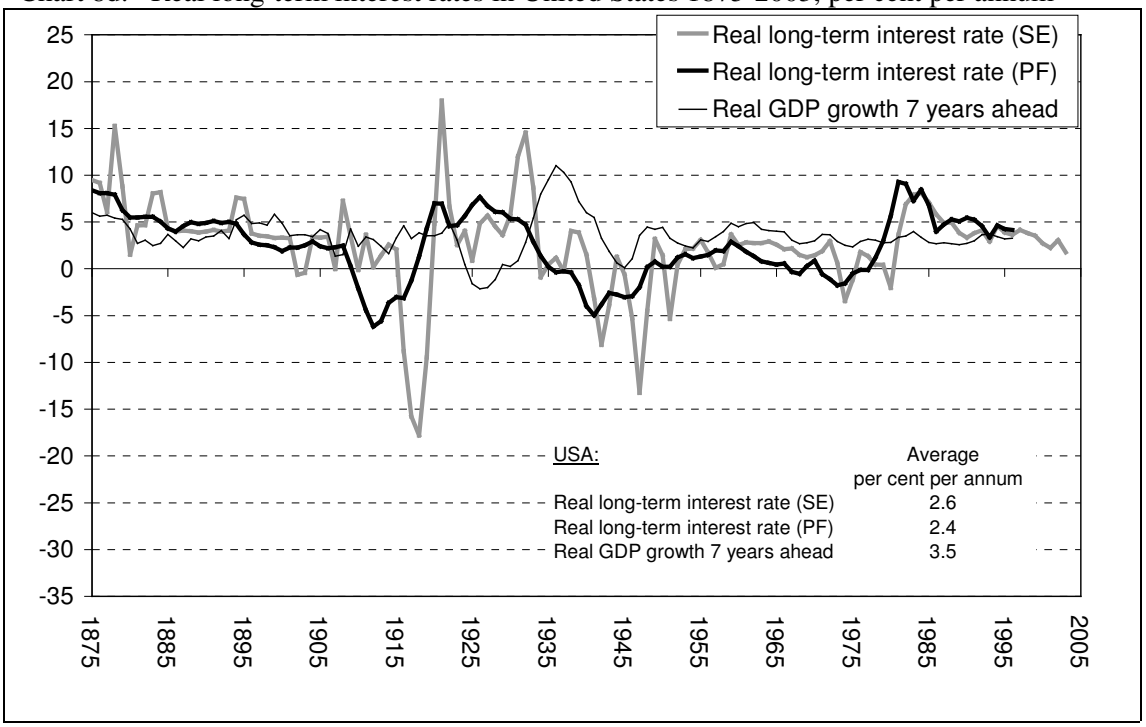


Notes: The "real long-term interest rate (SE)" is measured as the difference between the contemporaneous nominal long-term interest rate and the contemporaneous rate of consumer price inflation.

The "real long-term interest rate (PF)" is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average consumer price inflation 7 years ahead. Therefore, the last observation is 1996.

Sources: See appendix 2.

Chart 8d: Real long-term interest rates in United States 1875-2003, per cent per annum

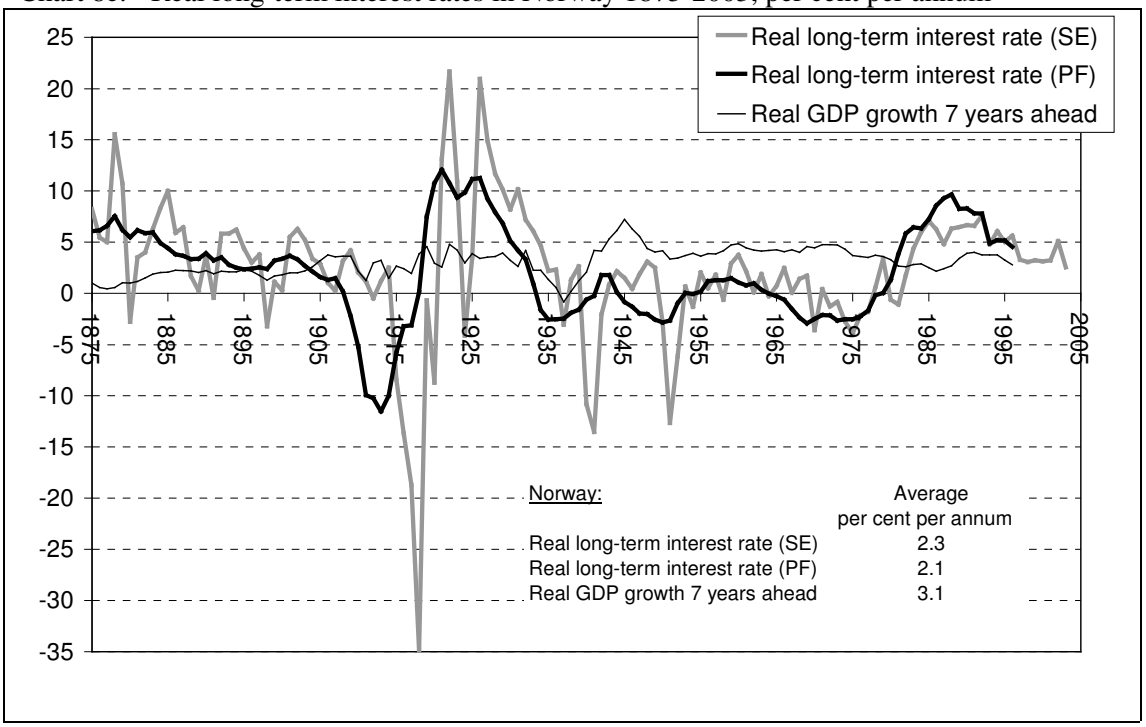


Notes: The "real long-term interest rate (SE)" is measured as the difference between the contemporaneous nominal long-term interest rate and the contemporaneous rate of consumer price inflation.

The "real long-term interest rate (PF)" is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average consumer price inflation 7 years ahead. Therefore, the last observation is 1996.

Sources: See appendix 2.

Chart 8e: Real long-term interest rates in Norway 1875-2003, per cent per annum

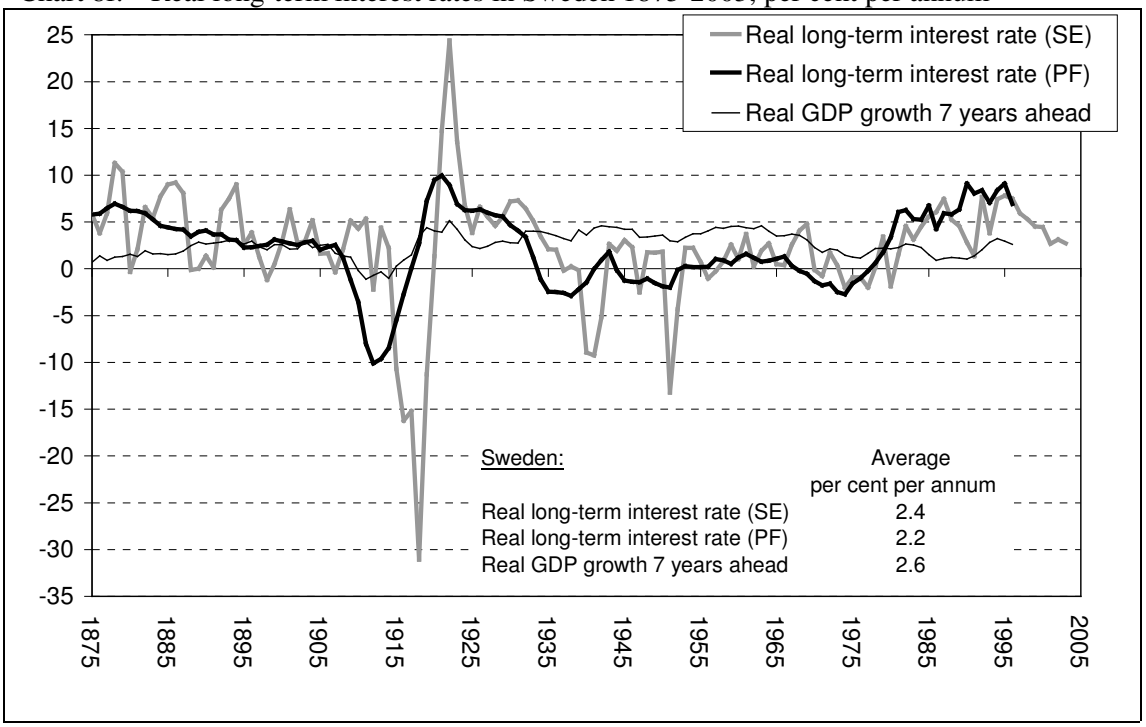


Notes: The "real long-term interest rate (SE)" is measured as the difference between the contemporaneous nominal long-term interest rate and the contemporaneous rate of consumer price inflation.

The "real long-term interest rate (PF)" is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average consumer price inflation 7 years ahead. Therefore, the last observation is 1996.

Sources: See appendix 2.

Chart 8f: Real long-term interest rates in Sweden 1875-2003, per cent per annum

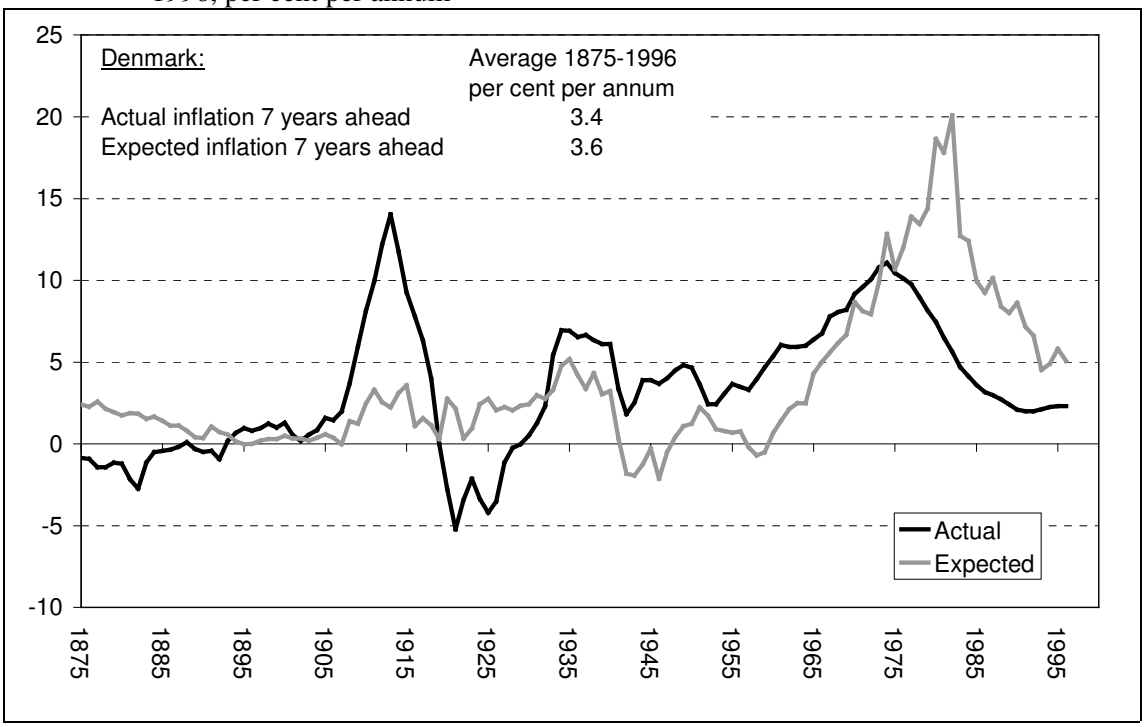


Notes: The "real long-term interest rate (SE)" is measured as the difference between the contemporaneous nominal long-term interest rate and the contemporaneous rate of consumer price inflation.

The "real long-term interest rate (PF)" is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average consumer price inflation 7 years ahead. Therefore, the last observation is 1996.

Sources: See appendix 2.

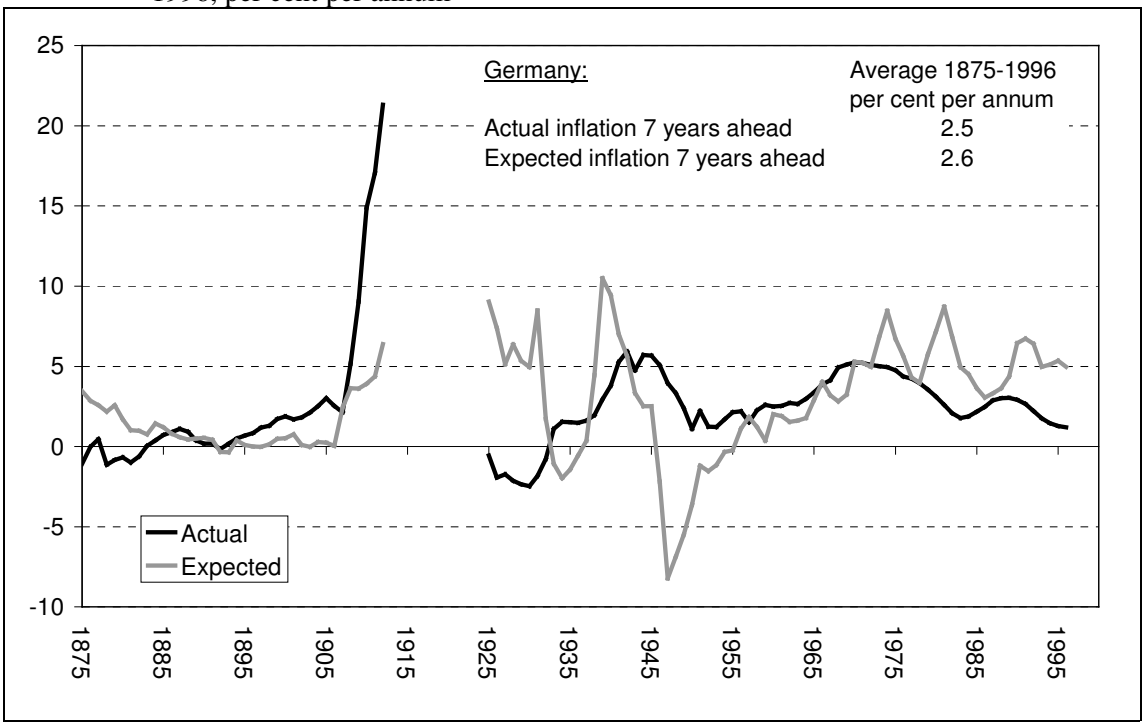
Chart 9a: Actual and expected consumer price inflation 7 years ahead in Denmark 1875-1996, per cent per annum



Notes: The expected consumer price inflation 7 years ahead is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average growth rate in real GDP 7 years ahead.

Sources: See appendix 2.

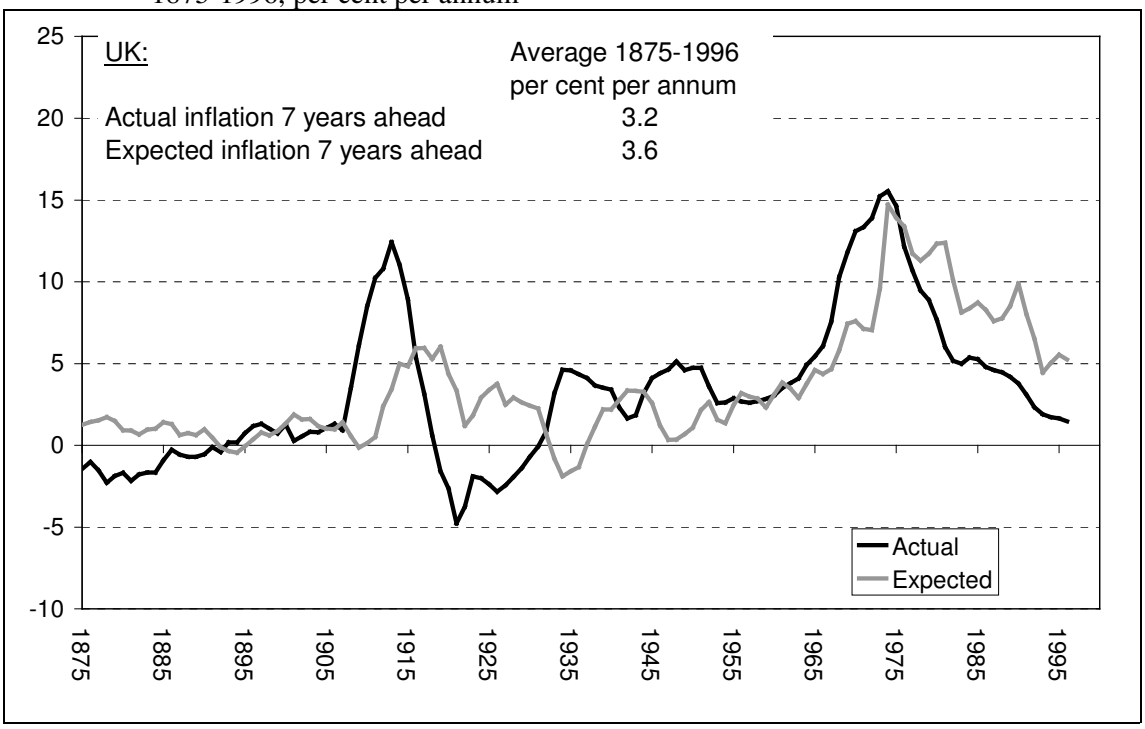
Chart 9b: Actual and expected consumer price inflation 7 years ahead in Germany 1875-1996, per cent per annum



Notes: The expected consumer price inflation 7 years ahead is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average growth rate in real GDP 7 years ahead.
The observations 1913-1924 (around World War I and the hyperinflation period) are omitted.

Sources: See appendix 2.

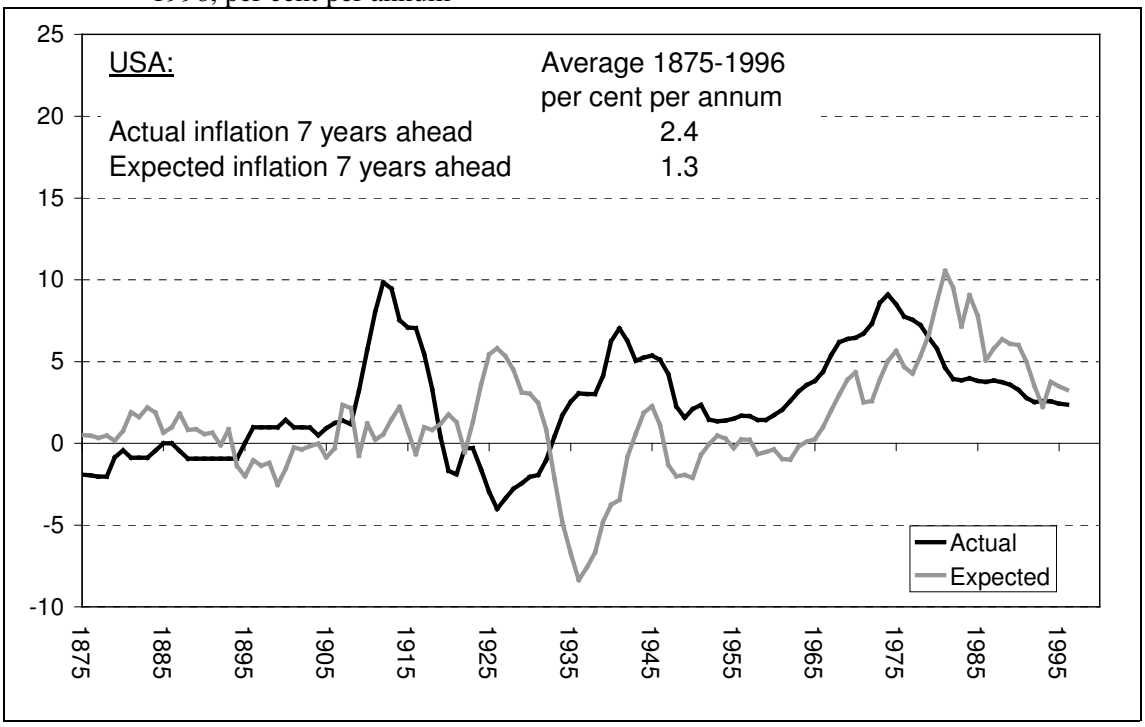
Chart 9c: Actual and expected consumer price inflation 7 years ahead in United Kingdom 1875-1996, per cent per annum



Notes: The expected consumer price inflation 7 years ahead is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average growth rate in real GDP 7 years ahead.

Sources: See appendix 2.

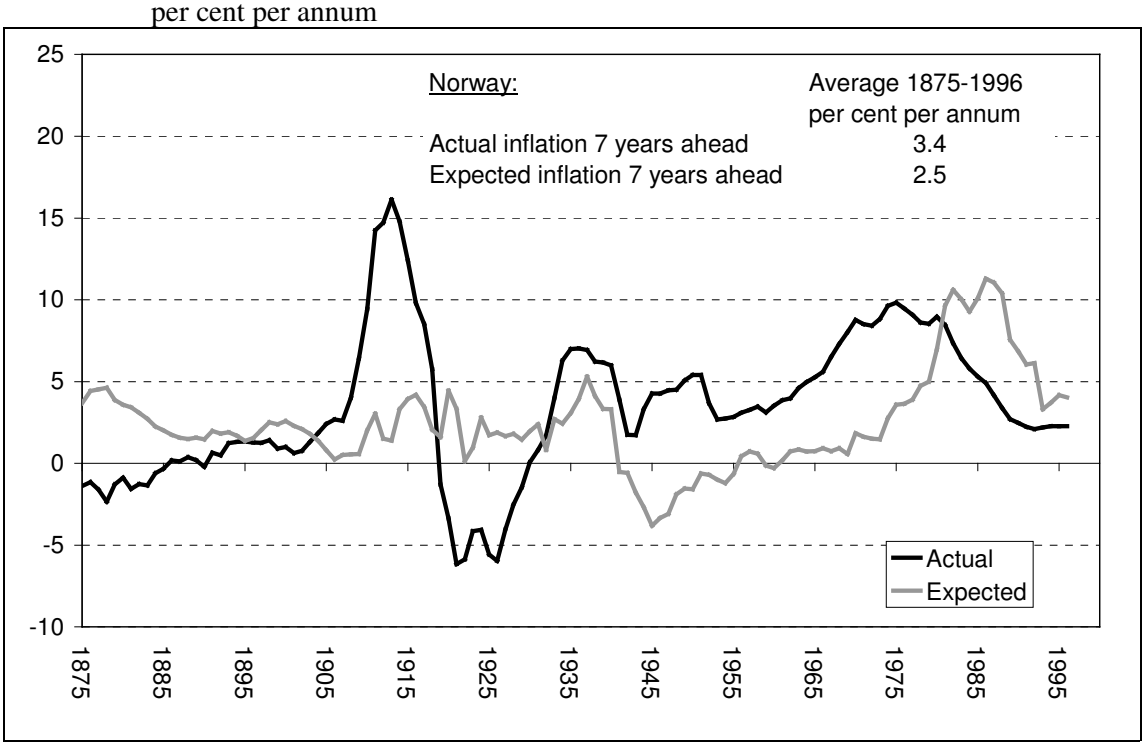
Chart 9d: Actual and expected consumer price inflation 7 years ahead in United States 1875-1996, per cent per annum



Notes: The expected consumer price inflation 7 years ahead is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average growth rate in real GDP 7 years ahead.

Sources: See appendix 2.

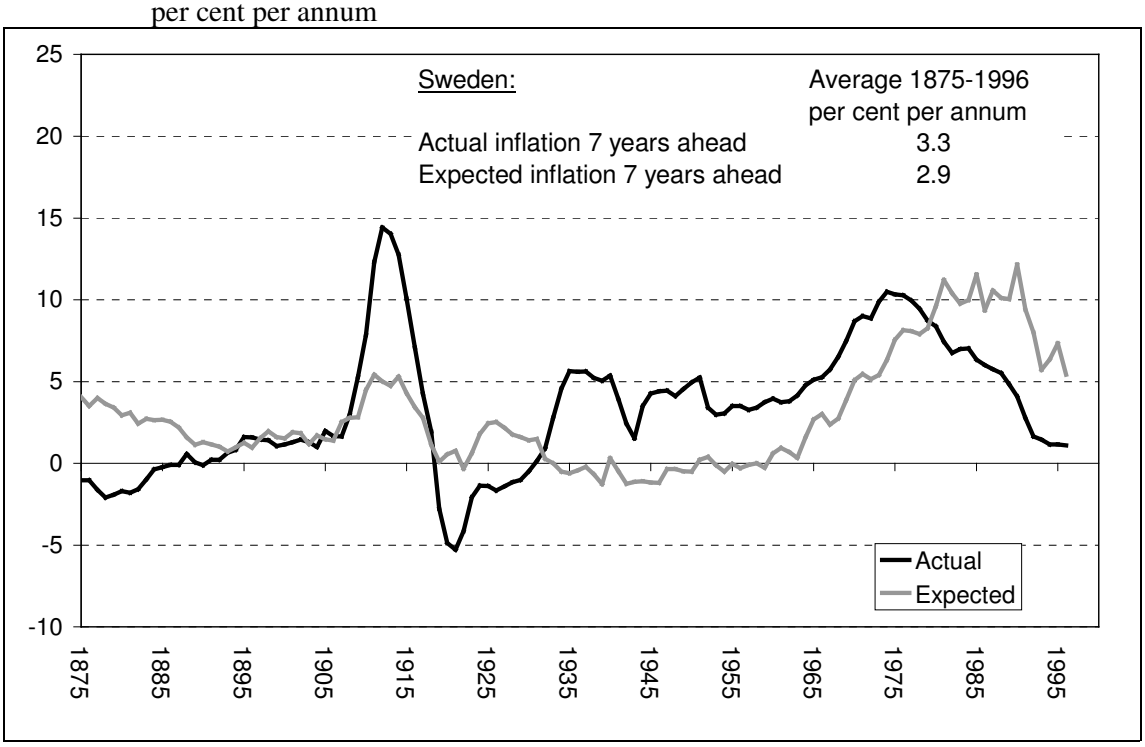
Chart 9e: Actual and expected consumer price inflation 7 years ahead in Norway 1875-1996, per cent per annum



Notes: The expected consumer price inflation 7 years ahead is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average growth rate in real GDP 7 years ahead.

Sources: See appendix 2.

Chart 9f: Actual and expected consumer price inflation 7 years ahead in Sweden 1875-1996, per cent per annum



Notes: The expected consumer price inflation 7 years ahead is measured as the difference between the contemporaneous nominal long-term interest rate and the annual average growth rate in real GDP 7 years ahead.

Sources: See appendix 2.